Entrepreneurship & Sales

First edition | 10 units | 50 lessons + exams | A video for every lesson

FIRST EDITION

Course guide

This is a one-year course in starting and running a business honestly. Its ten units follow the life of a venture: who the entrepreneur is and what makes him or her trustworthy; how to find a real need and test an idea cheaply; how to turn it into a business model and a written plan; how to do the numbers (start-up costs, pricing, unit economics, break-even, projected statements and cash); how businesses have been financed, from the Medici partnerships and the Dutch East India Company to the first venture-capital fund; marketing, brands and honest advertising; selling as a service to the customer; operations, quality and the supply chain; the law, ethics and the six stakeholders; and, in the last unit, a real small venture the student chooses, launches, keeps books on and pitches.

Every lesson follows the same path. First comes **the story**: a real person and a real business at a turning point. Then **how they figured it out**: what stood in the way, what they tried, what failed, what they counted and what they changed. Then **the big idea** underneath, stated plainly with its vocabulary and, where it helps, a formula. Then **in business today**: how the idea is used now and what an honest person does with it. Worked examples show the reasoning and the arithmetic step by step, a project puts the idea to work with real numbers, and a practice set with answers fixes it in place.

Businesses are weighed throughout by what they meant for **six stakeholders**: the financiers who lent or invested, the risk-takers who started and owned them, the builders who designed and made the product, the workers, the customers and the community. A business may be big without being great; it is great when it creates real value and serves all six over a long time. Each unit ends with a 100-point test and a portfolio project, there is a midterm after Unit 5 and a final after Unit 10, and the year closes with a pitch of the student's own venture to family "investors."

> Most videos come from museums, foundations and company archives (The Henry Ford, the Kauffman Foundation, LeTourneau

> University, the Deming Institute, Heinz), university and teaching sources (MIT, Stanford Graduate School of Business, Khan Academy, Accounting Stuff), government and international agencies (the Federal Trade Commission, the World Intellectual Property Organization), public television (WPSU, the Smithsonian Channel, Biz Kid$) and a few trusted business-history channels chosen lesson by lesson. Every video was checked for content and accuracy before it was chosen, and none comes from a channel that takes sides in present-day public debates or sells a course or scheme. Some videos end with an invitation to subscribe or a short sponsor message; stop when the teaching ends. Tax and legal rules mentioned in videos change over time, so check current official sources with a parent.

Start with Lesson 1.1 →

Who it is for

Written for students in grades 9–12 who are comfortable with arithmetic, percents and simple algebra (solving a one-step equation, using a formula). No earlier business course is needed, though the School Launch K–8 business courses make a good foundation. Students work fairly independently; a parent or mentor checks practice sets against the answers, discusses the essay questions, plays customer or investor in the projects and supervises every real sale. Nothing needs to be bought beyond a calculator, a notebook and free spreadsheet software.

How to use this course

1. **The weekly rhythm.** The course has 50 lessons in 10 units. Each lesson takes three sessions of about 50 minutes: (1) the video, the teaching and the worked examples; (2) the project and the ledger notebook; (3) the practice set and corrections. A unit test follows each unit, a midterm follows Unit 5 and a final follows Unit 10. At five sessions a week the course fills about 34 weeks.
2. **Story, then the big idea.** Read the core ideas slowly. The paragraphs marked *The story* and *How they figured it out* tell what happened; *The big idea* names the principle; *In business today* shows how it is used now. After reading, close the page and explain the lesson aloud in two minutes, as if to a customer or an investor.
3. **Worked examples and practice.** Work each example yourself on paper before reading the steps. In the practice set, the easy problems check the vocabulary, the

medium and hard problems apply the idea to new numbers, and the challenge problem asks you to combine ideas. Mark your answers against the key and rework every miss; a corrected problem counts as done.

4. **Picture study.** Each lesson has one public-domain painting, print, patent drawing or historic photograph. Look for two minutes, look away and tell what you saw, then work through the questions, which point to the work, trade or business in the picture.
5. **The ledger notebook.** Keep one bound notebook (and one spreadsheet file) for the year. Every project ends with something counted and written down: an interview log, a cost sheet, a break-even table, a cash-flow forecast, a sales log, a stakeholder scorecard. Date every page and finish with one sentence about what you would change.
6. **The six stakeholders.** Whenever the course looks at a business, ask what it meant for the financiers, the risk-takers, the builders, the workers, the customers and the community. Unit 1 introduces the stakeholder scorecard; Unit 10 asks you to fill one out honestly for your own venture.
7. **Optional books and games.** Some units list free classics such as Benjamin Franklin's *Autobiography*, free teaching sites and good books. They are extras; every lesson can be completed without them.
8. **Unit tests, portfolio and exams.** Each unit test is worth 100 points and mixes calculations, concepts and one short essay; calculators are allowed and work must be shown. Each unit also has a portfolio piece: an interview log, a business model canvas, a financial model, a pitch deck, a sales log, a process map, the venture's books. Keep them in one folder: by May it is a real business file.
9. **Selling and money safety.** A parent supervises all selling and all handling of real money. Sell only to people you know or at events your parent approves; never sell door to door or meet strangers alone; never give out personal information, passwords or card numbers; do not open accounts, sell online or post publicly without a parent. Check local rules (permits, cottage-food rules) before selling food. Investment, loan and equity exercises in this course use pretend money or family agreements a parent writes and approves.
10. **The venture (Unit 10).** In the last unit the student chooses, launches and runs a small, safe venture for four to six weeks with a parent as partner, keeps its books,

writes a stakeholder review and pitches the results. Start thinking about it in Unit 2; many students test their Unit 2 idea all year.

Scope and sequence

UNIT 1 · WEEKS 1–4

The Entrepreneur

What entrepreneurs do and how the word was coined; great entrepreneurs in history; risk, reward and expected value; character and vocation; and the six stakeholders as the measure of a great business.

1.1 What Entrepreneurs Do: Cantillon, Say and McCormick's Reaper

1.2 Great Entrepreneurs in History: Andrew Carnegie and the Pattern of the Builder

1.3 Risk and Reward: Milton Hershey's Failures and the Caramel Company

1.4 Character and Vocation: R. G. LeTourneau and the Trustworthy Entrepreneur

1.5 The Six Stakeholders: The Cadbury Brothers and Bournville

UNIT 2 · WEEKS 4–7

Finding and Testing an Idea

Seeing needs as Clarence Birdseye did in Labrador; customer interviews and the first market research; the minimum viable product; testing demand with real sales; and pivoting, from the Wrights' bicycle shop to aviation and LEGO's wooden toys to the brick.

2.1 Seeing Needs: Clarence Birdseye and the Fish That Froze in Labrador

2.2 Customer Interviews: Charles Coolidge Parlin and the First Market Research

2.3 The Minimum Viable Product: Henry Ford's Quadricycle

2.4 Testing Demand: Richard Sears and a Box of Unwanted Watches

2.5 Pivoting: The Wright Brothers' Bicycle Shop and LEGO's Wooden Toys

UNIT 3 · WEEKS 7–10

The Business Model and Plan

The value proposition and Davis and Strauss's riveted work pants; business models and Gillette's razor and blades; competition and market size in the sewing machine war; legal forms from Procter & Gamble's partnership to the corporation; and the written plan with Frederic Tudor, the Ice King.

3.1 The Value Proposition: Jacob Davis, Levi Strauss and Pants That Would Not Tear

3.2 The Business Model: King Gillette's Razor and Blades

3.3 Competition and Market Size: Singer and the Sewing Machine War

3.4 Legal Forms: Procter & Gamble's Partnership and the Corporation

3.5 The Written Plan: Frederic Tudor, the Ice King

UNIT 4 · WEEKS 10–13

The Numbers

Start-up costs in the Hewlett-Packard garage; pricing strategies and Woolworth's five-and-ten; unit economics and break-even with Wedgwood's cost book; projected income statements with the penny press; and managing cash, including Ford's crisis of 1920–21.

4.1 Start-Up Costs: Hewlett, Packard and $538 in a Garage

4.2 Pricing Strategies: Frank Woolworth's Five-and-Ten

4.3 Unit Economics and Break-Even: Wedgwood's Cost Book of 1772

4.4 The Projected Income Statement: Benjamin Day's Penny Paper

4.5 Managing Cash: Henry Ford and the Slump of 1920–21

UNIT 5 · WEEKS 13–17

Financing

Bootstrapping with J. L. Kraft's horse and wagon; loans and A. P. Giannini's Bank of Italy; partners and equity from the Medici to the VOC; venture capital and Georges Doriot's investment in Digital Equipment; and crowdfunding, from the Statue of Liberty's pedestal to family investors, with honest contracts.

5.1 Bootstrapping: J. L. Kraft's Horse and Wagon

5.2 Loans and Banks: A. P. Giannini and the Bank of Italy

5.3 Partners and Equity: The Medici Branches and the Dutch East India Company

5.4 Venture Capital: Georges Doriot and Digital Equipment

5.5 Crowdfunding and Family Investors: The Statue of Liberty's Pedestal

UNIT 6 · WEEKS 17–20

Marketing

The four P's with Ivory soap; brands and trust with Wedgwood and the Coca-Cola bottle; the mail-order catalog and the website; truthful advertising; and online marketing with safety and privacy.

6.1 The Four P's: Harley Procter and Ivory Soap

6.2 Brands and Trust: Wedgwood's Queen's Ware and the Coca-Cola Bottle

6.3 From the Catalog to the Website: Montgomery Ward and Sears, Roebuck

6.4 Advertising Truthfully: The Printers' Ink Statute and the FTC

6.5 Online Marketing with Safety and Privacy

UNIT 7 · WEEKS 20–23

Selling

The honest salesperson (Proverbs 20:14 and Wanamaker); John H. Patterson's NCR sales school; consultative selling and Franklin's modest questions; handling objections and closing without manipulation; and principled negotiation, from Abraham at Machpelah to BATNA.

7.1 The Honest Salesperson: Proverbs 20:14 and John Wanamaker

7.2 The Sales Process: John H. Patterson's NCR Sales School

7.3 Consultative Selling and Listening: Franklin's Modest Questions

7.4 Handling Objections and Closing without Manipulation

7.5 Negotiation: Abraham at Machpelah and Principled Bargaining

UNIT 8 · WEEKS 23–26

Operations

Ford's moving line and Toyota's lean production; quality and W. Edwards Deming; the supply chain and Malcolm McLean's shipping container; and customer service and scaling up, from Marshall Field to the McDonald brothers' Speedee System.

8.1 The Moving Assembly Line: Ford at Highland Park, 1913

8.2 Lean Production: Sakichi Toyoda's Loom and the Toyota Production System

8.3 Quality: W. Edwards Deming and the Red Beads

8.4 The Supply Chain: Malcolm McLean and the Shipping Container

8.5 Customer Service and Scaling Up: Marshall Field and the Speedee System

UNIT 9 · WEEKS 27–30

Law, Ethics and Stakeholders

Contracts and Sam Walton's lost lease; patents, trademarks and copyright, with Lincoln's patent; employees, wages and safety after the Triangle fire; taxes and licenses as practical steps; and failure, bankruptcy and starting again with H. J. Heinz.

9.1 Contracts: Sam Walton's Lost Lease

9.2 Intellectual Property: Lincoln's Patent and the "Fuel of Interest"

9.3 Employees, Wages and Safety: After the Triangle Fire

9.4 Taxes and Licenses: Rendering unto Caesar as a Practical Step

9.5 Failure, Bankruptcy and Starting Again: H. J. Heinz

UNIT 10 · WEEKS 30–33

The Venture

The capstone venture: choosing it, launching it, selling and measuring, keeping the books and writing a stakeholder review, and pitching the results, with Ewing Kauffman, Piggly Wiggly, A. C. Nielsen, Johnson & Johnson's Credo and Elisha Otis as guides.

10.1 Choosing the Venture: Ewing Kauffman and Marion Laboratories

10.2 Launch: Clarence Saunders and the First Piggly Wiggly

10.3 Selling and Measuring: A. C. Nielsen and Key Performance Indicators

10.4 The Books and a Stakeholder Review: Johnson & Johnson's Credo

10.5 The Pitch: Elisha Otis and "All Safe, Gentlemen"

Weekly pacing calendar

WEEK	PLAN
1	• Day 1: Lesson 1.1 What Entrepreneurs Do: Cantillon, Say and McCormick's Reaper: video, teaching and worked examples • Day 2: Lesson 1.1: project and notebook • Day 3: Lesson 1.1: practice set and corrections • Day 4: Lesson 1.2 Great Entrepreneurs in History: Andrew Carnegie and the Pattern of the Builder: video, teaching and worked examples • Day 5: Lesson 1.2: project and notebook *Five sessions a week of about 50 minutes. Families on a four-day week can combine the practice day of one lesson with the teaching day of the next.*
2	• Day 1: Lesson 1.2: practice set and corrections • Day 2: Lesson 1.3 Risk and Reward: Milton Hershey's Failures and the Caramel Company: video, teaching and worked examples • Day 3: Lesson 1.3: project and notebook • Day 4: Lesson 1.3: practice set and corrections

WEEK	PLAN
	• Day 5: Lesson 1.4 Character and Vocation: R. G. LeTourneau and the Trustworthy Entrepreneur: video, teaching and worked examples
3	• Day 1: Lesson 1.4: project and notebook • Day 2: Lesson 1.4: practice set and corrections • Day 3: Lesson 1.5 The Six Stakeholders: The Cadbury Brothers and Bournville: video, teaching and worked examples • Day 4: Lesson 1.5: project and notebook • Day 5: Lesson 1.5: practice set and corrections
4	• Day 1: Unit 1 test • Day 2: Lesson 2.1 Seeing Needs: Clarence Birdseye and the Fish That Froze in Labrador: video, teaching and worked examples • Day 3: Lesson 2.1: project and notebook • Day 4: Lesson 2.1: practice set and corrections • Day 5: Lesson 2.2 Customer Interviews: Charles Coolidge Parlin and the First Market Research: video, teaching and worked examples
5	• Day 1: Lesson 2.2: project and notebook • Day 2: Lesson 2.2: practice set and corrections • Day 3: Lesson 2.3 The Minimum Viable Product: Henry Ford's Quadricycle: video, teaching and worked examples • Day 4: Lesson 2.3: project and notebook • Day 5: Lesson 2.3: practice set and corrections
6	• Day 1: Lesson 2.4 Testing Demand: Richard Sears and a Box of Unwanted Watches: video, teaching and worked examples • Day 2: Lesson 2.4: project and notebook • Day 3: Lesson 2.4: practice set and corrections • Day 4: Lesson 2.5 Pivoting: The Wright Brothers' Bicycle Shop and LEGO's Wooden Toys: video, teaching and worked examples • Day 5: Lesson 2.5: project and notebook
7	• Day 1: Lesson 2.5: practice set and corrections • Day 2: Unit 2 test • Day 3: Lesson 3.1 The Value Proposition: Jacob Davis, Levi Strauss and Pants That Would Not Tear: video, teaching and worked examples • Day 4: Lesson 3.1: project and notebook

WEEK	PLAN
	• Day 5: Lesson 3.1: practice set and corrections
8	• Day 1: Lesson 3.2 The Business Model: King Gillette's Razor and Blades: video, teaching and worked examples • Day 2: Lesson 3.2: project and notebook • Day 3: Lesson 3.2: practice set and corrections • Day 4: Lesson 3.3 Competition and Market Size: Singer and the Sewing Machine War: video, teaching and worked examples • Day 5: Lesson 3.3: project and notebook
9	• Day 1: Lesson 3.3: practice set and corrections • Day 2: Lesson 3.4 Legal Forms: Procter & Gamble's Partnership and the Corporation: video, teaching and worked examples • Day 3: Lesson 3.4: project and notebook • Day 4: Lesson 3.4: practice set and corrections • Day 5: Lesson 3.5 The Written Plan: Frederic Tudor, the Ice King: video, teaching and worked examples
10	• Day 1: Lesson 3.5: project and notebook • Day 2: Lesson 3.5: practice set and corrections • Day 3: Unit 3 test • Day 4: Lesson 4.1 Start-Up Costs: Hewlett, Packard and $538 in a Garage: video, teaching and worked examples • Day 5: Lesson 4.1: project and notebook
11	• Day 1: Lesson 4.1: practice set and corrections • Day 2: Lesson 4.2 Pricing Strategies: Frank Woolworth's Five-and-Ten: video, teaching and worked examples • Day 3: Lesson 4.2: project and notebook • Day 4: Lesson 4.2: practice set and corrections • Day 5: Lesson 4.3 Unit Economics and Break-Even: Wedgwood's Cost Book of 1772: video, teaching and worked examples
12	• Day 1: Lesson 4.3: project and notebook • Day 2: Lesson 4.3: practice set and corrections • Day 3: Lesson 4.4 The Projected Income Statement: Benjamin Day's Penny Paper: video, teaching and worked examples • Day 4: Lesson 4.4: project and notebook

WEEK	PLAN
	• Day 5: Lesson 4.4: practice set and corrections
13	• Day 1: Lesson 4.5 Managing Cash: Henry Ford and the Slump of 1920–21: video, teaching and worked examples • Day 2: Lesson 4.5: project and notebook • Day 3: Lesson 4.5: practice set and corrections • Day 4: Unit 4 test • Day 5: Lesson 5.1 Bootstrapping: J. L. Kraft's Horse and Wagon: video, teaching and worked examples
14	• Day 1: Lesson 5.1: project and notebook • Day 2: Lesson 5.1: practice set and corrections • Day 3: Lesson 5.2 Loans and Banks: A. P. Giannini and the Bank of Italy: video, teaching and worked examples • Day 4: Lesson 5.2: project and notebook • Day 5: Lesson 5.2: practice set and corrections
15	• Day 1: Lesson 5.3 Partners and Equity: The Medici Branches and the Dutch East India Company: video, teaching and worked examples • Day 2: Lesson 5.3: project and notebook • Day 3: Lesson 5.3: practice set and corrections • Day 4: Lesson 5.4 Venture Capital: Georges Doriot and Digital Equipment: video, teaching and worked examples • Day 5: Lesson 5.4: project and notebook
16	• Day 1: Lesson 5.4: practice set and corrections • Day 2: Lesson 5.5 Crowdfunding and Family Investors: The Statue of Liberty's Pedestal: video, teaching and worked examples • Day 3: Lesson 5.5: project and notebook • Day 4: Lesson 5.5: practice set and corrections • Day 5: Unit 5 test
17	• Day 1: Review day for the midterm • Day 2: Midterm exam • Day 3: Lesson 6.1 The Four P's: Harley Procter and Ivory Soap: video, teaching and worked examples • Day 4: Lesson 6.1: project and notebook • Day 5: Lesson 6.1: practice set and corrections

WEEK	PLAN
18	• Day 1: Lesson 6.2 Brands and Trust: Wedgwood's Queen's Ware and the Coca-Cola Bottle: video, teaching and worked examples • Day 2: Lesson 6.2: project and notebook • Day 3: Lesson 6.2: practice set and corrections • Day 4: Lesson 6.3 From the Catalog to the Website: Montgomery Ward and Sears, Roebuck: video, teaching and worked examples • Day 5: Lesson 6.3: project and notebook
19	• Day 1: Lesson 6.3: practice set and corrections • Day 2: Lesson 6.4 Advertising Truthfully: The Printers' Ink Statute and the FTC: video, teaching and worked examples • Day 3: Lesson 6.4: project and notebook • Day 4: Lesson 6.4: practice set and corrections • Day 5: Lesson 6.5 Online Marketing with Safety and Privacy: video, teaching and worked examples
20	• Day 1: Lesson 6.5: project and notebook • Day 2: Lesson 6.5: practice set and corrections • Day 3: Unit 6 test • Day 4: Lesson 7.1 The Honest Salesperson: Proverbs 20:14 and John Wanamaker: video, teaching and worked examples • Day 5: Lesson 7.1: project and notebook
21	• Day 1: Lesson 7.1: practice set and corrections • Day 2: Lesson 7.2 The Sales Process: John H. Patterson's NCR Sales School: video, teaching and worked examples • Day 3: Lesson 7.2: project and notebook • Day 4: Lesson 7.2: practice set and corrections • Day 5: Lesson 7.3 Consultative Selling and Listening: Franklin's Modest Questions: video, teaching and worked examples
22	• Day 1: Lesson 7.3: project and notebook • Day 2: Lesson 7.3: practice set and corrections • Day 3: Lesson 7.4 Handling Objections and Closing without Manipulation: video, teaching and worked examples • Day 4: Lesson 7.4: project and notebook • Day 5: Lesson 7.4: practice set and corrections

WEEK	PLAN
23	• Day 1: Lesson 7.5 Negotiation: Abraham at Machpelah and Principled Bargaining: video, teaching and worked examples • Day 2: Lesson 7.5: project and notebook • Day 3: Lesson 7.5: practice set and corrections • Day 4: Unit 7 test • Day 5: Lesson 8.1 The Moving Assembly Line: Ford at Highland Park, 1913: video, teaching and worked examples
24	• Day 1: Lesson 8.1: project and notebook • Day 2: Lesson 8.1: practice set and corrections • Day 3: Lesson 8.2 Lean Production: Sakichi Toyoda's Loom and the Toyota Production System: video, teaching and worked examples • Day 4: Lesson 8.2: project and notebook • Day 5: Lesson 8.2: practice set and corrections
25	• Day 1: Lesson 8.3 Quality: W. Edwards Deming and the Red Beads: video, teaching and worked examples • Day 2: Lesson 8.3: project and notebook • Day 3: Lesson 8.3: practice set and corrections • Day 4: Lesson 8.4 The Supply Chain: Malcolm McLean and the Shipping Container: video, teaching and worked examples • Day 5: Lesson 8.4: project and notebook
26	• Day 1: Lesson 8.4: practice set and corrections • Day 2: Lesson 8.5 Customer Service and Scaling Up: Marshall Field and the Speedee System: video, teaching and worked examples • Day 3: Lesson 8.5: project and notebook • Day 4: Lesson 8.5: practice set and corrections • Day 5: Unit 8 test
27	• Day 1: Lesson 9.1 Contracts: Sam Walton's Lost Lease: video, teaching and worked examples • Day 2: Lesson 9.1: project and notebook • Day 3: Lesson 9.1: practice set and corrections • Day 4: Lesson 9.2 Intellectual Property: Lincoln's Patent and the "Fuel of Interest": video, teaching and worked examples • Day 5: Lesson 9.2: project and notebook

WEEK	PLAN
28	• Day 1: Lesson 9.2: practice set and corrections • Day 2: Lesson 9.3 Employees, Wages and Safety: After the Triangle Fire: video, teaching and worked examples • Day 3: Lesson 9.3: project and notebook • Day 4: Lesson 9.3: practice set and corrections • Day 5: Lesson 9.4 Taxes and Licenses: Rendering unto Caesar as a Practical Step: video, teaching and worked examples
29	• Day 1: Lesson 9.4: project and notebook • Day 2: Lesson 9.4: practice set and corrections • Day 3: Lesson 9.5 Failure, Bankruptcy and Starting Again: H. J. Heinz: video, teaching and worked examples • Day 4: Lesson 9.5: project and notebook • Day 5: Lesson 9.5: practice set and corrections
30	• Day 1: Unit 9 test • Day 2: Lesson 10.1 Choosing the Venture: Ewing Kauffman and Marion Laboratories: video, teaching and worked examples • Day 3: Lesson 10.1: project and notebook • Day 4: Lesson 10.1: practice set and corrections • Day 5: Lesson 10.2 Launch: Clarence Saunders and the First Piggly Wiggly: video, teaching and worked examples
31	• Day 1: Lesson 10.2: project and notebook • Day 2: Lesson 10.2: practice set and corrections • Day 3: Lesson 10.3 Selling and Measuring: A. C. Nielsen and Key Performance Indicators: video, teaching and worked examples • Day 4: Lesson 10.3: project and notebook • Day 5: Lesson 10.3: practice set and corrections
32	• Day 1: Lesson 10.4 The Books and a Stakeholder Review: Johnson & Johnson’s Credo: video, teaching and worked examples • Day 2: Lesson 10.4: project and notebook • Day 3: Lesson 10.4: practice set and corrections • Day 4: Lesson 10.5 The Pitch: Elisha Otis and “All Safe, Gentlemen”: video, teaching and worked examples • Day 5: Lesson 10.5: project and notebook

WEEK	PLAN
33	• Day 1: Lesson 10.5: practice set and corrections • Day 2: Unit 10 test • Day 3: Review day for the final • Day 4: Final exam

Materials

A calculator

A basic or scientific calculator is enough. A financial calculator is optional.

Free spreadsheet software (Google Sheets or LibreOffice Calc)

Used in most units for cost sheets, break-even tables, projected statements, cash-flow forecasts and the venture's books.

A bound notebook (graph or ledger paper)

The ledger notebook for interview logs, cost sheets, scorecards and every worked problem.

Index cards, sticky notes and markers

For customer-interview notes, the business model canvas, price tests and pitch practice.

Household materials for small product tests

Whatever your chosen product needs in small amounts (craft supplies, baking supplies, seeds, tools you already own). Nothing special to buy; the first tests should cost very little.

Store flyers, receipts, catalogs and printed ads

Save them for the pricing, marketing and advertising lessons.

A parent or mentor as partner

To act as customer, banker or investor in the projects, to supervise every real sale and to sign any family agreement.

Optional: one of the books listed in a unit

Never required. See the list in each unit.

Grading

Grades come from the practice sets, the projects, the ledger notebook, the ten unit tests, the midterm and the final. A calculation earns full credit when the formula, the numbers put into it and the answer with its units are all shown. A project earns

full credit for honest numbers carefully recorded and explained, even when the test failed or the venture lost money, because learning what does not work is a large part of entrepreneurship.

PART	%
Practice sets (completed and corrected)	**15**
Projects and portfolio (real numbers, honest records, the improve-it step)	**25**
Ledger notebook (dated pages, labeled tables, scorecards)	**10**
Unit tests	**30**
Midterm exam	**10**
Final exam	**10**

Scale: A 90–100, B 80–89, C 70–79, D 60–69, F below 60.

- Practice sets are graded for completion and correction, not first-try accuracy: a problem done, checked and correctly reworked earns full credit.
- On tests, give partial credit for a correct formula and setup even if the arithmetic slips. An answer with no work earns at most half credit. Essays are graded on a clear claim, accurate history and a specific example.
- A notebook page earns full marks when it has a date, a title, labeled columns with units, correct totals and one sentence about what the numbers mean.
- For a high-school transcript this course is one full credit of Entrepreneurship (business elective). The portfolio folder and the Unit 10 venture file are the record of the year.

A NOTE TO PARENTS

You do not need to have run a business to teach this course. Read the stories, watch the videos, and then play the part the project calls for: the customer being interviewed, the banker hearing a loan request, the investor asking hard questions at

the pitch. The three most useful questions you can ask are “Who is the customer?”, “How do you know?” and “Show me the numbers.”

The course tells business history honestly. Great entrepreneurs are shown with their strengths and their failings, frauds and failures are taught as lessons, and laws are taught as settled history and practical steps, never as present-day debates. The course never promises riches. It teaches that profit is the reward for serving others well, that most new ventures start small and many fail, and that a good name is worth more than a quick sale (Proverbs 22:1).

Please stay close to the real selling. Any venture, test sale or family investment in this course should be small, safe and supervised: you hold the cash box, approve every customer contact and sign any agreement. Above all, the course hopes to form a young man or woman who sees needs, works heartily, deals honestly and treats customers, workers and partners as he or she would want to be treated. *Fabricando fit faber*: by making, one becomes a maker.

UNIT 1

The Entrepreneur

An entrepreneur is a person who sees a need, gathers the money, people and materials to meet it, and bears the risk that it will not work. This unit begins with the word itself, coined by the Irish-French banker Richard Cantillon, and with Cyrus McCormick, who did not only invent a reaper but also learned to build, demonstrate, guarantee, finance and sell it. Then it looks at the pattern in great entrepreneurs, with Andrew Carnegie's rise from bobbin boy to steelmaker, and at risk and reward through Milton Hershey's string of failures before his caramel company succeeded.

The last two lessons ask what kind of person an entrepreneur should be. R. G. LeTourneau, the earthmoving-machine builder who gave away most of his income, shows character and vocation; the Cadbury brothers' chocolate works and their village at Bournville introduce the **six stakeholders** and the stakeholder scorecard you will use all year. By the end of the unit you will be able to explain what entrepreneurs do, calculate a simple expected value, and judge a business by what it means for everyone who has a stake in it.

PREREQUISITES

- Comfortable with percents, decimals and simple averages
- Can solve a one-step equation and use a formula
- Has a bound notebook and a spreadsheet program ready for the year

MASTERY CHECKLIST

- ☐ I can define an entrepreneur in Cantillon's, Say's and Schumpeter's terms and give a historical example of each.
- ☐ I can describe the common habits of great entrepreneurs and the failings that marred some of them.
- ☐ I can calculate expected value, a simple return on investment and the cost of failure, and explain how entrepreneurs reduce risk.
- ☐ I can explain work as a calling and describe the character traits that make a business trustworthy.
- ☐ I can complete a six-stakeholder scorecard for a real business and defend each rating with evidence.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- ***The Autobiography of Benjamin Franklin* (Project Gutenberg)**: Free. Franklin's own story of starting a printing business, his partnerships and his list of thirteen virtues. Read the chapters on his first shop alongside Lessons 1.2 and 1.4. Ages 13+.
- **Andrew Carnegie, "Wealth" ("The Gospel of Wealth," 1889)**: Free from the Carnegie Corporation of New York. Carnegie's short essay on the duty of the rich to give their fortunes away during their lives. Use with Lesson 1.2 and discuss where you agree and disagree. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

1.1 What Entrepreneurs Do: Cantillon, Say and McCormick's Reaper

3 sessions of 50 minutes

1.2 Great Entrepreneurs in History: Andrew Carnegie and the Pattern of the Builder

3 sessions of 50 minutes

1.3 Risk and Reward: Milton Hershey's Failures and the Caramel Company

3 sessions of 50 minutes

1.4 Character and Vocation: R. G. LeTourneau and the Trustworthy Entrepreneur

3 sessions of 50 minutes

1.5 The Six Stakeholders: The Cadbury Brothers and Bournville

3 sessions of 50 minutes

Unit 1 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**

   Define entrepreneur as Cantillon did, and as Schumpeter did.

2. **5 pts**

   Name four things Cyrus McCormick did besides inventing the reaper that turned it into a successful business.

3. **6 pts**

   A tool costs a customer $150 and saves him $45 a year for 5 years, with $5 a year in upkeep. What is the value to the customer?

4. **5 pts**

   Define vertical integration and explain why Carnegie used it.

5. **6 pts**

   A cost of $5.00 per unit is cut by 12%. What is the new cost, and the savings on 40,000 units?

6. **5 pts**

   Name the five habits of great builders from Lesson 1.2.

7. **7 pts**

   Find the expected value: 40% chance of +$500, 35% chance of +$100, 25% chance of −$400.

8. **6 pts**

   You invest $800 and receive $1,040. What is the ROI?

9. **6 pts**

   Describe two of Milton Hershey's failures and the lesson he learned before the Lancaster Caramel Company succeeded.

10. **6 pts**

    Plan X: 80% chance of +$300, 20% chance of −$200. Plan Y: 50% chance of +$2,000, 50% chance of −$1,500. Find both expected values. Which would you advise a beginner with $500 in savings to choose, and why?

11. **5 pts**

    Explain what “vocation” means in the Christian tradition and how it applies to a shop owner.

12. **6 pts**

    A customer brings $2 profit per visit, visits twice a week for 50 weeks a year, and stays 3 years. What is the lifetime value? What is lost if a dishonest act drives away 25 such customers?

13. **5 pts**

    Name the six stakeholders and give one thing each contributes to a business.

14. **6 pts**

    Name three things the Cadbury brothers did for their workers and one way the business fell short.

15. **5 pts**

    For what probability p of success does a venture costing $500 and returning $2,000 on success (nothing on failure) have a positive expected profit?

16. **16 pts**

    Essay (one to two paragraphs): Choose Carnegie, Hershey or the Cadburys. Using the six-stakeholder scorecard, argue whether the business was great and not merely big. Give a rating and evidence for at least four stakeholders.

ANSWER KEY

1. Cantillon: one who buys or pays costs at known prices to sell at uncertain prices, bearing uncertainty. Schumpeter: an innovator who brings new products, methods, markets or organizations into use.
2. Any four: field demonstrations; a written guarantee; credit payable after harvest; a fixed published price; a factory in Chicago near customers; agents who sold and repaired machines.
3. Benefit $5 \times 45 = \$225$; costs $150 + 5 \times 5 = \$175$; value $\$50$.
4. Owning several stages of production. Carnegie bought ore mines, coke ovens and transport to secure supplies, control quality and cut costs.
5. $5.00 \times 0.88 = \$4.40$; savings $0.60 \times 40{,}000 = \$24{,}000$.
6. Serving a large need, careful measurement, reinvestment, choosing good partners and managers, persistence.
7. $0.4(500) + 0.35(100) + 0.25(-400) = 200 + 35 - 100 = \$135$
8. $(1040 - 800)/800 = 30\%$
9. Philadelphia shop (1876–1882) failed with high costs and credit sales; New York business failed in 1886. He learned the fresh-milk caramel recipe in Denver and, back in Lancaster, started small with a proven product and a real order before expanding.
10. X: $240 - 40 = \$200$; Y: $1000 - 750 = \$250$. Choose X: Y's higher average comes with a 50% chance of a $1,500 loss, three times the beginner's savings.
11. A calling from God to serve others in one's work. A shop owner serves God by honest dealing, good products, fair treatment of workers and faithful stewardship of the business.
12. $2 \times 2 \times 50 \times 3 = \$600$; $25 \times 600 = \$15{,}000$.
13. Financiers (money), risk-takers (savings, time, reputation), builders (design and skill), workers (labor and time), customers (payment and trust), community (place, roads, neighbors).
14. Any three: Saturday half-holiday, sick pay, pensions, education classes, works councils, gardens and sports fields, the Bournville village. Fell short: kept buying São Tomé cocoa produced by forced labor from 1901 until 1909.
15. $2000p - 500 > 0 \Rightarrow p > 0.25$.
16. Graded on a clear claim, accurate history, ratings with specific evidence for four or more stakeholders, and honest treatment of both strengths and failings (for

example, Carnegie's low steel prices and libraries against Homestead; Hershey's school and town against his early debts; Cadbury's workers against São Tomé).

PORTFOLIO PIECE: ENTREPRENEUR PROFILE AND STAKEHOLDER REPORT

Combine your work from this unit into a short file: the local business profile from Lesson 1.1, your comparison chart of great entrepreneurs, your risk ledger with expected value, your business creed, and your stakeholder scorecard and report. Add a one-page introduction: what kind of entrepreneur you hope to be and which stakeholder you will find hardest to serve well.

LOOK FOR	WHAT IT MEANS
Accuracy	Facts, dates and calculations are correct and sourced.
Evidence	Every rating, classification and claim is supported by specific evidence.
Honesty	Strengths and failings are both shown; estimates are realistic.
Reflection	The introduction applies the unit's lessons to the student's own plans thoughtfully.

1.1 What Entrepreneurs Do: Cantillon, Say and McCormick's Reaper

OBJECTIVES

- Define entrepreneur as Cantillon, Say and Schumpeter did, and explain the difference between an inventor and an entrepreneur.
- Tell how Cyrus McCormick turned a reaping machine into a business with demonstrations, a guarantee, credit, a factory and agents.
- Calculate the value a new tool creates for its customers and compare it with the price.

> **Warm-up.** List three things in your home that someone invented and three that someone sold to you. For one item, write who you think took the bigger risk: the inventor or the seller. Keep the list for the end of the lesson.

WATCH

What is Entrepreneurship

MIT OpenCourseWare · 4:40

https://www.youtube.com/watch?v=Xcsp0486olY

> **WHEN TO WATCH**
> After the story of Cantillon and Say, before McCormick.

BACKUP VIDEO

Entrepreneurship - the Entrepreneur

Council for Economic Education · 1:50

https://www.youtube.com/watch?v=q7K9RXqAK6s

Optional, a short review of what an entrepreneur does.

KEY TERMS

entrepreneur

A person who organizes resources to meet a need and bears the risk of loss in hope of profit; from the French *entreprendre*, to undertake.

inventor

A person who creates a new device or method. An inventor becomes an entrepreneur only when he or she brings it to customers as a business.

innovation

Putting a new product, method, market or way of organizing into practical use (Schumpeter's term for the entrepreneur's work).

uncertainty

Not knowing what a price, a sale or a result will be. Cantillon's entrepreneur buys at a known price to sell at an unknown one.

factors of production

The resources a business combines: land (natural resources), labor, capital (tools and buildings) and entrepreneurship.

CORE IDEAS

The story. The word *entrepreneur* entered economics through Richard Cantillon, an Irish-born banker in Paris whose *Essay on the Nature of Trade in General* was written around 1730 and published in 1755. Cantillon noticed that a farmer pays fixed rent and wages but sells his harvest at a price no one can know in advance; a merchant buys wool at a known price in the country and hopes to sell it in town at an unknown one. Such people, he wrote, live with **uncertainty**. In 1803 the French economist Jean-Baptiste Say added that the entrepreneur combines land, labor and capital and directs them toward what people value more. In 1911 the Austrian economist Joseph Schumpeter described the entrepreneur as the **innovator** who brings a new product, method or market into use.

How they figured it out. Cyrus McCormick, a Virginia farmer's son, demonstrated a horse-drawn reaper in the summer of 1831 and patented it in 1834. For nearly ten years he sold almost none. Farmers had seen clever machines break in the field, and the reaper was expensive. McCormick learned that an invention is not a business. He gave public field trials where neighbors could watch it cut wheat, offered a written guarantee, sold on credit so a farmer could pay after the harvest, and published a fixed price. In 1847 he moved to Chicago, close to the new prairie wheat farms and the railroads, built a factory and set up a network of agents who sold, delivered and repaired machines. At the Great Exhibition in London in 1851, the reaper won a top medal in a field trial.

The big idea. An **inventor** creates something new; an **entrepreneur** organizes the **factors of production** (land, labor and capital) to bring something valuable to

customers and bears the risk that it will fail. Many inventors are not entrepreneurs, and many entrepreneurs invent nothing: they find a better way to make, deliver, finance or sell. Value is created when a customer gains more than he pays. A reaper that let one family harvest several times as much wheat before it spoiled was worth far more to a farmer than its price, so both McCormick and his customers gained.

Who gained? Farmers could plant more land with the same family labor. McCormick's investors and his own family profited. His factory employed thousands of builders and workers in Chicago. City customers ate cheaper bread. The cost was sharp competition and patent quarrels (Obed Hussey patented a rival reaper in 1833, and the two fought for years), and later in the century the McCormick works had bitter labor troubles. An entrepreneur's story is rarely simple.

In business today. The pattern holds for a bakery, a repair shop or a software company: notice a need, organize the resources, prove the product to doubtful customers, make buying easy and safe, and stand behind what you sell. As you study each entrepreneur this year, ask Cantillon's question (what did they risk?), Say's question (what did they combine?) and Schumpeter's question (what was new?).

PICTURE STUDY



Cyrus McCormick's Reaper, Unknown photographer, late 19th century · Photograph · Wikimedia Commons

Image: Wikimedia Commons, public domain

This photograph shows a horse-drawn reaper of the McCormick type at work in a grain field. McCormick knew that farmers had to see a machine like this cutting real wheat before they would buy one.

Look closely

- Find the cutting bar and the platform where the cut grain falls.
- Count the people and horses. How many workers does the machine still need?
- Look at the field. How much grain is still standing compared with what is cut?
- Find the windmill. What other machine is helping this farm?

Talk about it

1. If you were selling this machine in 1840, what would you want a farmer to see first?
2. Which workers might worry about the reaper, and what new jobs did it create?

3. Why would a picture like this be good advertising, and when could it become dishonest?

Safety first. Arrange every interview through a parent, meet only at the business or a public place with your parent present, and never share your address, phone number or other personal details.

PROJECT

Inventor or Entrepreneur? A Local Business Profile

You will profile a real local business (a family business, a shop at your church, a farm stand, a trade) and identify what its owner risked, combined and did new. With a parent, you will interview the owner for fifteen minutes.

You will need

- Ledger notebook
- A list of interview questions (below)
- A parent to arrange and attend the interview

Steps

1. With a parent, choose a local business whose owner you or your family know, and ask for a 15-minute conversation at a time that suits the owner.
2. Prepare questions: What need did you see? What did you put in at the start (money, time, tools)? What was the hardest part of the first year? Who are your customers? What did you do differently from others?
3. Hold the interview with your parent present. Take notes in your ledger notebook; ask permission before recording anything.
4. Write a one-page profile: the need, the resources combined (land, labor, capital), the risks and the new thing (if any).
5. Classify the owner by Cantillon's, Say's and Schumpeter's definitions, with one sentence of evidence for each.
6. List three things the owner does to make customers trust the business, as McCormick did with trials and guarantees.
7. Send a short handwritten thank-you note, with a parent's help.
8. Write one sentence: what surprised you most, and what would you ask next time?

Tips

- Owners are busy. Arrive on time, keep to fifteen minutes and listen more than you talk.

- Do not ask about private numbers such as income; ask about decisions and lessons.

Check your work

- ☐ I can define an entrepreneur in three ways and apply each to a real person.
- ☐ My profile names the need, the resources, the risks and the innovation with evidence.
- ☐ I wrote a thank-you note.

LEDGER NOTEBOOK

1. Draw a three-column table: Cantillon (risk), Say (combining), Schumpeter (innovation). Put McCormick, Hussey and your local owner in the rows.
2. Sketch the reaper with labels for the reel, cutting bar, platform and driver's seat.
3. Write a timeline: 1730s Cantillon; 1803 Say; 1831 reaper demonstrated; 1834 patent; 1847 Chicago; 1851 London medal; 1911 Schumpeter.

KEY FORMULAS

$$\text{Value to customer} = \text{benefit to customer} - \text{price paid}$$
$$\text{Profit} = \text{revenue} - \text{costs}$$

From history. McCormick's company merged with several rivals in 1902 to form International Harvester. His brother Leander and later his son Cyrus Jr. ran parts of the business, and his widow, Nettie Fowler McCormick, gave generously to Christian schools and missions, including McCormick Theological Seminary in Chicago.

WORKED EXAMPLES

Example 1. A farm family can cut about 2 acres of wheat a day by hand with cradles. With a reaper and the same workers it can cut about 10 acres a day. Ripe wheat must be cut within about 10 days or much of it is lost. How many acres can the family harvest in the 10 days each way, and what does that suggest about how much land they can plant?

Show solution

1. By hand: $2 \text{ acres/day} \times 10 \text{ days} = 20 \text{ acres}$.
2. With the reaper: $10 \text{ acres/day} \times 10 \text{ days} = 100 \text{ acres}$.
3. The harvest window, not the planting, limited farm size. With the reaper the family can plant about five times as much wheat and still bring it in on time.

Answer: 20 acres by hand and 100 acres with the reaper; the family can plant about five times as much land. (These are round teaching numbers; actual rates varied by crop and machine.)

Example 2. Suppose a reaper costs a farmer $120, lasts 6 harvests and needs $10 of repairs a year. It saves him hiring extra hands worth $60 each harvest. What is his net benefit over the reaper's life, and what is the value created for him?

Show solution

1. Benefit: $6 \times \$60 = \$360$.
2. Costs: $\$120 + 6 \times \$10 = \$180$.
3. Value to the customer: $\$360 - \$180 = \$180$.

Answer: The farmer gains $180 over six harvests (a hypothetical example). Because he gains more than he pays, the sale benefits both him and the maker.

Example 3. Classify each person by the definitions in this lesson: (a) Obed Hussey, who patented a reaper in 1833; (b) a Chicago agent who sells and repairs McCormick reapers on commission; (c) McCormick in 1847, building a factory in Chicago.

Show solution

1. (a) Hussey was an inventor; he also sold reapers, so he was an entrepreneur too, but on a smaller scale.
2. (b) The agent invents nothing but bears risk (his time and travel are unpaid if he sells nothing) and serves customers: a small entrepreneur in Cantillon's sense.
3. (c) McCormick is combining land, labor and capital in a new place with new methods of selling: an entrepreneur in Say's and Schumpeter's sense.

Answer: (a) inventor and small entrepreneur; (b) entrepreneur in Cantillon's sense (bears uncertainty); (c) entrepreneur in Say's and Schumpeter's sense (organizer and innovator).

PRACTICE

1. Easy What does the French word *entreprendre* mean?

   Show answer

   To undertake.

2. Easy Name the four factors of production.

   Show answer

   Land (natural resources), labor, capital and entrepreneurship.

3. Easy In what year did McCormick first demonstrate his reaper, and when did he move to Chicago?

   Show answer

   1831; 1847.

4. **Medium** Explain in two sentences the difference between an inventor and an entrepreneur.

Show answer

An inventor creates a new device or method. An entrepreneur organizes resources to bring a product to customers and bears the risk of loss; he or she may or may not have invented it.

5. **Medium** Give two reasons farmers were slow to buy the reaper in the 1830s, and the step McCormick took to answer each.

Show answer

They doubted it would work (he held public field trials and gave a guarantee) and it cost a lot at once (he sold on credit, payable after harvest). Also accepted: repairs were hard to get (agents who repaired machines).

6. **Medium** A machine lets a worker produce 40 units a day instead of 25. By what percent did output per worker rise?

Show answer

$(40 - 25)/25 = 0.60$, a 60% increase.

7. **Medium** A customer values a tool at $90 and pays $65. The maker's cost is $40. Find the value to the customer, the maker's profit and the total value created.

Show answer

Customer: $\$90 - \$65 = \$25$; maker: $\$65 - \$40 = \$25$; total $\$90 - \$40 = \$50$.

8. **Hard** Why did moving to Chicago in 1847 make sense for McCormick? Give three reasons.

Show answer

It was near the new prairie wheat farms (his customers), it had water and growing rail transport to ship machines and bring in iron and lumber, and it had workers and a growing population. Distance from the East also mattered less once railroads came.

9. Hard A merchant buys 200 bales of wool at $8 each and pays $150 to carry them to town. He does not know the town price. At what price per bale does he break even? What is his profit if the price is $9.50? If it is $8.25?

Show answer

Cost $200 \times 8 + 150 = \$1{,}750$; break-even $\$1{,}750 / 200 = \$8.75$. At $9.50: $\$1{,}900 - \$1{,}750 = \$150$. At $8.25: $\$1{,}650 - \$1{,}750 = -\$100$, a loss.

10. Hard Which of Cantillon's, Say's or Schumpeter's definitions best fits a person who opens a second lawn-care business in a town that already has three? Explain.

Show answer

Cantillon's: she bears uncertainty about prices and customers but brings nothing new. If she introduced a new method (for example, battery tools and evening service), Schumpeter's would also fit.

11. Challenge Using the story, explain why "build a better mousetrap and the world will beat a path to your door" is only half true.

Show answer

A better product still has to be known, trusted, affordable, delivered and repaired. McCormick's reaper sold poorly for years until he added demonstrations, a guarantee, credit, a factory near customers and agents. Customers must be reached and persuaded honestly; a good product is necessary but not sufficient.

COMMON MISTAKES

- Thinking entrepreneur means inventor. Most entrepreneurs organize, improve, deliver or sell; few invent.
- Thinking a good product sells itself. McCormick's reaper sold poorly for a decade until he solved trust, credit and service.
- Forgetting that the customer must gain. A business that takes more value than it gives does not last.

Make it a game · Machine or Business?. Set a 60-second timer and list everything McCormick added beyond the reaper itself: demonstrations, a guarantee, credit, a factory and agents. One point for each, one bonus point for saying what problem each one solved. Then your parent holds up any household gadget. Tell who might be its inventor, and what an entrepreneur would still have to do. Beat your own score tomorrow.

Scripture. “She considereth a field, and buyeth it: with the fruit of her hands she planteth a vineyard.” (Proverbs 31:16, KJV)

The virtuous woman of Proverbs is an entrepreneur in Cantillon’s sense: she weighs a purchase, commits her resources and plants for a harvest she cannot yet see.

1.2 Great Entrepreneurs in History: Andrew Carnegie and the Pattern of the Builder

OBJECTIVES

- Trace Andrew Carnegie's career from bobbin boy to the sale of Carnegie Steel in 1901, and identify the habits that drove his success.
- Compare Carnegie with other great entrepreneurs in history and find the common pattern.
- Weigh Carnegie's achievements against his failings, including the Homestead strike of 1892, and his teaching in "The Gospel of Wealth."

> **Warm-up.** Write down the names of three people you think were great entrepreneurs. Next to each, write one word for what made them great. Compare your words with a parent's list.

WATCH

Andrew Carnegie Biography: The Rise of a Steel Tycoon | DAILY BELLRINGER

The Daily Bellringer · 5:29

https://www.youtube.com/watch?v=Tyq-9ko2JyQ

> **WHEN TO WATCH**
> After the story, before the comparison of entrepreneurs.

BACKUP VIDEO

Man of Steel: Andrew Carnegie | The Gilded Age

American Experience | PBS · 1:17

https://www.youtube.com/watch?v=vmbRtjN0gAk

Optional, a short clip from PBS American Experience.

KEY TERMS

vertical integration

Owning several stages of production, from raw materials to finished goods, as Carnegie did with ore, coal, railroads and mills.

cost accounting

Measuring the cost of each step of production so waste can be found and cut.

reinvestment

Putting profits back into the business instead of paying them out.

philanthropy

Giving money and effort for the good of others, especially through lasting institutions.

Bessemer process

A method, patented in the 1850s, of blowing air through molten iron to make steel cheaply and in large amounts.

CORE IDEAS

The story. Andrew Carnegie was born in 1835 in Dunfermline, Scotland, the son of a hand-loom weaver whose trade was ruined by power looms. In 1848 the family emigrated to Allegheny, Pennsylvania, and thirteen-year-old Andrew went to work as a bobbin boy in a cotton mill for $1.20 a week. He became a telegraph messenger, learned to read Morse code by ear, and was hired by Thomas Scott of the Pennsylvania Railroad as his telegrapher and assistant. He saved, borrowed and invested in a sleeping-car company and an iron-bridge company, and by his thirties he was wealthy.

How they figured it out. In the 1870s Carnegie staked everything on steel. He opened the Edgar Thomson Works near Pittsburgh in 1875, using the Bessemer process, and he did something few competitors did: he measured the cost of every ton at every step. “Watch the costs,” he told his managers, and they cut them year after year. He reinvested profits in new furnaces even in bad years, when equipment was cheap, and he bought iron-ore mines, coke ovens and shipping to control his supplies (**vertical integration**). He chose able partners, such as Henry Clay Frick and Charles Schwab, and gave them shares. In 1901 he sold Carnegie Steel to the banker J. P. Morgan for about $480 million, and it became the core of U.S. Steel.

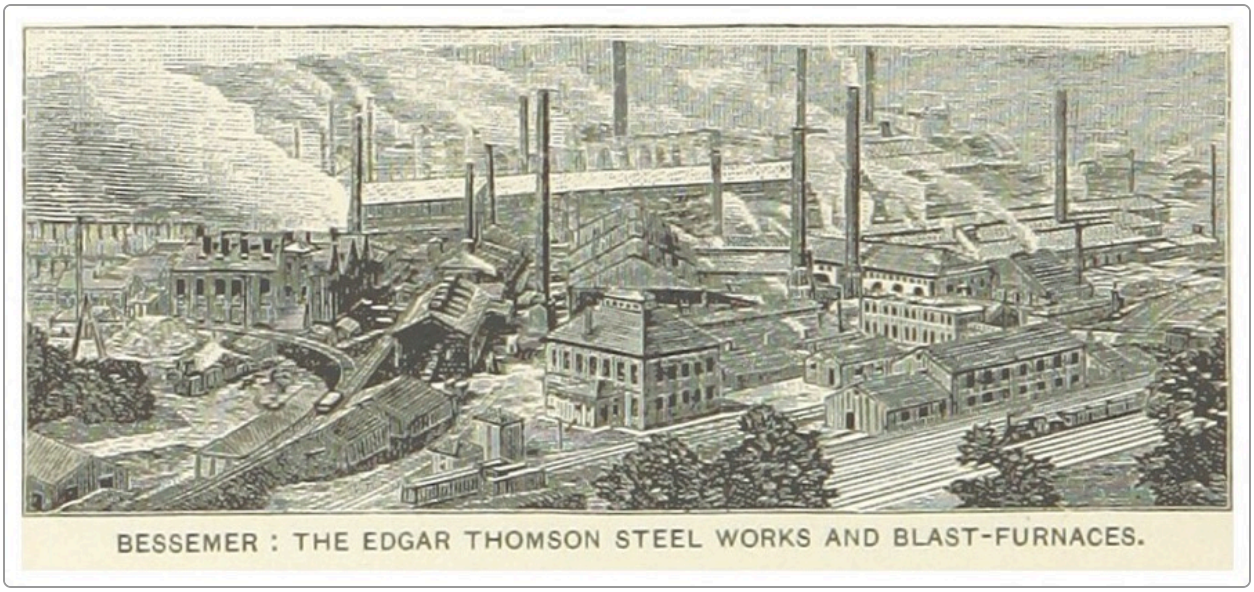
The big idea. Look at many great entrepreneurs (Lydia of Thyatira selling purple cloth, Jakob Fugger the banker, Josiah Wedgwood the potter, Carnegie, Ford, Hershey) and a pattern appears: they served a large need, they measured carefully, they reinvested and kept improving, they chose and trusted good partners and managers, and they persisted through bad years. None of these habits is a secret.

They are diligence and stewardship applied to a business, and they can be practiced on a small scale.

Who gained, and who did not? Cheap steel built railroads, bridges and city buildings, and steel rails fell sharply in price over Carnegie's career. His partners grew rich. But steelworkers often worked twelve-hour shifts, and in 1892, while Carnegie was in Scotland and Frick ran the company, a bitter strike at the Homestead mill ended in deadly fighting and the defeat of the union. In "Wealth" (1889), later called "The Gospel of Wealth," Carnegie wrote that "the man who dies thus rich dies disgraced," and he gave away about $350 million, building more than 2,500 public libraries, concert halls and schools. Students should weigh both sides.

In business today. The best founders still watch costs, reinvest, keep learning and choose good partners. The great question Carnegie raises is what a successful entrepreneur owes to the workers and the community, not only to customers and partners. A builder who serves customers brilliantly but treats workers harshly is a great producer, not yet a great business in the full sense this course uses.

PICTURE STUDY



Bessemer, the Edgar Thomson Steel Works and Blast Furnaces, Unknown engraver, 1891 · Engraving from a Pennsylvania state report · Wikimedia Commons

Image: Wikimedia Commons, public domain

Carnegie named his first steel mill for J. Edgar Thomson, president of the Pennsylvania Railroad, his old employer and his biggest likely customer. The works stood at Braddock, beside the Monongahela River and the railroad, which brought in coke and ore and carried away rails.

Look closely

- Find the river and the railroad. Why did the mill need both?
- Count the smokestacks and blast furnaces. What does the size tell you about the money invested?
- Look for houses or workers. How close did workers live to the mill?
- Find what is coming into the works and what might be going out.

Talk about it

1. Why would naming the mill after the railroad's president be good for business?
2. Which stakeholders do you see in this picture, and which are hidden?
3. What would the sky and air near this mill have been like for families nearby?

PROJECT

The Pattern of the Builder: A Comparison Chart

You will research three great entrepreneurs from different centuries and test whether the five habits in this lesson really appear in all of them.

You will need

- Library books or reputable websites (museums, company archives, encyclopedias)
- Ledger notebook or a spreadsheet

Steps

1. Choose three entrepreneurs from at least two centuries (for example, Jakob Fugger, Josiah Wedgwood, Cyrus McCormick, Milton Hershey, Ole Kirk Christiansen, J. C. Penney).
2. For each, write the need they served, their start (money, place, year) and their biggest setback.
3. Make a table with five columns for the habits: large need, measurement, reinvestment, partners, persistence. Rate each person 1–5 with one piece of evidence per cell.
4. Add a sixth column: one failing or criticism, with its source.
5. Total the ratings and compare. Which habit appears in all three? Which is missing in one?
6. Write a paragraph: Is the five-habit pattern real, or did you find a sixth habit that matters more?
7. List your sources at the bottom of the page.

Tips

- Use museum, archive and encyclopedia sources, not promotional “success secrets” pages.
- A setback is often more instructive than a success; look for one.

Check your work

☐ I can name and explain the five habits with examples.

- ☐ My chart has evidence in every cell and a source list.
- ☐ I identified at least one failing honestly.

LEDGER NOTEBOOK

1. Make a timeline of Carnegie's life: 1835 born; 1848 emigrates; telegraph and railroad; 1875 Edgar Thomson Works; 1889 "Wealth"; 1892 Homestead; 1901 sale to Morgan; 1919 death.
2. Draw a vertical-integration chain: ore mine → ship → railroad → coke ovens → furnace → rolling mill → customer. Label which Carnegie owned.
3. Copy your comparison chart and circle the habit you most need to practice yourself.

KEY FORMULAS

$$\text{Percent change} = \frac{\text{new} - \text{old}}{\text{old}} \times 100\%$$

From history. Carnegie Hall in New York opened in 1891, and the Carnegie Institute of Technology, now part of Carnegie Mellon University, was founded in 1900. Carnegie also funded church organs for thousands of congregations, though he himself was not a churchgoer.

WORKED EXAMPLES

Example 1. Suppose the price of steel rails fell from $100 a ton to $25 a ton over twenty years. What was the percent change? (These are round teaching numbers.)

Show solution

1. Use the percent-change formula: $\frac{25 - 100}{100} \times 100\% = -75\%$.
2. A railroad could now buy four tons of rail for the old price of one.

Answer: A 75% decrease: the same money bought four times as much rail.

Example 2. A mill's cost sheet for one ton of steel shows: ore \$6.00, coke \$3.50, labor \$4.00, other costs \$2.50. A new furnace cuts coke use by 20% and labor by 10%. Find the old and new cost per ton and the savings on 50,000 tons.

Show solution

1. Old cost: $6.00 + 3.50 + 4.00 + 2.50 = \$16.00$.
2. New coke: $3.50 \times 0.80 = \$2.80$; new labor: $4.00 \times 0.90 = \$3.60$.
3. New cost: $6.00 + 2.80 + 3.60 + 2.50 = \$14.90$.
4. Savings: $(16.00 - 14.90) \times 50{,}000 = \$55{,}000$.

Answer: \$16.00 falls to \$14.90 a ton, saving \$55,000 on 50,000 tons. Measuring each line is what made the saving visible.

Example 3. Use the pattern of great entrepreneurs (large need, careful measurement, reinvestment, good partners, persistence) to rate Carnegie 1–5 on each habit, with evidence.

Show solution

1. Large need: 5. Steel for railroads, bridges and buildings in a fast-growing country.
2. Measurement: 5. Cost sheets for every step at the Edgar Thomson Works.
3. Reinvestment: 5. Built new plants in downturns when equipment was cheap.
4. Partners: 4. Able partners such as Schwab and Frick, though he and Frick later quarreled bitterly.
5. Persistence: 5. Kept expanding through the depressions of the 1870s and 1890s.

Answer: About 24 of 25 on the habits of a builder. The ratings say nothing yet about workers and community, which the stakeholder scorecard in Lesson 1.5 adds.

PRACTICE

1. Easy What was Carnegie's first job in America and his weekly pay?

Show answer

Bobbin boy in a cotton mill, \$1.20 a week.

2. **Easy** Define vertical integration and give one example from Carnegie Steel.

Show answer

Owning several stages of production; Carnegie owned iron-ore mines, coke ovens, ships and railroads as well as mills.

3. **Easy** To whom did Carnegie sell his company in 1901, and for about how much?

Show answer

J. P. Morgan, for about $480 million; it became the core of U.S. Steel.

4. **Medium** A worker's pay rose from $1.20 to $4.80 a week. What is the percent increase?

Show answer

$(4.80 - 1.20)/1.20 = 3.00$, a 300% increase.

5. **Medium** Why was building new furnaces during a depression a shrewd move?

Show answer

Equipment, materials and labor were cheaper then, and when demand returned his new, low-cost plants could undersell competitors who had waited.

6. **Medium** Name three great entrepreneurs from history other than Carnegie and one habit each shared with him.

Show answer

Sample: Wedgwood (careful costing), Ford (serving a large need cheaply), Hershey (persistence through failure). Any accurate pairing earns credit.

7. **Medium** A cost line of $4.00 per ton is cut by 15%. What is the new cost, and the savings on 80,000 tons?

Show answer

$4.00 \times 0.85 = \$3.40$; savings $0.60 \times 80{,}000 = \$48{,}000$.

8. Hard Carnegie wrote that “the man who dies thus rich dies disgraced.” In a paragraph, explain what he meant and compare it with 1 Timothy 6:17-19.

Show answer

He meant that the wealthy should give their fortunes away during their lives to institutions that help people help themselves. Paul tells the rich not to trust in riches but to “do good,” be “rich in good works,” and “ready to distribute.” Both call for generosity; Paul roots it in trust in God rather than in social duty alone.

9. Hard Explain why the Homestead strike of 1892 complicates the judgment that Carnegie was a great entrepreneur.

Show answer

His company served customers and partners well but treated workers harshly (long shifts, a broken union, a deadly confrontation). A great business in the full sense serves all six stakeholders over time, so his record is mixed even though he was a superb builder and a generous giver.

10. Hard A $1,000 investment grows to $480,000 over 35 years. By what factor did it grow?

Show answer

$480{,}000/1{,}000 = 480$, a factor of 480.

11. Challenge Argue for or against this claim in one paragraph with evidence: “Carnegie’s libraries did more good than his low steel prices.”

Show answer

Answers vary. Strong answers weigh measurable effects (cheap steel lowered the cost of railroads, buildings and goods for millions) against the libraries’ effect on learning in thousands of towns, and note that the gifts were possible only because the business created value first.

COMMON MISTAKES

- Telling only the success story. Great entrepreneurs had setbacks and failings; leaving them out teaches the wrong lessons.
- Assuming bigness equals greatness. Size measures reach, not whether all stakeholders were served.

- Confusing percent change with the difference. A fall from $100 to $25 is a $75 difference but a 75% change only because the old price was $100.

Make it a game · Bobbin Boy to Steel. Tell Carnegie's story as a relay. You and your parent take turns adding one sentence, from bobbin boy to the 1901 sale of Carnegie Steel. Every sentence must name a habit or a term: cost accounting, reinvestment, vertical integration, philanthropy or the Bessemer process. Hesitate more than five seconds and you lose the turn. End by naming another builder who shared the pattern.

Scripture. “Charge them that are rich in this world, that they be not highminded, nor trust in uncertain riches, but in the living God, who giveth us richly all things to enjoy; That they do good, that they be rich in good works, ready to distribute, willing to communicate;” (1 Timothy 6:17-18, KJV)

Paul does not condemn wealth, but he tells the rich where to put their trust and what to do with what they have. Carnegie’s giving echoes the second verse; the first reminds us that riches are “uncertain.”

1.3 Risk and Reward: Milton Hershey's Failures and the Caramel Company

OBJECTIVES

- Tell how Milton Hershey failed in several candy businesses before the Lancaster Caramel Company succeeded, and what he learned each time.
- Calculate expected value, return on investment and the size of a possible loss.
- Explain how entrepreneurs reduce risk without avoiding it, and what Scripture says about planning and diligence.

> **Warm-up.** Flip a coin ten times and record the results. Suppose heads wins you $3 and tails loses you $1. Add up your result. Then calculate what you would expect "on average" per flip. Was your actual result close?

WATCH

Hershey: The Chocolate King's life & legacy | Past PA | Pennsylvania history

wpsu · 9:35

https://www.youtube.com/watch?v=H_AQG9GOjGI

> **WHEN TO WATCH**
> After the story, before the expected-value examples.

Note: From WPSU, Penn State's public television station.

BACKUP VIDEO

Biz Kid$: Learning From Failure (Accessible Preview)

Described and Captioned Media Program · 4:05

https://www.youtube.com/watch?v=a2IEI5vOhiE

Optional, before the project.

KEY TERMS

risk

The chance that an outcome will be worse than expected, including the chance of losing what was invested.

expected value

The average result of a decision if it could be repeated many times: each outcome times its probability, added up.

return on investment (ROI)

Profit from an investment divided by the amount invested, usually given as a percent.

downside

The worst realistic outcome of a decision; a wise entrepreneur asks whether he can survive it.

collateral

Property a borrower pledges to a lender, which the lender may take if the loan is not repaid.

CORE IDEAS

The story. Milton Hershey left school after the fourth grade and was apprenticed to a Lancaster, Pennsylvania, candy maker. In 1876, at eighteen, he opened his own candy shop in Philadelphia with money from his mother's family. He worked day and night for six years, but sugar was costly, many customers bought on credit, and the shop failed in 1882. He went west to Denver, where he worked for a caramel maker and learned that fresh milk made caramels that stayed soft and lasted. He tried again in Chicago and New Orleans, and then in New York, where his business failed in 1886. He came home to Lancaster nearly penniless; some relatives would no longer lend to him.

How they figured it out. Back in Lancaster, Hershey started small, making milk caramels and selling them from a pushcart. An English importer tasted them and placed a large order. To fill it Hershey needed equipment he could not afford. A bank officer, Frank Brenneman, risked his own name to help him get a loan. The order was filled and paid, the loan was repaid, and the Lancaster Caramel Company grew into one of the largest caramel makers in the country. In 1900 Hershey sold it for $1 million and put the money into milk chocolate, which he had first seen made on machines at the 1893 Chicago World's Fair.

The big idea. Every venture has **risk**: the chance of a worse result than you hoped. Entrepreneurs cannot avoid risk, but they can measure and reduce it. The **expected value** of a decision adds up each possible result times its probability; the **downside** is the worst result you might face. A wise entrepreneur takes chances with good expected value only when he can survive the downside. Hershey's early failures came from borrowing to grow before he had a proven product and paying customers. His success came from a proven product (fresh-milk caramels), a real order, and a lender who knew him.

How entrepreneurs reduce risk. Start small and test before spending much. Sell before you build when you can, or take deposits. Keep fixed costs low. Avoid debt that you could not repay if sales were poor (Proverbs 22:7). Learn the trade before you own the shop, as Hershey did in Denver. And never risk money that belongs to others, or that your family needs, without their full knowledge and consent.

In business today. Most new businesses are small, and many do not last: U.S. government surveys of business establishments have long found that about one in five closes within its first year and about half within five years. The ones that survive usually began small, kept costs low, learned from earlier work and listened to customers. "Count the cost" (Luke 14:28) is not advice to avoid risk but to understand it.

PICTURE STUDY



Lancaster Caramel Company, Unknown photographer, about 1896 · Photograph · Wikimedia Commons

Image: Wikimedia Commons, public domain

This is the factory that Milton Hershey built after years of failure. By the 1890s the Lancaster Caramel Company employed many workers and shipped caramels across the United States and abroad.

Look closely

- Count the floors and windows. How many workers might this building have held?
- Look for signs, doors and loading areas. How did ingredients come in and candy go out?
- Compare this building with a pushcart. What changed in the size of the risk?

Talk about it

1. Hershey started his Lancaster business with a pushcart. Why was that a wise way to begin after his failures?
2. What would the workers in this building have needed from Hershey as their employer?
3. Hershey sold this company to put his money into chocolate. Was that a large risk? Why do you think he took it?

PROJECT

The Risk Ledger: Expected Value for a Real Idea

You will choose a small business idea you might really try this year, list its possible outcomes with honest probabilities, calculate the expected value and the downside, and redesign the idea to reduce its risk.

You will need

- Ledger notebook or spreadsheet
- Prices from a store or flyer for any materials
- A parent or mentor to review your estimates

Steps

1. Choose a simple idea you could try with a parent (a baked-goods table at a church event, yard work for neighbors you know, a craft for a fair).
2. List the start-up costs with real prices.
3. Write three outcomes (good, fair, poor) with the revenue and profit or loss for each.
4. Assign probabilities that add to 100%, and write one reason for each probability. Ask a parent whether your estimates are realistic.
5. Calculate the expected value and identify the downside.
6. Redesign the idea to cut the downside in half (smaller first batch, pre-orders, borrowed tools, cheaper materials). Recalculate.
7. Compare the two versions in a table and write which you would try and why.
8. Write a sentence on what you would need to see in a small test before investing more.

Tips

- Be honest about the poor outcome. Most first ventures sell less than their owners expect.
- A spreadsheet makes it easy to change probabilities and watch the expected value move.

Check your work

- ☐ I can calculate expected value and ROI and identify the downside.
- ☐ My probabilities add to 100% and each has a reason.
- ☐ My redesigned plan has a smaller downside.

LEDGER NOTEBOOK

1. Draw Hershey's path as a map: Lancaster → Philadelphia (failed 1882) → Denver (learned fresh-milk caramels) → Chicago, New Orleans, New York (failed 1886) → Lancaster (success) → chocolate (1900).
2. Copy your risk ledger: outcomes, probabilities, results, expected value, downside, before and after redesign.
3. Write one lesson from each of Hershey's failures.

KEY FORMULAS

$$E = p_1 x_1 + p_2 x_2 + \cdots + p_n x_n$$

$$\text{ROI} = \frac{\text{gain} - \text{cost}}{\text{cost}} \times 100\%$$

From history. Hershey began building his chocolate factory in 1903 among the dairy farms of Derry Township, Pennsylvania, so he would have fresh milk. Hershey's Milk Chocolate bar was sold from 1900, and in 1909 Milton and Catherine Hershey founded a school for orphan boys, now the Milton Hershey School, which they later endowed with their fortune.

WORKED EXAMPLES

Example 1. A student considers a holiday cookie table. She estimates a 50% chance of a profit of \$120, a 30% chance of a profit of \$40, and a 20% chance of a loss of \$60. What is the expected value? What is the downside?

Show solution

1. Multiply each outcome by its probability: $0.50(120) = 60$, $0.30(40) = 12$, $0.20(-60) = -12$.
2. Add: $E = 60 + 12 - 12 = \$60$.
3. The downside is a \$60 loss. If she can afford to lose \$60, the expected value of \$60 makes the venture reasonable.

Answer: Expected value \$60; downside a \$60 loss.

Example 2. Hershey's English order (hypothetical numbers): a $2,500 loan buys equipment; the order brings $4,000 in sales; ingredients and labor cost $1,000; interest is $150. What is the profit and the ROI on the $2,500?

Show solution

1. Profit: $4{,}000 - 2{,}500 - 1{,}000 - 150 = \$350$.
2. ROI: $\dfrac{350}{2{,}500} \times 100\% = 14\%$.
3. The equipment remains after the order, so later orders earn much more on the same investment.

Answer: Profit $350, an ROI of 14% on the first order alone; the business also keeps the equipment.

Example 3. Two plans. Plan A: 90% chance of earning $200, 10% chance of losing $500. Plan B: 60% chance of earning $600, 40% chance of losing $3,000. Find each expected value and say which a wise beginner should choose.

Show solution

1. A: $0.9(200) + 0.1(-500) = 180 - 50 = \$130$.
2. B: $0.6(600) + 0.4(-3{,}000) = 360 - 1{,}200 = -\$840$.
3. Plan B has a negative expected value and a downside that would ruin a beginner.

Answer: A: +$130; B: −$840. Choose A. Even if B had a positive expected value, a $3,000 downside could be more than a beginner could survive.

PRACTICE

1. Easy Where and in what year did Hershey open his first candy shop, and when did it fail?

   Show answer

   Philadelphia, 1876; it failed in 1882.

2. Easy What did Hershey learn in Denver?

   Show answer

   That caramels made with fresh milk stayed soft and kept well.

3. **Easy** Define expected value in your own words.

Show answer

The average result you would get if you could make the same decision many times: each outcome times its probability, added up.

4. **Medium** Find the expected value: 70% chance of +$50, 30% chance of −$20.

Show answer

$0.7(50) + 0.3(-20) = 35 - 6 = \$29$

5. **Medium** You invest $400 and receive $520 back. What is your ROI?

Show answer

$(520 - 400)/400 = 30\%$

6. **Medium** Give three ways an entrepreneur can reduce risk without giving up on a venture.

Show answer

Any three: start small and test; sell or take deposits before building; keep fixed costs low; avoid debt you could not repay; learn the trade first; find partners.

7. **Medium** A product has a 25% chance of a $1,000 profit and a 75% chance of a $200 loss. What is the expected value?

Show answer

$0.25(1000) + 0.75(-200) = 250 - 150 = \$100$

8. **Hard** In the previous problem, why might the venture still be unwise for someone with only $150 in savings?

Show answer

The most likely result (75%) is a $200 loss, which is more than the person can pay. A positive expected value does not help if the downside ruins you before the good outcomes can average out.

9. Hard Compare Hershey's Philadelphia shop with the Lancaster Caramel Company. List two differences that reduced risk the second time.

Show answer

In Lancaster he had a proven product (fresh-milk caramels learned in Denver) and a real order from a customer before he expanded; he started small with a pushcart. Also: a lender who knew him and stood behind the loan.

10. Hard If half of new businesses close within five years, and you plan to open one, what should that fact change about your plan, and what should it not change?

Show answer

It should make you start small, test, keep costs low, avoid ruinous debt and plan for a possible closing. It should not by itself stop a well-tested idea; many businesses do survive, and failures often teach lessons for the next attempt.

11. Challenge A venture costs \$1,000. With probability p it returns \$3,000; otherwise it returns nothing. For what values of p is the expected profit positive?

Show answer

Expected profit $3000p - 1000 > 0$, so $p > 1/3$.

COMMON MISTAKES

- Treating expected value as what will happen. It is an average over many tries; one try can come out far worse.
- Ignoring the downside. A good average does not help if one bad result ruins you.
- Assigning probabilities that do not add to 100%.

> **Make it a game · Hershey's Odds Desk.** Your parent invents three pretend ventures on paper, each with a cost in paper chips, a chance of success and a payoff. You have twenty seconds each to calculate expected value, return on investment and the worst loss, then pick the best. After that, recall in order what Hershey learned from each failed candy business before the caramel company worked.

> **Scripture.** “In the morning sow thy seed, and in the evening withhold not thine hand: for thou knowest not whether shall prosper, either this or that, or whether they both shall be alike good.” (Ecclesiastes 11:6, KJV)
>
> The Preacher admits that we do not know which venture will succeed, and his answer is not to stop sowing but to keep working diligently. That is the honest entrepreneur’s attitude toward risk.

1.4 Character and Vocation: R. G. LeTourneau and the Trustworthy Entrepreneur

OBJECTIVES

- Explain the Christian idea of vocation and how it applies to business.
- Tell how R. G. LeTourneau built an earthmoving-machine business through near-bankruptcy and why he gave away most of his income.
- Identify the character traits that make a business trustworthy and calculate how a good reputation affects repeat sales.

> **Warm-up.** Think of a store or business your family trusts and one it avoids. Write three reasons for each. How many of the reasons are about the product, and how many are about the people?

WATCH

The History of R.G. LeTourneau / Dale Hardy

LeTourneau University · 3:30

https://www.youtube.com/watch?v=z9Asar_ny0s

> **WHEN TO WATCH**
> After the story of LeTourneau.

Note: A short history from LeTourneau University, the school he founded.

BACKUP VIDEO

God's Calling Is More Than Work

Theology of Work Project · 1:25

https://www.youtube.com/watch?v=W4RdKn5Ep7I

Before the big idea, on vocation.

KEY TERMS

vocation

A calling: the work God gives a person to do in service to others, whether in a church, a home, a trade or a business.

integrity

Being the same in private as in public; keeping one's word and dealing honestly when no one is watching.

reputation

What customers, workers and lenders believe about a person or business, based on past conduct.

repeat customer

A customer who buys again; repeat customers are usually far cheaper to keep than new ones are to find.

stewardship

Managing what belongs to God, including money, time, skill and a business, faithfully for His purposes.

CORE IDEAS

The story. Robert Gilmour LeTourneau was born in Vermont in 1888, left school at fourteen and worked as an iron molder, mechanic and garage owner, mostly without success. In California in the 1920s he began building earthmoving scrapers for road and dam work and soon designed better machines than he could buy. The business nearly failed more than once. In 1932, deep in debt during the Depression, he pledged a large gift to his church's missions anyway. Within a few years his business recovered, and by the late 1930s he was giving 90 percent of his income and living on the rest, an arrangement he kept for the rest of his life.

How they figured it out. LeTourneau was a gifted inventor who held about 300 patents, but his business grew because customers trusted his machines and his word. Contractors on dams and highways needed equipment that would not break down in the field, and when his machines did fail he redesigned them. During the Second World War his plants built a large share of the earthmoving machines used by the Allied armies to clear airfields and roads. He told audiences that God was his partner and that a Christian businessman should be the best businessman in his field. In 1946 he founded LeTourneau Technical Institute in Longview, Texas, now LeTourneau University, to train engineers and technicians.

The big idea. In the Christian tradition, a **vocation** is not only for pastors. The Reformers taught that a farmer, a smith or a merchant who does honest work for his neighbor serves God as truly as a monk. In business, this calling shows itself in **integrity**: honest weights, honest claims, promises kept and wages paid. Integrity is right in itself, and it is also wise, because **reputation** is a business's most valuable asset. A trusted business keeps **repeat customers** who buy for years and send their friends; a business caught cheating loses them all.

What character looks like. A trustworthy entrepreneur tells the truth about the product, including its limits; keeps promises on price and delivery; pays suppliers and workers on time; fixes mistakes without being asked; refuses deals that harm the customer; and treats the business as a stewardship, not an idol. Diligence, humility, patience and generosity belong on the list too. LeTourneau was not perfect (he could be headstrong and took on risky expansions), but he tried to run his business by these rules.

In business today. Online reviews, credit reports and word of mouth make reputation visible faster than ever. Many businesses lose more through one dishonest act than they gain from years of advertising. “A good name is rather to be chosen than great riches” (Proverbs 22:1) is not only a moral rule but also sound business arithmetic, as the worked examples show.

PICTURE STUDY



The Syndics of the Drapers' Guild, Rembrandt van Rijn, 1662 · Oil on canvas · Rijksmuseum, Amsterdam

Image: Wikimedia Commons, public domain

The men in Rembrandt's painting were elected by Amsterdam's cloth guild to inspect the quality of dyed cloth and check that it matched the samples sold. Their job was to protect the guild's reputation for honest goods. Rembrandt painted them as men of integrity, looking up from their book as if a customer had just walked in.

Look closely

- Find the book on the table. What might the syndics be checking?
- Look at their faces. What qualities did Rembrandt want viewers to see?
- Find the man who seems to be rising from his chair. Why might he be standing?
- Look at their plain black clothing. What does it suggest about how they wanted to be seen?

Talk about it

1. Why would every cloth maker in Amsterdam benefit from honest inspectors?
2. Who inspects the honesty of a small business today?
3. If you hung a picture in your future business to remind you of integrity, would this be a good one? Why?

PROJECT

A Reputation Audit and a Business Creed

You will study how trust is earned and lost by surveying people you know about businesses they trust, then write a creed for your own future business.

You will need

- Ledger notebook
- A short survey form (on paper or a spreadsheet)

Steps

1. Write a five-question survey: Name a business you trust. Why? Name one you stopped using. Why? What would make you return?
2. Survey at least eight adults you know (family, church, neighbors) with a parent's help.
3. Sort every reason given into categories: product quality, price, honesty, service, keeping promises, treatment of workers, other.
4. Tally the categories and make a bar chart.
5. Calculate: if a business lost the customers who cited its broken promises, and each was worth $500 in future profit, what would it lose in your sample?
6. Write a six-line creed for a business you might start, with one line drawn from each of your top categories.
7. For each line, write how a customer could check whether you keep it.
8. Write a sentence about which line will be hardest for you and why.

Tips

- Ask follow-up questions ("Can you tell me what happened?"); stories reveal more than ratings.
- Keep names of businesses private in your report if a story is unflattering.

Check your work

- ☐ I can explain vocation, integrity and reputation with examples.
- ☐ My survey has at least eight responses, a tally and a chart.

- [ ] My creed has six checkable lines.

LEDGER NOTEBOOK

1. Draw a “trust ledger”: on the left, actions that add trust; on the right, actions that withdraw it. Add five to each side.
2. Copy your survey chart and the lifetime-value calculation.
3. Write your creed neatly and sign and date it.

KEY FORMULAS

$$\text{Lifetime value} \approx \text{profit per purchase} \times \text{purchases per year} \times \text{years as a customer}$$

From history. LeTourneau’s autobiography, *Mover of Men and Mountains*, was published in 1960. He also flew his own airplane to speaking engagements across the country, often several times a week, telling businessmen about his faith. He died in 1969 in Longview, Texas.

WORKED EXAMPLES

Example 1. A bakery earns $3 profit on a customer’s weekly loaf. A loyal customer buys 50 weeks a year for 6 years. What is that customer’s approximate lifetime value? If a dishonest act costs the bakery 40 such customers, what is lost?

Show solution

1. Lifetime value: $\$3 \times 50 \times 6 = \$900$.
2. Loss: $40 \times \$900 = \$36{,}000$.

Answer: About $900 per customer; losing 40 customers costs about $36,000 in future profit.

Example 2. A repair shop could save $15 a job by using a cheaper part that fails sooner, without telling customers. It does 400 jobs a year. If 10% of those customers discover it and never return, and each was worth $300 in future profit, does the trick pay even on money alone?

Show solution

1. Short-term gain: $400 \times \$15 = \$6{,}000$.
2. Customers lost: $0.10 \times 400 = 40$; future profit lost: $40 \times \$300 = \$12{,}000$.
3. Net: $\$6{,}000 - \$12{,}000 = -\$6{,}000$, before counting the lost referrals and the wrong done.

Answer: No. The shop loses about $6,000 in future profit; and the deception is wrong whether or not it is discovered.

Example 3. LeTourneau gave 90% of his income. If a business owner earns $80,000 and gives 10%, and another earns the same and gives 90%, how much does each keep?

Show solution

1. 10% giving: keeps $0.90 \times 80{,}000 = \$72{,}000$.
2. 90% giving: keeps $0.10 \times 80{,}000 = \$8{,}000$.

Answer: $72,000 and $8,000. LeTourneau could give 90% only because his income had grown large; the principle for everyone is cheerful, planned generosity (2 Corinthians 9:7), not a particular percent.

PRACTICE

1. Easy Define vocation.

   Show answer

   A calling: the work God gives a person to do in service to others, in any honest field.

2. Easy What school did LeTourneau found, where and when?

   Show answer

   LeTourneau Technical Institute (now LeTourneau University), Longview, Texas, 1946.

3. Easy What share of his income did LeTourneau give in his later life?

Show answer

About 90 percent.

4. Medium List five practices of a trustworthy business owner.

Show answer

Any five: tells the truth about products and limits; keeps promises on price and delivery; pays workers and suppliers on time; fixes mistakes; refuses harmful deals; treats the business as a stewardship.

5. Medium A coffee shop earns $1.50 profit per visit. A regular comes 3 times a week, 48 weeks a year, for 4 years. Find the lifetime value.

Show answer

$1.50 \times 3 \times 48 \times 4 = \$864$

6. Medium Explain how the Reformers changed the meaning of "calling."

Show answer

Before, "calling" often meant the religious life of priests and monks. Luther and other Reformers taught that every honest station (farmer, parent, merchant, magistrate) is a calling in which one serves God by serving the neighbor.

7. Medium A store earns $20,000 a year from repeat customers. It loses 15% of them after a bad public review it ignored. How much yearly profit is lost?

Show answer

$0.15 \times 20{,}000 = \$3{,}000$ a year.

8. Hard Why is integrity "wise" as well as right? Answer with a numerical example of your own.

Show answer

Reputation brings repeat customers and referrals, which are worth far more than the gain from a single dishonest act. Example: saving $5 per sale on 100 sales ($500) while losing 10 customers worth $200 each ($2,000).

9. Hard LeTourneau pledged a large gift while in debt in 1932. Discuss one argument for and one argument against that decision from the point of view of stewardship.

Show answer

For: it expressed trust in God and a settled priority of generosity, and he kept his word. Against: creditors also have a claim (Romans 13:8; Psalm 37:21), so a debtor should not give away what he owes. Strong answers note that both views appeal to faithfulness.

10. Hard Give a business example of keeping a promise "to thine own hurt" (Psalm 15:4).

Show answer

Sample: a contractor who quoted a fixed price finishes the job at that price even though lumber costs rose, accepting a smaller profit, because the customer relied on the quote.

11. Challenge Write a short creed (5–7 lines) for a business you might start, modeled on LeTourneau's or J. C. Penney's ideals, and explain how a customer could check whether you live up to each line.

Show answer

Answers vary. Each line should be specific and checkable (for example, "We deliver on the day we promise or call before," checked by delivery records).

COMMON MISTAKES

- Thinking honesty is only a rule for when you might be caught. Integrity means the same conduct when no one is watching.
- Thinking a calling must be a church job. Honest work in any field can be a vocation.
- Measuring a customer by one sale instead of a lifetime of purchases and referrals.

> **Make it a game · Truth or Tall Tale.** Say three statements about R. G. LeTourneau, vocation or reputation. Two are true; one is a tall tale. Your parent guesses which. Then switch roles. Finish with a role play: your parent is a customer who received poor work. You have thirty seconds to make it right in a way that earns a repeat customer and keeps your integrity.

> **Scripture.** “And whatsoever ye do, do it heartily, as to the Lord, and not unto men;” (Colossians 3:23, KJV)
>
> This verse turns every honest job into a vocation: the scraper builder, the clerk and the bookkeeper all work, finally, for the Lord. Work done that way is careful, honest and diligent.

1.5 The Six Stakeholders: The Cadbury Brothers and Bournville

OBJECTIVES

- Name the six stakeholders of a business and explain what each contributes and needs.
- Tell how George and Richard Cadbury rebuilt their family's business, moved it to Bournville in 1879 and built a village for workers, and where they fell short.
- Complete and defend a six-stakeholder scorecard for a real business.

> **Warm-up.** Pick a product in your kitchen. List every group of people who had something to do with it reaching you: who paid for the factory, who started the company, who designed it, who made it, who sold it, who lives near the factory. How many groups did you find?

WATCH

How This Poor Boy Built the Cadbury Empire

YourFamilyTree · 8:32

https://www.youtube.com/watch?v=6-CxJi9T83s

> **WHEN TO WATCH**
> After the story of the Cadbury brothers.

BACKUP VIDEO

Cadbury's Bournville factory, 1930's. Archive film 96940

HuntleyFilmArchives · 4:36

https://www.youtube.com/watch?v=E-TFtaa8T88

Optional, silent archive footage of the Bournville works in the 1930s.

KEY TERMS

stakeholder

A person or group with something at stake in a business: money, work, a purchase or a neighborhood.

financiers

The people who lend or invest the money: bankers, shareholders, partners.

risk-takers

The founders and owners who put their own savings, time and reputation on the line.

builders

The inventors, engineers, managers and craftsmen who design and make the product or system.

stakeholder scorecard

A table rating how well a business serves each of the six stakeholders, with evidence for every rating.

CORE IDEAS

The story. John Cadbury, a Quaker, opened a shop in Birmingham, England, in 1824, selling tea, coffee and cocoa, and later made cocoa himself. By 1861 the business was failing, and his sons Richard and George took it over, putting in their own inheritances. For several years they lost money and nearly gave up. In 1866 they bought a press from the Netherlands that squeezed out much of the cocoa butter, letting them sell a pure cocoa at a time when many makers mixed cocoa with starch and other fillers. They advertised it as "Absolutely Pure, Therefore Best," and sales grew.

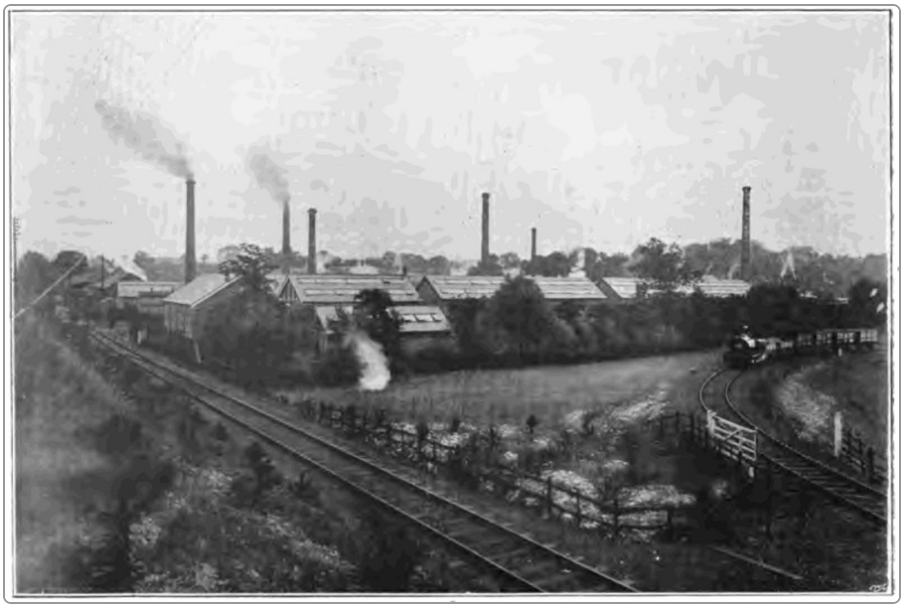
How they figured it out. The brothers believed a factory should be good for the people who worked in it. In 1879 they moved out of crowded Birmingham to a green site four miles south, which they named Bournville, with gardens, sports fields and a rail link. They introduced a half-day holiday on Saturdays, sick pay, a pension fund, education classes for young workers and, later, elected works councils. From 1893 George Cadbury built a village of well-built cottages with large gardens near the factory, open to anyone, not only Cadbury workers, and in 1900 he gave it to a trust so it could not be sold for profit. Bournville became a model for planned towns.

The big idea. Every business has **six stakeholders**. The **financiers** lend or invest the money. The **risk-takers** are the founders and owners. The **builders** design and make the product. The **workers** earn wages and give their time, skill and health. The **customers** pay for the product and trust it. **The community** provides the place, the roads and the neighbors, and bears any harm. A business is **great** when it creates real value and serves all six over a long time. A **stakeholder scorecard** rates each from 1 to 5 with evidence.

Where they fell short. In the early 1900s it became known that much of the cocoa Cadbury bought came from plantations on the Portuguese islands of São Tomé and Príncipe, where laborers were taken from the African mainland and held in conditions little different from bondage. The Cadburys learned of the reports in 1901, sent an investigator and pressed for reform, but kept buying until 1909, a delay many critics thought too long. When they stopped, they turned to cocoa grown by independent farmers in the Gold Coast (now Ghana). The episode shows that serving one's own workers well does not settle every duty along the supply chain.

In business today. Investors, customers and communities now ask companies about their workers, suppliers and neighbors as well as their profits. A wise entrepreneur asks the six-stakeholder questions before a crisis forces them. Use the scorecard for every business you study this year, and for your own venture in Unit 10.

PICTURE STUDY



Bournville: The Factory in a Garden, Unknown photographer, 1903 · Photograph · From a 1903 book on cocoa and chocolate (Wikimedia Commons)

Image: Wikimedia Commons, public domain

The Cadburys called Bournville "the factory in a garden." Compare this picture with the crowded mills of Birmingham or the Edgar Thomson Works in Lesson 1.2. Every lawn and tree here cost money that could have gone to owners.

Look closely

- Find the factory buildings and the chimneys. How much open land surrounds them?
- Find the railway. Why did the Cadburys choose a site beside it?
- Look at the trees and fields. Who would enjoy them, and when?
- Compare the space around this factory with a crowded city mill.

Talk about it

1. Which stakeholders gained from the gardens, and which paid for them?
2. Could a small business today do something similar on a small scale? What?
3. What does this picture not show about the business's supply chain?

PROJECT

A Stakeholder Scorecard for a Real Business

You will choose a real business (local or historical), gather evidence about each of its six stakeholders, and write a scorecard and a one-page stakeholder report.

You will need

- Ledger notebook or spreadsheet
- Sources: the business's website and history page, news and encyclopedia articles, or an interview with a parent present

Steps

1. Choose a business you can find evidence about: a family business, a local company, or a historical firm such as Wedgwood, Hershey, LEGO or Ford.
2. For each of the six stakeholders, write one question (for example, Workers: How are they paid and treated? Community: What does the business give and what harm does it cause?).
3. Gather at least two pieces of evidence for each stakeholder and note the source.
4. Rate each stakeholder 1–5 and write one sentence of evidence for the rating.
5. Total the scorecard and identify the strongest and weakest stakeholders.
6. Write a one-page report: what the business does, its scorecard, and one specific change that would raise its weakest score.
7. Exchange reports with a parent or classmate and ask whether each rating is supported. Revise one rating if the evidence is weak.

Tips

- Look for evidence on both sides; a company's own website tells only its side.
- Be fair. A rating of 3 is not an insult; it means mixed.

Check your work

- ☐ I can name the six stakeholders and what each needs.
- ☐ Every rating on my scorecard has evidence and a source.
- ☐ My report suggests one specific improvement.

LEDGER NOTEBOOK

1. Draw a wheel with the business in the center and six spokes for the stakeholders. On each spoke, write what that group gives and what it receives.
2. Copy your scorecard with ratings, evidence and total.
3. Make a timeline: 1824 John Cadbury's shop; 1861 sons take over; 1866 the press; 1879 Bournville; 1893 village; 1900 trust; 1905 Dairy Milk; 1909 São Tomé purchases end.

KEY FORMULAS

$$\text{Scorecard total} = \sum_{i=1}^{6} r_i, \quad 6 \le \text{total} \le 30$$

From history. George Cadbury taught an adult Sunday-morning Bible class for about fifty years. The Cadbury family, as Quakers, did not drink alcohol and promoted cocoa as a wholesome drink for working families. Cadbury Dairy Milk, launched in 1905, became Britain's best-selling chocolate bar.

WORKED EXAMPLES

Example 1. Complete a six-stakeholder scorecard for Cadbury at Bournville around 1905, with a rating (1–5) and one piece of evidence for each.

Show solution

1. Financiers: 4. The family's money was risked and rewarded; the firm grew steadily and paid its way.
2. Risk-takers: 5. Richard and George put in their inheritances, survived early losses and built a lasting business.
3. Builders: 5. The Dutch press, pure cocoa and new products such as Dairy Milk (1905) showed skill and innovation.
4. Workers: 5. Better pay and conditions than most factories, pensions, sick pay, education, sports and the Saturday half-holiday.
5. Customers: 4. Pure, honestly labeled cocoa at fair prices; lower if one counts the supply-chain concerns customers did not know of.
6. Community: 3. The Bournville village was a gift to the region, but the cocoa purchases from São Tomé harmed distant laborers until 1909.

Answer: Total $4 + 5 + 5 + 5 + 4 + 3 = 26$, out of 30. Reasonable ratings may differ by a point if the evidence supports them.

Example 2. A small bakery pays workers $14 an hour while similar bakeries pay $12. It employs 6 workers for 1,800 hours a year each. How much more does it pay per year, and what might it gain in return?

Show solution

1. Extra per hour: $\$14 - \$12 = \$2$.
2. Extra per year: $\$2 \times 1{,}800 \times 6 = \$21{,}600$.
3. Possible returns: lower turnover (each departure may cost hundreds or thousands of dollars to hire and train), better quality and service, and a good name in town.

Answer: $21,600 a year more in wages. Whether it pays depends on what turnover, mistakes and reputation would otherwise cost; many employers, like the Cadburys, found that treating workers well also served customers.

PRACTICE

1. Easy Name the six stakeholders.

   Show answer

   Financiers, risk-takers, builders, workers, customers and the community.

2. Easy What did the Cadburys' 1866 press do, and how did they advertise the result?

   Show answer

   It pressed out much of the cocoa butter so they could sell pure cocoa without fillers; "Absolutely Pure, Therefore Best."

3. Easy When did Cadbury move to Bournville, and when was the village begun?

   Show answer

   The factory moved in 1879; the village was begun in 1893 (given to a trust in 1900).

4. Medium Explain the difference between financiers and risk-takers. Can one person be both?

Show answer

Financiers supply money (loans or investment); risk-takers are founders and owners who stake their savings, time and reputation. Yes: an owner who puts in his own money is both.

5. Medium Name one way a business can harm the community even while serving its customers well.

Show answer

Examples: pollution or noise, traffic, closing suddenly and leaving debts, buying from suppliers who abuse workers.

6. Medium A factory with 300 workers cuts turnover from 30% to 15% a year. If each replacement costs $2,000 to hire and train, what does it save each year?

Show answer

Departures fall from 90 to 45; savings $45 \times \$2{,}000 = \$90{,}000$.

7. Medium Why did George Cadbury give the Bournville village to a trust in 1900?

Show answer

So the houses could not be sold off for profit and the village would stay a healthy, affordable place to live for the long term.

8. Hard The Cadburys learned of the São Tomé reports in 1901 and stopped buying in 1909. Give one argument that the delay was reasonable and one that it was not.

Show answer

Reasonable: they investigated, pressed for reform and needed a new supply of cocoa. Not reasonable: the reports were serious from the start, and eight years of purchases funded abuse of human beings, so they should have stopped sooner and accepted the cost.

9. Hard Build a scorecard for a business you know well, with ratings and evidence. What is its total, and which stakeholder is weakest?

Show answer

Answers vary; each rating must have specific evidence, and the total must be between 6 and 30.

10. Hard Is it possible for a business to score 5 for customers and 1 for workers and still last a long time? What usually happens?

Show answer

For a while, yes, but poor treatment of workers tends to raise turnover, lower quality and service, invite unrest or stricter rules, and damage the business's name, so the customer score usually falls too.

11. Challenge Write a paragraph explaining why "big" and "great" are different, using Carnegie (Lesson 1.2) and Cadbury as examples.

Show answer

Big measures size; great measures lasting service to all six stakeholders. Carnegie Steel was huge and served customers and financiers superbly but scored poorly with workers at Homestead. Cadbury was smaller but scored highly with workers and community at home, though not on its supply chain until 1909. Neither was perfect; the scorecard shows where each excelled and failed.

COMMON MISTAKES

- Rating stakeholders without evidence. Every number needs a reason.
- Forgetting the community and the supply chain. Harm to people far away counts.
- Treating the scorecard as a final verdict. It is a tool for judging honestly and improving.

> **Make it a game · Six Seats at the Table.** From memory, write each of the six stakeholders on its own card and set the cards around a table. Your parent shuffles, draws one, and you have twenty seconds to say what that stakeholder contributes and what it needs. Each missed point costs a card. Finish by naming one thing the Cadburys did well at Bournville and one place they fell short.

> **Scripture.** “Look not every man on his own things, but every man also on the things of others.” (Philippians 2:4, KJV)
>
> The six-stakeholder scorecard is a disciplined way of obeying this verse in business: before asking “What will I gain?”, ask what the decision means for everyone else with a stake in it.

UNIT 1

The Entrepreneur

An entrepreneur is a person who sees a need, gathers the money, people and materials to meet it, and bears the risk that it will not work. This unit begins with the word itself, coined by the Irish-French banker Richard Cantillon, and with Cyrus McCormick, who did not only invent a reaper but also learned to build, demonstrate, guarantee, finance and sell it. Then it looks at the pattern in great entrepreneurs, with Andrew Carnegie's rise from bobbin boy to steelmaker, and at risk and reward through Milton Hershey's string of failures before his caramel company succeeded.

The last two lessons ask what kind of person an entrepreneur should be. R. G. LeTourneau, the earthmoving-machine builder who gave away most of his income, shows character and vocation; the Cadbury brothers' chocolate works and their village at Bournville introduce the **six stakeholders** and the stakeholder scorecard you will use all year. By the end of the unit you will be able to explain what entrepreneurs do, calculate a simple expected value, and judge a business by what it means for everyone who has a stake in it.

PREREQUISITES

- Comfortable with percents, decimals and simple averages
- Can solve a one-step equation and use a formula
- Has a bound notebook and a spreadsheet program ready for the year

MASTERY CHECKLIST

- ☐ I can define an entrepreneur in Cantillon's, Say's and Schumpeter's terms and give a historical example of each.
- ☐ I can describe the common habits of great entrepreneurs and the failings that marred some of them.
- ☐ I can calculate expected value, a simple return on investment and the cost of failure, and explain how entrepreneurs reduce risk.
- ☐ I can explain work as a calling and describe the character traits that make a business trustworthy.
- ☐ I can complete a six-stakeholder scorecard for a real business and defend each rating with evidence.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- ***The Autobiography of Benjamin Franklin* (Project Gutenberg)**: Free. Franklin's own story of starting a printing business, his partnerships and his list of thirteen virtues. Read the chapters on his first shop alongside Lessons 1.2 and 1.4. Ages 13+.
- **Andrew Carnegie, "Wealth" ("The Gospel of Wealth," 1889)**: Free from the Carnegie Corporation of New York. Carnegie's short essay on the duty of the rich to give their fortunes away during their lives. Use with Lesson 1.2 and discuss where you agree and disagree. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

1.1 What Entrepreneurs Do: Cantillon, Say and McCormick's Reaper

3 sessions of 50 minutes

1.2 Great Entrepreneurs in History: Andrew Carnegie and the Pattern of the Builder

3 sessions of 50 minutes

1.3 Risk and Reward: Milton Hershey's Failures and the Caramel Company

3 sessions of 50 minutes

1.4 Character and Vocation: R. G. LeTourneau and the Trustworthy Entrepreneur

3 sessions of 50 minutes

1.5 The Six Stakeholders: The Cadbury Brothers and Bournville

3 sessions of 50 minutes

Unit 1 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**

   Define entrepreneur as Cantillon did, and as Schumpeter did.

2. **5 pts**

   Name four things Cyrus McCormick did besides inventing the reaper that turned it into a successful business.

3. **6 pts**

   A tool costs a customer $150 and saves him $45 a year for 5 years, with $5 a year in upkeep. What is the value to the customer?

4. **5 pts**

   Define vertical integration and explain why Carnegie used it.

5. **6 pts**

   A cost of $5.00 per unit is cut by 12%. What is the new cost, and the savings on 40,000 units?

6. **5 pts**

   Name the five habits of great builders from Lesson 1.2.

7. **7 pts**

   Find the expected value: 40% chance of +$500, 35% chance of +$100, 25% chance of −$400.

8. **6 pts**

   You invest $800 and receive $1,040. What is the ROI?

9. **6 pts**

   Describe two of Milton Hershey's failures and the lesson he learned before the Lancaster Caramel Company succeeded.

10. **6 pts**

    Plan X: 80% chance of +$300, 20% chance of −$200. Plan Y: 50% chance of +$2,000, 50% chance of −$1,500. Find both expected values. Which would you advise a beginner with $500 in savings to choose, and why?

11. **5 pts**

    Explain what “vocation” means in the Christian tradition and how it applies to a shop owner.

12. **6 pts**

    A customer brings $2 profit per visit, visits twice a week for 50 weeks a year, and stays 3 years. What is the lifetime value? What is lost if a dishonest act drives away 25 such customers?

13. **5 pts**

    Name the six stakeholders and give one thing each contributes to a business.

14. **6 pts**

    Name three things the Cadbury brothers did for their workers and one way the business fell short.

15. **5 pts**

    For what probability p of success does a venture costing $500 and returning $2,000 on success (nothing on failure) have a positive expected profit?

16. **16 pts**

    Essay (one to two paragraphs): Choose Carnegie, Hershey or the Cadburys. Using the six-stakeholder scorecard, argue whether the business was great and not merely big. Give a rating and evidence for at least four stakeholders.

ANSWER KEY

1. Cantillon: one who buys or pays costs at known prices to sell at uncertain prices, bearing uncertainty. Schumpeter: an innovator who brings new products, methods, markets or organizations into use.
2. Any four: field demonstrations; a written guarantee; credit payable after harvest; a fixed published price; a factory in Chicago near customers; agents who sold and repaired machines.
3. Benefit $5 \times 45 = \$225$; costs $150 + 5 \times 5 = \$175$; value $\$50$.
4. Owning several stages of production. Carnegie bought ore mines, coke ovens and transport to secure supplies, control quality and cut costs.
5. $5.00 \times 0.88 = \$4.40$; savings $0.60 \times 40{,}000 = \$24{,}000$.
6. Serving a large need, careful measurement, reinvestment, choosing good partners and managers, persistence.
7. $0.4(500) + 0.35(100) + 0.25(-400) = 200 + 35 - 100 = \$135$
8. $(1040 - 800)/800 = 30\%$
9. Philadelphia shop (1876–1882) failed with high costs and credit sales; New York business failed in 1886. He learned the fresh-milk caramel recipe in Denver and, back in Lancaster, started small with a proven product and a real order before expanding.
10. X: $240 - 40 = \$200$; Y: $1000 - 750 = \$250$. Choose X: Y's higher average comes with a 50% chance of a $1,500 loss, three times the beginner's savings.
11. A calling from God to serve others in one's work. A shop owner serves God by honest dealing, good products, fair treatment of workers and faithful stewardship of the business.
12. $2 \times 2 \times 50 \times 3 = \$600$; $25 \times 600 = \$15{,}000$.
13. Financiers (money), risk-takers (savings, time, reputation), builders (design and skill), workers (labor and time), customers (payment and trust), community (place, roads, neighbors).
14. Any three: Saturday half-holiday, sick pay, pensions, education classes, works councils, gardens and sports fields, the Bournville village. Fell short: kept buying São Tomé cocoa produced by forced labor from 1901 until 1909.
15. $2000p - 500 > 0 \Rightarrow p > 0.25$.
16. Graded on a clear claim, accurate history, ratings with specific evidence for four or more stakeholders, and honest treatment of both strengths and failings (for

example, Carnegie's low steel prices and libraries against Homestead; Hershey's school and town against his early debts; Cadbury's workers against São Tomé).

PORTFOLIO PIECE: ENTREPRENEUR PROFILE AND STAKEHOLDER REPORT

Combine your work from this unit into a short file: the local business profile from Lesson 1.1, your comparison chart of great entrepreneurs, your risk ledger with expected value, your business creed, and your stakeholder scorecard and report. Add a one-page introduction: what kind of entrepreneur you hope to be and which stakeholder you will find hardest to serve well.

LOOK FOR	WHAT IT MEANS
Accuracy	Facts, dates and calculations are correct and sourced.
Evidence	Every rating, classification and claim is supported by specific evidence.
Honesty	Strengths and failings are both shown; estimates are realistic.
Reflection	The introduction applies the unit's lessons to the student's own plans thoughtfully.

UNIT 2

Finding and Testing an Idea

Most new ventures fail not because they are badly run but because they make something too few people want. This unit teaches the habits that guard against that: seeing real needs, as Clarence Birdseye did when he watched fish freeze in the Labrador winter; asking customers about their lives instead of pitching to them, as Charles Coolidge Parlin did when he counted soup cans in Philadelphia's trash; and building the smallest thing that can teach you something, as Henry Ford did with his Quadricycle in a backyard shed.

Then you will test demand with real money, as Richard Sears did with a box of unwanted watches, and learn when and how to change course, following the Wright brothers from bicycles to the airplane and Ole Kirk Christiansen from wooden toys to the LEGO brick. By the end of the unit you will have interviewed real people, built a simple prototype and run a small, honest demand test for an idea of your own.

PREREQUISITES

- Knows what entrepreneurs do and the six stakeholders (Unit 1)
- Can compute percents and simple averages
- Can make a simple table and bar chart

MASTERY CHECKLIST

- ☐ I can find and describe real needs by observing problems, workarounds and complaints.
- ☐ I can plan and conduct a customer interview that asks about past behavior rather than opinions of my idea.
- ☐ I can design a minimum viable product and state what it is meant to teach.
- ☐ I can run a small demand test and calculate conversion rates and a projected demand.
- ☐ I can decide between persevering and pivoting using evidence, and avoid the sunk-cost trap.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Kauffman Foundation entrepreneurship resources**: Free articles and research from the Ewing Marion Kauffman Foundation on starting and testing new businesses. A parent may preview; useful throughout the course. Ages 14+.
- **U.S. Small Business Administration, "Plan your business"**: Free government guide to market research and competitive analysis, with links to free data. Use with Lessons 2.2 and 2.4. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

2.1 Seeing Needs: Clarence Birdseye and the Fish That Froze in Labrador

3 sessions of 50 minutes

2.2 Customer Interviews: Charles Coolidge Parlin and the First Market Research

3 sessions of 50 minutes

2.3 The Minimum Viable Product: Henry Ford's Quadricycle 3 sessions of 50 minutes

2.4 Testing Demand: Richard Sears and a Box of Unwanted Watches

3 sessions of 50 minutes

2.5 Pivoting: The Wright Brothers' Bicycle Shop and LEGO's Wooden Toys

3 sessions of 50 minutes

Unit 2 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   What did Clarence Birdseye observe in Labrador, and what scientific fact explained it?

2. **5 pts**

   Define a workaround and a job to be done, and give an example of each.

3. **6 pts**

   A town has 8,000 households; 20% have the need; 25% of those would pay $12 a month. What is the monthly market?

4. **6 pts**

   Describe Parlin's soup-can study and explain why it was more persuasive than a survey of opinions.

5. **6 pts**

   Rewrite as good interview questions: (a) "Would you use my snow-shoveling service?" (b) "Isn't shoveling exhausting?"

6. **5 pts**

   Of 18 people interviewed, 12 had the problem in the past month. What percent? Is this enough to build a factory? Explain.

7. **5 pts**

   Describe Ford's Quadricycle and explain why it was an MVP rather than a product.

8. **5 pts**

   Name the build–measure–learn steps and apply them to a homemade-candle idea.

9. **6 pts**

   A test costs $90 and tests 3 assumptions; another costs $24 and tests 2. Find the cost per assumption for each.

10. **6 pts**

    You offer a product to 40 people and 10 buy. Find the conversion rate and the projected buyers among 500 similar people, and a cautious projection one-third lower.

11. **6 pts**

    Tell how Richard Sears tested demand in 1886 and why his first market was well chosen.

12. **5 pts**

    Test A: 3 of 8 buy. Test B: 24 of 120 buy. Compute both rates and say which you would plan on.

13. **6 pts**

    You have spent $250 on a venture. Continuing costs $100 more for an expected $80 benefit; pivoting costs $60 more for an expected $140 benefit. What should you do?

14. **6 pts**

    Explain how the Wright brothers' bicycle business made their airplane possible.

15. **6 pts**

    Trace LEGO's pivot from wooden toys to the brick with four dates.

16. **16 pts**

    Essay: Using at least two stories from this unit, explain why entrepreneurs should test small before building big, and describe the honesty a test owes to customers.

ANSWER KEY

1. Fish frozen almost instantly at about −40° tasted nearly fresh later; fast freezing forms small ice crystals that do little damage to cells, while slow freezing forms large crystals that tear them.
2. Workaround: a makeshift way of coping with a problem (salting fish). Job to be done: the progress a customer seeks (serve good vegetables all winter).
3. $8{,}000 \times 0.20 \times 0.25 = 400$; $400 \times 12 = \$4{,}800$.
4. He had trash from different Philadelphia neighborhoods collected and counted soup cans, finding working-class families bought more canned soup than wealthy ones. It measured real purchases rather than what people said.
5. Samples: (a) “Tell me about the last big snow. Who cleared your driveway, and how?” (b) “How do you usually handle snow on your walk? What has that cost you?”
6. $12/18 \approx 67\%$. No: it suggests a real need in a small sample; next run an MVP and a demand test before investing heavily.
7. A light gasoline vehicle on four bicycle wheels with a two-cylinder engine, tiller and no reverse, built in a shed in 1896. Its purpose was to test whether such a vehicle would work and to learn, not to sell in quantity.
8. Build: make ten candles. Measure: offer them at a family event and count sales and comments. Learn: decide what to change (scent, size, price) and test again.
9. $90/3 = \$30$; $24/2 = \$12$.
10. 25%; $500 \times 0.25 = 125$; cautious about 83.
11. He bought a refused shipment of watches and offered them to other railroad station agents by telegraph and mail; they sold at a profit. The agents needed accurate watches and were reachable cheaply through his own network.
12. A 37.5%, B 20%. Plan on about B’s rate: its larger sample is far more reliable.
13. Ignore the sunk $250. Continue: $80 - 100 = -\$20$; pivot: $140 - 60 = +\$80$. Pivot.
14. Profits funded experiments; shop tools built gliders, a wind tunnel and parts; bicycle work taught light structures, chains and balance; their mechanic Charlie Taylor built the engine.
15. 1932 wooden toys begin; 1934 LEGO name; 1947 plastic molding machine; 1949 Automatic Binding Bricks; 1958 stud-and-tube patent; 1960 wooden toys end after a warehouse fire. (Any four accurate.)

16. Graded on a clear thesis, accurate use of two or more stories (Birdseye's first failure, Parlin's count, the Quadricycle, Sears's watches, the Wrights or LEGO), correct use of terms (MVP, conversion, sunk cost, pivot), and specific duties: honest offers, delivering or refunding, protecting testers' safety and privacy.

PORTFOLIO PIECE: THE IDEA FILE

Assemble the evidence for one idea: your need-finding log and market estimate, your interview guide and tally, your MVP and its build–measure–learn log, your demand-test report, and your pivot-or-persevere decision. Add a one-page summary: the customer, the job to be done, what you tested, what the numbers showed and what you will do next.

LOOK FOR	WHAT IT MEANS
Evidence	Every claim about customers is backed by observations, interviews or test results, with numbers.
Method	Interviews avoid leading questions; the MVP tests the riskiest assumption; the decision ignores sunk costs.
Honesty	Weak or disappointing results are reported plainly; every promise to testers was kept.
Clarity	The summary is clear, organized and states a decision with reasons.

2.1 Seeing Needs: Clarence Birdseye and the Fish That Froze in Labrador

OBJECTIVES

- Tell how Clarence Birdseye turned an observation in Labrador into quick-frozen food, and why his first company failed.
- Find needs by looking for problems, workarounds, complaints and "jobs" customers are trying to get done.
- Estimate how many people share a need using simple arithmetic.

> **Warm-up.** Spend five minutes listing every small frustration you or your family had in the last week: something that took too long, broke, cost too much or was hard to find. Star the one that happens most often.

WATCH

Frozen Food: The $300 Billion Idea That Changed How We Eat | Billion Dollar Breakthrough

Business Insider · 9:07

https://www.youtube.com/watch?v=_JaI5zDFDig

> **WHEN TO WATCH**
> After the story of Labrador, before the big idea.

Note: From a business-history series; it ends with frozen food today.

KEY TERMS

need

A problem or desire that people care about enough to spend time or money on.

workaround

A makeshift way people cope with a problem because no good solution exists. Workarounds are clues to unmet needs.

job to be done

The progress a customer is trying to make in a situation; people "hire" a product to do that job.

pain point

A specific part of a problem that frustrates customers or costs them time or money.

market estimate

A rough calculation of how many people share a need and how much they might spend to meet it.

CORE IDEAS

The story. Clarence Birdseye, a naturalist from Brooklyn, spent several winters between 1912 and 1915 trading furs in Labrador, in far northeastern Canada. He learned from the Inuit to fish through holes in the ice. At forty degrees below zero, the fish froze almost the instant they were pulled out, and months later, when they were thawed and cooked, they tasted nearly fresh. At home, frozen food was known to be mushy and bland, and many families could get fresh vegetables and fish only in season. Birdseye noticed the difference and asked why.

How they figured it out. Back in the United States, Birdseye learned that slow freezing forms large ice crystals that tear the cells of food, while very fast freezing forms tiny crystals that do little harm. In 1922 he started a company to freeze fish fillets, and it went bankrupt within two years. He kept experimenting, and in 1924 he and partners formed a new company in Gloucester, Massachusetts, using machines that pressed packaged food between metal plates chilled to far below zero. In 1929 the business and its patents were sold for $22 million to the Postum Company (soon renamed General Foods) and Goldman Sachs. In March 1930, the first Birds Eye frozen foods went on sale in Springfield, Massachusetts. Few grocers had freezers, so the company leased display cases to stores, and frozen food spread slowly over the next two decades.

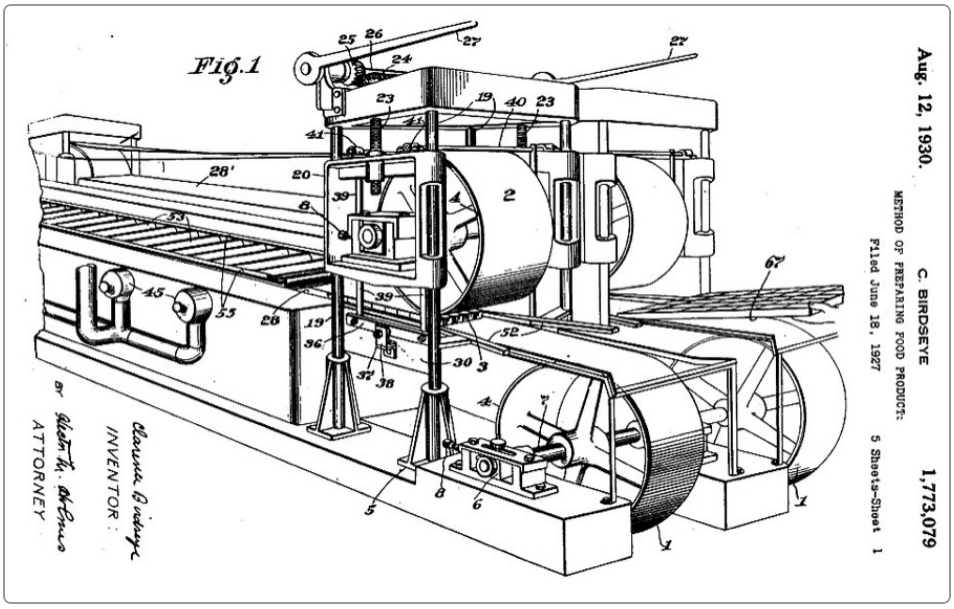
The big idea. Entrepreneurs begin with a **need**, not a product. Needs show themselves in **pain points** (food spoiled, winters without vegetables) and in **workarounds** (salting, canning, cellars). A helpful question is the **job to be done**: what progress is the customer trying to make? The family in 1925 wanted good food all year without daily shopping or waste. Birdseye did not invent freezing; he saw the job, understood why existing freezing did it poorly, and built a better way.

How to see needs. Watch people at work and at home. Listen for complaints and for "I wish." Notice what people pay for despite the cost, and what they do by hand that could be easier. Look at changes (new roads, new rules, new tools) that create new needs. Then do a rough **market estimate**: how many people have the need, how

often, and what they spend now. Birdseye's second lesson matters too: a real need does not guarantee early success. The stores needed freezers, and customers needed to learn to trust frozen food.

In business today. Many successful firms began when someone was annoyed by a problem in his own work or home. The best need-finders are humble observers. "The hearing ear, and the seeing eye, the LORD hath made even both of them" (Proverbs 20:12): use them before you build anything.

PICTURE STUDY



Birdseye's Patent for Freezing Packaged Food, Clarence Birdseye (inventor); U.S. Patent Office drawing, 1930 · Patent drawing, U.S. Patent 1,773,079 · U.S. Patent and Trademark Office (Wikimedia Commons)

Image: Wikimedia Commons, public domain

Birdseye received hundreds of patents. This drawing shows one of his methods for freezing packaged food quickly between chilled surfaces. The patent protected the know-how that made his company worth $22 million in 1929.

Look closely

- Find the flat surfaces that press against the packages. Why does contact speed up freezing?
- Find the numbered parts. Why does a patent drawing label every part?
- Look for where the food goes in and comes out.

Talk about it

1. How does this machine copy what Birdseye saw in Labrador?
2. Why would General Foods pay so much for patents like this one?
3. What other things would a grocer need before selling the food this machine made?

PROJECT

The Need-Finding Log

For one week you will observe and record needs in your home, church, neighborhood and among family friends, then estimate the market for the most promising one.

You will need

- Ledger notebook or a spreadsheet
- Sticky notes

Steps

1. Each day for a week, record at least five observations in a log with columns: date, place, who, problem, current workaround, how often, how much it costs them (time or money).
2. Listen especially for complaints and “I wish” statements from people you know; record their words exactly.
3. At the end of the week, put each observation on a sticky note and group similar ones.
4. Rewrite the three biggest groups as jobs to be done.
5. Score each job 1–5 on: how painful, how frequent, how many people, could you serve it safely. Total the scores.
6. For the top job, write a market estimate with every assumption shown.
7. Write a paragraph: Which need surprised you? Which would you test next, and why?

Tips

- Record what people do, not just what they say; workarounds reveal needs people may not mention.
- Do not judge ideas yet. Collect first.

Check your work

☐ I can explain needs, workarounds and jobs to be done.

☐ My log has at least 30 observations over seven days.

- [ ] My market estimate shows every assumption.

LEDGER NOTEBOOK

1. Draw a timeline: 1912–1915 Labrador; 1922 first company; 1924 bankruptcy and new company in Gloucester; 1929 sale for $22 million; 1930 first sales in Springfield.
2. Copy your top three jobs to be done with their scores.
3. Sketch the ice crystals in slow and fast freezing, with labels.

KEY FORMULAS

$$\text{Potential customers} = \text{population} \times \text{share with the need}$$
$$\text{Annual market} = \text{customers} \times \text{purchases per year} \times \text{price}$$

From history. Birdseye was a lifelong tinkerer. Besides his freezing patents, he worked on infrared heat lamps, a harpoon for marking whales for study, and a way to make paper pulp from sugarcane waste. He is said to have remarked that he did not regard himself as a remarkable man; he simply asked questions about what he saw.

WORKED EXAMPLES

Example 1. A town has 12,000 households. You estimate that 15% have a dog and that 30% of those would pay $20 a month for a midday dog walk. What is the potential monthly market in dollars?

Show solution

1. Dog households: $12{,}000 \times 0.15 = 1{,}800$.
2. Willing customers: $1{,}800 \times 0.30 = 540$.
3. Monthly market: $540 \times \$20 = \$10{,}800$.

Answer: About $10,800 a month in potential spending. One young person could serve only a small share; the estimate shows the need is real, not that one business can capture it all.

Example 2. Rewrite each product idea as a job to be done: (a) “a better lunchbox”; (b) “a phone holder for cars”; (c) Birdseye’s frozen peas.

Show solution

1. (a) “Help me pack a lunch my child will eat that stays cold until noon.”
2. (b) “Help me follow directions safely without holding my phone.”
3. (c) “Help me serve my family good vegetables in January without spoilage or a daily trip to the market.”

Answer: Each job describes the customer’s situation and goal, not the product. That opens other solutions and makes it easier to test whether the need is real.

PRACTICE

1. Easy What did Birdseye observe in Labrador?

   Show answer

   Fish caught at about −40° froze almost instantly and tasted nearly fresh when thawed months later.

2. Easy Why does slow freezing make food mushy?

   Show answer

   It forms large ice crystals that tear the food’s cells.

3. Easy Define a workaround and give an everyday example.

   Show answer

   A makeshift way of coping with a problem. Example: taping a note to the door because the family calendar is hard to see.

4. Medium In what year and where did Birds Eye frozen foods first go on sale? Why did they spread slowly?

   Show answer

   1930, Springfield, Massachusetts. Most grocers had no freezers (the company leased cases to stores) and customers distrusted frozen food.

5. Medium A county has 40,000 people; 8% are over 75. You think 1 in 5 of those would pay $15 a week for grocery delivery. What is the weekly market?

Show answer

$40{,}000 \times 0.08 = 3{,}200$; $3{,}200/5 = 640$; $640 \times \$15 = \$9{,}600$.

6. Medium Rewrite “a phone app for homework” as a job to be done.

Show answer

Sample: “Help me remember and finish every assignment on time without my parents reminding me.”

7. Medium Give three places to look for needs, with one example each.

Show answer

Sample: complaints (“the park has no shade”), workarounds (neighbors sharing a ladder), changes (a new subdivision needs lawn care).

8. Hard Birdseye’s first company failed in 1924. Using the lesson, give two reasons a real need may not produce early success.

Show answer

The supporting system may be missing (stores without freezers) and customers may not yet trust or understand the product; costs may also be too high at small scale.

9. Hard A market estimate gives $50,000 a year. Your realistic share is 2%. What revenue should you plan on? Why is it wiser to plan on your share than the total?

Show answer

$0.02 \times 50{,}000 = \$1{,}000$. You will reach only a fraction of customers, and competitors and substitutes serve the rest.

10. Hard Explain why “a solution looking for a problem” often fails, using a counter-example from Birdseye.

Show answer

Products made because they are clever, not because people need them, find few buyers. Birdseye started from a real job (good food all year) and a known pain (mushy frozen food), so once stores and customers caught up, demand followed.

11. **Challenge** Estimate the yearly market for birthday cakes from home bakers in a town of 20,000. State every assumption.

    Show answer

    Sample: 20,000 people, 1 birthday each a year; 25% celebrated with a bought cake = 5,000 cakes; 10% would buy from a home baker = 500 cakes; at $30 = $15,000 a year. Credit for clear, reasonable assumptions.

COMMON MISTAKES

- Starting with a product you like instead of a need others have.
- Treating a market estimate as a sales forecast. Your share will be small.
- Hiding assumptions. A market estimate is only as good as the assumptions you can show and defend.

> **Make it a game · Labrador Eyes.** Go on a five-minute scavenger hunt through the house for workarounds: a book under a wobbly table leg, tape on a frayed cord. For each one you find, name the pain point and the job the person was trying to get done. Then tell Birdseye's Labrador story in three sentences, including why his first company failed.

2.2 Customer Interviews: Charles Coolidge Parlin and the First Market Research

OBJECTIVES

- Tell how Charles Coolidge Parlin founded commercial market research at the Curtis Publishing Company beginning in 1911.
- Plan and conduct a customer interview that asks about past behavior and real problems rather than opinions of an idea.
- Summarize interview results in a tally and decide what they show.

> **Warm-up.** Ask a parent two questions and write the answers: (1) "Would you buy a gadget that keeps your keys from getting lost?" (2) "Tell me about the last time you lost your keys. What did you do?" Which answer tells you more? Why?

WATCH

Customer Discovery: What Do You Ask, with Justin Wilcox

Techstars · 6:59

https://www.youtube.com/watch?v=OTkP2JDeGWM

> **WHEN TO WATCH**
> After the story of Parlin, before you write your interview guide.

KEY TERMS

market research

Gathering facts about customers, competitors and markets to make better business decisions.

customer interview

A one-to-one conversation to learn about a person's problems, habits and spending.

open question

A question that cannot be answered yes or no ("Tell me about…", "How do you…").

leading question

A question that suggests the answer the asker wants ("Wouldn't you love…?"). It produces flattering but useless data.

sample

The group of people actually studied, chosen to represent a larger group.

The story. In 1911 the Curtis Publishing Company of Philadelphia, publisher of *The Saturday Evening Post* and *The Ladies' Home Journal*, hired a Wisconsin school principal named Charles Coolidge Parlin to do something new: find out facts about markets that would help advertisers. Curtis made its money selling advertising space, and it wanted to show companies who their customers were. Parlin traveled thousands of miles interviewing merchants, wholesalers and manufacturers, and his report on the farm-implement industry ran to hundreds of pages.

How they figured it out. Parlin's most famous study concerned the Campbell Soup Company, which doubted that advertising in Curtis magazines would help. Many assumed that well-to-do families bought canned soup. Parlin had trash collected from different Philadelphia neighborhoods and counted the soup cans. Working-class families, it turned out, bought far more canned soup than wealthy ones, who had cooks to make soup at home. Behavior, not opinion, had revealed the market. Campbell's became a major advertiser, and other publishers and companies soon set up research departments of their own.

The big idea. Market research replaces guesses with facts. The simplest kind is the **customer interview**. Its rule is to learn about the customer's life, not to pitch your idea. People are kind and will say they love an idea they will never buy. So ask about the past and the specific: "When did this last happen? What did you do? What did it cost? What have you tried?" Use **open questions** and avoid **leading questions**. Listen far more than you talk. Afterward, count: how many people had the problem, how often, what they spend now.

Who to ask, and how many. Interview people who might really be customers, not only friends who want to please you. Your **sample** should look like the market you hope to serve. Ten to twenty interviews often reveal the main patterns for a small venture; if the same problem comes up again and again, you have found something. If no one has the problem, or no one has tried to solve it, that is valuable news too.

In business today. Companies large and small still interview customers, watch them use products and study what they actually buy. The same honesty applies: tell people why you are asking, keep their answers private, and never use research as a disguised sales pitch. "Counsel in the heart of man is like deep water; but a man of understanding will draw it out" (Proverbs 20:5).

PICTURE STUDY



Campbell's Soups Newspaper Advertisement, Joseph Campbell Company (advertiser), 1914 · Newspaper advertisement · An Oregon newspaper (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This advertisement ran in an Oregon newspaper in 1914, a few years after Parlin's research for Curtis Publishing. Look at whom it seems to be speaking to; research about who bought canned soup shaped ads like this.

Look closely

- Find the price. Is it stated plainly?
- Find the people in the ad. Whom is the ad trying to reach?
- Find the main claim. Could a customer check whether it is true?

Talk about it

1. If you were Parlin, what would you want to know before designing this ad?
2. Which families in 1914 would find canned soup most useful, and why?
3. What questions would you ask a customer today about how she chooses soup?

Safety first. Interview only people you and your parent know, in person at home, church or another familiar place, or by phone with a parent nearby. Do not post surveys publicly online or collect anyone's personal information.

PROJECT

Ten Customer Interviews

Using one of the needs from your Lesson 2.1 log, you will write an interview guide, interview at least ten people you know who might be customers, and summarize what you learned.

You will need

- Ledger notebook or a spreadsheet
- An interview guide (one page)
- A parent to approve whom you interview

Steps

1. Choose the need from Lesson 2.1 and write who you think the customer is.
2. Write an interview guide of 6–8 open questions about past behavior: the last time the problem happened, what they did, what it cost, what they have tried, what they wish.
3. Check your guide for leading and hypothetical questions and rewrite them.
4. With a parent's approval, interview at least ten people who fit your customer description. Take notes; record nothing without permission.
5. Do not describe your idea until the last minute of the interview, if at all.
6. Tally the answers: how many have the problem, how often, what they spend now, what they have tried.
7. Write a one-page summary with percents and three direct quotations (no names).
8. Decide: continue with this need, change the customer group, or choose another need. Explain why.

Tips

- Silence is your friend. After an answer, wait; people often add the most useful detail.
- Ask "Why?" and "Can you tell me more?" more than anything else.

Check your work

- ☐ I can explain why interviews should ask about past behavior.
- ☐ I interviewed at least ten people and tallied the answers.
- ☐ My decision is based on the evidence.

LEDGER NOTEBOOK

1. Copy your interview guide and mark which questions were the most useful.
2. Make a tally table and bar chart of the answers.
3. Write the three most revealing quotations you heard.

KEY FORMULAS

$$\text{Share} = \frac{\text{number with a given answer}}{\text{number interviewed}} \times 100\%$$

From history. Parlin is often called the father of market research. The American Marketing Association's Philadelphia chapter has given an award in his name since 1945. His department at Curtis also produced studies of department stores and the automobile market, which helped advertisers decide where to spend.

WORKED EXAMPLES

Example 1. Rewrite each bad interview question as a good one: (a) "Would you buy homemade granola?" (b) "Don't you hate how expensive cereal is?" (c) "How much would you pay for my granola?"

Show solution

1. (a) Asks for a prediction about your product. Better: "What did you eat for breakfast this week? Where did it come from?"
2. (b) Leading. Better: "How do you decide which breakfast foods to buy?"
3. (c) Hypothetical. Better: "What did you spend on breakfast foods last week?"

Answer: Good questions are open, specific and about past behavior; they learn about the person rather than ask for approval.

Example 2. You interview 16 parents about school lunches. 11 say they pack lunches every day; 7 of those say packing takes more than 15 minutes; 3 say they have tried a meal-prep service and quit because of cost. What shares do these represent, and what do they suggest?

Show solution

1. Pack daily: $11/16 = 69\%$.
2. Spend over 15 minutes (of all 16): $7/16 = 44\%$.
3. Tried and quit a paid solution: $3/16 = 19\%$.
4. Interpretation: the problem is common and costs time; some parents have paid to solve it, so a cheaper or simpler solution might find buyers. A sample of 16 is small; treat this as a pattern to test, not proof.

Answer: 69%, 44% and 19%. The need appears real and some will pay, but price is a key concern.

PRACTICE

1. Easy Who hired Parlin in 1911, and why?

   Show answer

   The Curtis Publishing Company, to gather facts about markets that would help sell advertising.

2. Easy What did Parlin count to study canned-soup buyers, and what did he find?

   Show answer

   Soup cans in neighborhood trash; working-class families bought much more canned soup than wealthy families.

3. Easy Define a leading question and give an example.

   Show answer

   A question that suggests the desired answer, such as “Wouldn’t this save you lots of time?”

4. Medium Turn “Do you like my idea for a tutoring service?” into two good interview questions.

Show answer

Samples: “Tell me about the last time your child struggled with homework. What did you do?” “Have you ever paid for help with schoolwork? What was it like?”

5. Medium Of 20 people interviewed, 13 had the problem in the last month. What percent is that?

Show answer

$13/20 = 65\%$

6. Medium Why is past behavior a better guide than stated intentions?

Show answer

People are polite and optimistic about the future, but what they actually did and paid shows what they truly value.

7. Medium Why did Parlin’s trash count persuade Campbell’s more than opinions would have?

Show answer

It measured what families actually bought, contradicting the company’s assumption with hard evidence.

8. Hard You interview 12 friends from your youth group about a phone-repair service. What is wrong with this sample, and how would you fix it?

Show answer

It is small and unrepresentative (similar ages, friends who want to please). Interview a wider group of likely customers, such as parents and older neighbors you know, with a parent’s help.

9. Hard After 15 interviews, only 2 people have the problem you hoped to solve. What should you do?

Show answer

Treat it as useful evidence that the need is weak in this group. Look for a different customer group that has it, or change the problem you are solving, before building anything.

10. Hard List three ethical rules for customer interviews.

Show answer

Say honestly why you are asking; keep answers private and anonymous in reports; do not disguise a sales pitch as research. Also: interview only with a parent's approval and never collect personal details you do not need.

11. Challenge Design a "trash count" style study for a modern product: what would you count, where, and what would it reveal?

Show answer

Sample: with permission, count bakery bags and boxes in a church kitchen's recycling after events for a month to estimate how many bought baked goods are served and from where. It reveals actual purchasing rather than opinions.

COMMON MISTAKES

- Pitching instead of listening. If you talked more than a third of the time, you pitched.
- Counting compliments as evidence. "Great idea!" is not a purchase.
- Interviewing only friends. Seek people who are really likely to be customers.

Make it a game · Ask, Don't Pitch. Your parent plays a customer with a made-up problem, such as keeping houseplants alive. You have two minutes to interview them using only open questions about past behavior. Your parent says ding at every leading question or request for an opinion on your idea. Fewer than two dings wins. Afterward, say what Parlin's 1911 work added to business.

Scripture. "Counsel in the heart of man is like deep water; but a man of understanding will draw it out." (Proverbs 20:5, KJV)

People know far more about their own needs than they say at first. A good interviewer, like the man of understanding, patiently draws it out with good questions.

2.3 The Minimum Viable Product: Henry Ford's Quadricycle

OBJECTIVES

- Tell how Henry Ford built and sold his first experimental car, the Quadricycle, in 1896, and what he learned from it.
- Define a minimum viable product and the build–measure–learn loop.
- Design an MVP for your own idea, state the question it answers and estimate its cost.

> **Warm-up.** Your goal is to find out whether neighbors you know want fresh bread delivered on Saturdays. Write the cheapest, fastest way you could find out without buying an oven or starting a company.

WATCH

History of Henry Ford's Quadricycle | The Henry Ford's Innovation Nation

The Henry Ford · 3:34

https://www.youtube.com/watch?v=UEtnJ7eU7xc

> **WHEN TO WATCH**
> After the story of the Quadricycle, before the big idea.

BACKUP VIDEO

Eric Ries-Building the Minimum Viable Product

Entrepreneurship.org · 3:25

https://www.youtube.com/watch?v=1FoCbbbcYT8

Before the project; Eric Ries explains the minimum viable product.

KEY TERMS

prototype

An early model built to test a design.

minimum viable product (MVP)

The simplest version of a product that lets you learn from real customers or users; a term made popular by Eric Ries in *The Lean Startup* (2011).

build–measure–learn

The cycle of making something small, measuring how people respond and learning what to change.

assumption

Something you believe about customers or the product but have not yet tested.

iteration

One pass through the build–measure–learn loop.

CORE IDEAS

The story. In 1896 Henry Ford was chief engineer at the Edison Illuminating Company in Detroit. In his spare hours, in a brick shed behind his rented house on Bagley Avenue, he built a light, gasoline-powered vehicle on four bicycle wheels, which he called the Quadricycle. It had a two-cylinder engine, a chain drive, a tiller instead of a steering wheel, two forward speeds and no reverse, and a doorbell for a horn. Early on June 4, 1896, he was ready to drive it out, and found the shed door too narrow. He took an axe to the brick wall, widened the opening and drove into the rainy street.

How they figured it out. The Quadricycle was not a product for sale. It was a test of whether Ford could build a light, simple engine and vehicle that worked. He drove it around Detroit, fixed what broke and learned what a practical car needed. Then he sold it for $200 to Charles Ainsley and used the money toward a second, better car. Ford's next ventures stumbled: the Detroit Automobile Company (1899) closed after building few cars, and the Henry Ford Company (1901) broke up after he left. Each taught him more. The Ford Motor Company, founded in 1903, succeeded, and the Model T came in 1908.

The big idea. A **minimum viable product** is the smallest thing you can build that lets you learn from reality. It is not a cheap version of the final product; it is an experiment aimed at your riskiest **assumption**. Ford's riskiest assumption was technical (can a light gasoline car work?); for many ventures it is about customers (will anyone pay?). The **build–measure–learn** loop says: build only what you need to test the assumption, measure what really happens, learn, and decide what to build next. Each loop is an **iteration**.

Kinds of MVPs. A hand-made batch sold to ten people you know. A one-page flyer describing a service, with a sign-up sheet. A "concierge" MVP where you do the service by hand before building any system. A cardboard or 3D-printed model customers can hold. A short demonstration. Each costs far less than a factory and answers a specific question. Ask: what is the cheapest test that would change my mind?

In business today. Software companies release simple test versions to a few users; restaurants run a dish as a weekly special; food makers sell at a farmers' market before seeking stores. The danger is calling a sloppy product an MVP and selling it as finished. Be honest with testers about what they are getting, and charge fairly or not at all.

PICTURE STUDY



Henry Ford's Quadricycle, Unknown photographer, about 1910 (vehicle built 1896) · Photograph · Wikimedia Commons; the Quadricycle is at The Henry Ford museum, Dearborn, Michigan

Image: Wikimedia Commons, public domain

This is Ford's first experimental vehicle. Compare its simplicity with a car today: no roof, no doors, bicycle wheels, a tiller instead of a steering wheel. Everything not needed to answer Ford's question was left out.

Look closely

- Find the bicycle wheels. Why might Ford have used them?
- Find the seat and the tiller. How many people could ride?
- Look for any part that is there only for comfort or looks. Is there one?
- Where would the engine and the chain be?

Talk about it

1. What was Ford trying to learn from this machine?
2. Would you have bought the Quadricycle in 1896? What would you have wanted changed?
3. What is the "bicycle wheel" in your own idea: the existing part you can borrow instead of building?

> **Safety first.** Do not test food, electrical devices, chemicals or anything that could hurt someone without a parent's approval and supervision. Follow your local rules for selling food.

PROJECT

Build and Run an MVP

You will choose the riskiest assumption behind your idea, design the cheapest MVP that tests it, run it, and record the results in a build–measure–learn log.

You will need

- Ledger notebook or spreadsheet
- Materials for your MVP (budget: $25 or less, ideally using what you have)
- A parent as partner

Steps

1. List at least five assumptions behind your idea (customers, price, product, delivery, your skill).
2. Rank them by risk: how likely to be wrong and how costly if wrong.
3. Choose the riskiest and write the question your MVP will answer, and what result would mean yes or no.
4. Design the MVP. List its cost item by item; stay under $25.
5. Build it and, with a parent, put it in front of at least eight potential customers you know.
6. Measure: count responses, requests, sales or sign-ups, and record comments word for word.
7. Compare the results with your yes/no rule. Write what you learned.
8. Plan the next iteration: what will you build or change next?

Tips

- Ask: what is the least I could build to learn this?
- Write your stopping rule before you see the results, so you are not tempted to move the goalposts.

Check your work

☐ I can define an MVP and the build–measure–learn loop.

☐ My MVP tested my riskiest assumption for under $25.

☐ I compared results with a rule I set in advance.

LEDGER NOTEBOOK

1. Draw the build–measure–learn loop and label it with your MVP's steps.
2. Copy your assumption ranking and your stopping rule.
3. Sketch the Quadricycle and label what Ford left out.

KEY FORMULAS

$$\text{Cost per lesson learned} = \frac{\text{cost of the test}}{\text{number of key assumptions tested}}$$

From history. Ford bought the Quadricycle back in 1904 for $65, and it is displayed today at The Henry Ford museum in Dearborn, Michigan. Late in life he and his wife, Clara, were filmed riding a restored Quadricycle.

WORKED EXAMPLES

Example 1. A student wants to start a bicycle-repair service for neighbors. List the three riskiest assumptions and design an MVP for the riskiest one.

Show solution

1. Assumptions: (1) neighbors have bikes that need repair; (2) they would pay $15–$25 per repair rather than going to a shop; (3) the student can do common repairs well and quickly.
2. Riskiest: (2), willingness to pay, because the student can learn skills but cannot make people pay.
3. MVP: with a parent, post a notice at church or send a note to ten neighbors you know offering three specific repairs at stated prices for two Saturdays, using tools the family owns.
4. Measure: number of requests, repairs completed, payments received, time per repair, customer comments.

Answer: An MVP costing almost nothing that tests willingness to pay directly with real requests and payments.

Example 2. Option A: buy $600 of equipment and test 4 assumptions. Option B: borrow equipment, spend $60, and test the 3 most important assumptions. Compare the cost per assumption tested.

Show solution

1. A: $\$600/4 = \$150$.
2. B: $\$60/3 = \$20$.

Answer: B costs $20 per assumption against $150 for A. Unless the fourth assumption can only be tested with owned equipment, B is the better first step.

Example 3. Ford sold the Quadricycle for $200. If its parts had cost him about $300 and he spent 1,000 hours on it, was it a "failure"? Explain using the MVP idea. (The cost and hours are illustrative.)

Show solution

1. Money: $\$200 - \$300 = -\$100$, a loss.
2. But the goal was learning: Ford proved a light gasoline engine and vehicle would run and learned what to improve.
3. The $200 also funded his next vehicle.

Answer: As a product it lost money; as an MVP it succeeded, because it answered his riskiest question cheaply and led to better cars.

PRACTICE

1. Easy Where did Ford build the Quadricycle, and what did he do when it would not fit through the door?

   Show answer

   In a brick shed behind his house on Bagley Avenue, Detroit; he knocked out part of the brick wall.

2. Easy Name the three steps of the lean loop.

   Show answer

   Build, measure, learn.

3. Easy Who made the term “minimum viable product” popular, and in what book?

Show answer

Eric Ries, *The Lean Startup* (2011).

4. Medium Explain the difference between a prototype and an MVP.

Show answer

A prototype tests a design (does it work?). An MVP is aimed at learning from real customers or users, often about demand (will they use or buy it?). A prototype can serve as an MVP if real users try it.

5. Medium Design an MVP to test whether people you know will buy hand-painted flower pots at $12.

Show answer

Sample: make five pots, show them with a price card at a church event or family gathering a parent approves, and record how many sell and what people say.

6. Medium A test costs $45 and checks 3 assumptions. Find the cost per assumption.

Show answer

$45/3 = \$15$

7. Medium What did Ford do with the $200 from selling the Quadricycle?

Show answer

He used it toward building his next car.

8. Hard Why is it a mistake to make your MVP polished and complete?

Show answer

It costs more time and money, delays learning, and may test the wrong assumption. If customers do not want it, all the polish is wasted.

9. Hard Name two ethical limits on testing an MVP with real customers.

Show answer

Be honest that it is a test or early version; never put customers' safety at risk (for example, untested food or electrical devices); charge fairly and refund if it falls short.

10. Hard Ford's first two car companies failed. How might the build–measure–learn idea explain why the third succeeded?

Show answer

Each venture taught him about engineering, costs, partners and what customers wanted; by 1903 he had iterated through several designs and business arrangements and applied what he learned.

11. Challenge For an idea of your own, list five assumptions, rank them by risk, and design an MVP under $25 for the riskiest. Say what result would make you stop.

Show answer

Answers vary. A strong answer states a clear stopping rule, such as "If fewer than 3 of 15 people I offer it to buy one, I will change the product or the customer."

COMMON MISTAKES

- Building too much before testing anything.
- Testing an easy assumption instead of the riskiest one.
- Moving the goalposts after weak results instead of honestly learning from them.

> **Make it a game · Quadricycle in Paper.** Spend five minutes building a minimum viable product from paper, tape and household scraps. Show it to your parent, who gives one honest reaction. Say aloud which assumption you were testing, what you measured and what you will change on the next try. That is one full build, measure and learn lap. Then explain what Ford learned from his 1896 Quadricycle.

2.4 Testing Demand: Richard Sears and a Box of Unwanted Watches

OBJECTIVES

- Tell how Richard Sears, a railroad station agent, tested demand for watches in 1886 and built a business from the result.
- Design an honest demand test, such as pre-orders, a small batch or a sign-up offer.
- Calculate conversion rates and project demand from a test, and explain the limits of a small sample.

> **Warm-up.** If 3 of the 10 people you asked bought your product, how many would you expect to buy if you asked 200 people like them? What might make the real number lower?

WATCH

The Life and Times of Richard Warren Sears - Sears, Roebuck and Company Co-Founder

Retail Rewind · 4:50

https://www.youtube.com/watch?v=3ZuVMnZsac4

> **WHEN TO WATCH**
> After the story, before the conversion examples.

BACKUP VIDEO

How Sears Got Its Start From A Pile Of Watches

Times Ticking · 5:07

https://www.youtube.com/watch?v=UffLFWxLa20

Optional, a second short telling of the watch story.

KEY TERMS

demand test

A small, real offer that measures whether people will actually buy, sign up or pay.

pre-order

An order placed (and sometimes paid) before the product is made or delivered.

conversion rate

The share of people offered a product who take the next step (buy, sign up, order).

sample size

The number of people in a test. Small samples give rough, uncertain results.

projection

An estimate of future results based on test results and stated assumptions.

CORE IDEAS

The story. In 1886 Richard Sears was a 22-year-old railroad station agent in North Redwood, Minnesota. Station agents sold tickets, handled freight and sent telegraph messages, and they had spare time. One day a shipment of gold-filled watches arrived for a local jeweler, who refused it. Rather than send the watches back, Sears arranged to buy them himself and offered them by telegraph and mail to other station agents along the line, men who needed accurate watches for their work.

How they figured it out. The watches sold quickly at a profit. Sears bought more and kept selling, and within months he had made enough to quit the railroad and start the R. W. Sears Watch Company in Minneapolis, then in Chicago. Customers sometimes brought watches back for repair, so in 1887 he hired a watchmaker, Alvah C. Roebuck. Sears had found his market by testing: real watches, real prices, real buyers, a real network to reach them. Within a few years Sears and Roebuck were selling far more than watches through mail-order catalogs (Lesson 6.3).

The big idea. Interviews tell you about needs; a **demand test** tells you whether people will pay. The strongest evidence is a purchase or a **pre-order** with money; weaker evidence is a signed sign-up; weakest is a compliment. Measure the **conversion rate**: buyers divided by people offered. Then make a careful **projection** for the larger group you can reach. Sears's station agents were a perfect test market: a clear customer with a clear need, reachable cheaply through a network he already belonged to.

Limits of a test. A small sample can mislead. If 3 of 10 people buy, the true rate among people like them might easily be anywhere from about 10% to over 50%. Friends and family usually buy more readily than strangers, so projections from them should be cut down. And early buyers are often more eager than later ones.

Test with people as much like your real customers as possible, repeat the test, and project cautiously.

In business today. Bakers take orders before a holiday; craftsmen sell a few pieces at a fair before making a hundred; companies offer a product in one city first. The test must be honest: if you take pre-orders or deposits, deliver what you promised or refund the money in full. “The simple believeth every word: but the prudent man looketh well to his going” (Proverbs 14:15).

PICTURE STUDY



R. W. Sears Watch Company Advertisement, R. W. Sears Watch Company (advertiser), 1888 · Newspaper advertisement · Wikimedia Commons

Image: Wikimedia Commons, public domain

Two years after the box of refused watches arrived at North Redwood, Richard Sears was advertising watches by mail from Chicago. Ads like this one were his next demand test: each one could be counted by the orders that came back.

Look closely

- Find the drawing of the watch. Why show the product?
- Find the price or the offer. Is it stated plainly?
- Find the company's address. How would a customer far away order?
- Look for any promise or guarantee.

Talk about it

1. How could Sears tell whether this ad worked?
2. What would make a farmer or station agent trust a watch seller he had never met?
3. What is today's version of this small, countable ad?

Safety first. A parent handles all money and approves every setting. No door-to-door selling, no selling to strangers alone, and no online sales or payment accounts without a parent. Check local rules before selling food.

PROJECT

An Honest Demand Test

You will run a real, small demand test for your idea: a small batch for sale, pre-orders with a stated delivery date, or a sign-up for a service. You will measure conversion and make a cautious projection.

You will need

- Your MVP or a description card with a photo and a price
- An order or sign-up sheet
- A cash box kept by a parent
- Ledger notebook or spreadsheet

Steps

1. Choose the form of test (small batch, pre-order or sign-up) and write the offer: what it is, the price, the delivery date and the refund promise.
2. Decide in advance what conversion rate would justify going ahead.
3. With a parent, choose a setting with people you know who fit your customer: a church event, a family gathering, a homeschool group.
4. Make the offer to at least 25 people. Record each person offered (no names needed), whether they bought, and any comments.
5. Calculate the conversion rate.
6. Project demand for the group you could realistically reach this season, and a cautious projection one-third lower.
7. Deliver every order on time, or refund promptly.
8. Write a one-page report: offer, results, projections, what you learned and your decision.

Tips

- Make the offer the same way to everyone so the results can be compared.
- Record the people who said no as carefully as those who said yes.

Check your work

- ☐ I can calculate a conversion rate and a projection, and explain the limits of a small sample.
- ☐ I offered my product to at least 25 people and recorded every result.
- ☐ I delivered every order or refunded.

LEDGER NOTEBOOK

1. Copy your offer card and your decision rule.
2. Make a tally and a bar chart: offered, bought, did not buy.
3. Draw a map of Sears's network: one depot connected by telegraph to many others.

KEY FORMULAS

$$\text{Conversion rate} = \frac{\text{buyers}}{\text{people offered}} \times 100\%$$

$$\text{Projected buyers} = \text{people you can reach} \times \text{conversion rate}$$

From history. Alvah Roebuck sold his share of the company in 1895 for about $25,000 because the strain of the fast-growing business hurt his health, but Sears kept his name on the company. Julius Rosenwald, who bought in that year, later gave generously to build thousands of schools in the rural South.

WORKED EXAMPLES

Example 1. You offer a $10 set of greeting cards to 25 people at a church fellowship your parent approved. 6 buy. What is the conversion rate? If you could reach 300 similar people this season, how many sets might you sell?

Show solution

1. Conversion: $6/25 = 0.24 = 24\%$.
2. Projection: $300 \times 0.24 = 72$ sets.
3. Because the first group knew you, a cautious plan might cut the rate by a third: $72 \times \frac{2}{3} = 48$ sets.

Answer: 24% conversion; about 72 sets by simple projection, and about 48 as a cautious plan.

Example 2. Sears-style test (illustrative numbers): you buy 20 watches at $12 each and offer them to 60 station agents. 18 buy at $14. What is the conversion rate, the profit, and the profit per agent contacted?

Show solution

1. Conversion: $18/60 = 30\%$.
2. Revenue: $18 \times \$14 = \$252$; cost of all 20 watches: $20 \times \$12 = \$240$.
3. Profit so far: $\$252 - \$240 = \$12$, with 2 watches still to sell (worth $28 at full price).
4. Profit per agent contacted: $\$12/60 = \$0.20$.

Answer: 30% conversion and $12 profit so far, plus two watches in stock. The test proves demand; the margin per watch decides whether it is worth scaling.

Example 3. Two tests: A, 4 buyers out of 10 offered; B, 30 buyers out of 150 offered. Which rate is higher, and which result would you trust more?

Show solution

1. A: $4/10 = 40\%$; B: $30/150 = 20\%$.
2. A is higher but based on only 10 people; one buyer more or less changes it by 10 points.
3. B is based on 150 people; one buyer changes it by less than 1 point.

Answer: A has the higher rate (40% vs 20%), but B's larger sample makes it more trustworthy. Plan on something near B unless A is repeated with more people.

PRACTICE

1. Easy What was Richard Sears's job in 1886, and to whom did he sell the watches?

   Show answer

   A railroad station agent; to other station agents along the line.

2. Easy Whom did Sears hire in 1887, and why?

   Show answer

   Alvah C. Roebuck, a watchmaker, to repair watches.

3. Easy Rank these from strongest to weakest evidence of demand: a compliment, a paid pre-order, a signed sign-up sheet.

Show answer

Paid pre-order, signed sign-up, compliment.

4. Medium 9 of 45 people offered buy. Find the conversion rate.

Show answer

$9/45 = 20\%$

5. Medium With a 15% conversion rate and 400 people you can reach, how many buyers would you project?

Show answer

$400 \times 0.15 = 60$

6. Medium Why were station agents an ideal first market for Sears?

Show answer

They needed accurate watches for their work, they were a clear group, and Sears could reach them cheaply through the railroad telegraph and mail network he already used.

7. Medium Give two reasons a test among family and friends may overstate demand.

Show answer

They want to please you, and they already trust you; strangers will be more cautious and price-sensitive.

8. Hard You take $15 deposits from 12 people for custom birdhouses and then find you cannot make them. What must you do, and why?

Show answer

Refund all $180 promptly and explain honestly. The deposits were taken on a promise; keeping them would be theft and destroy your reputation.

9. Hard A test shows 5 of 20 buy at $8, and 2 of 20 buy at $12. Which price brings more revenue per 20 people offered?

Show answer

At $8: $5 \times 8 = \$40$; at $12: $2 \times 12 = \$24$. $8 brings more revenue (costs would also need checking for profit).

10. Hard Why might early buyers be more eager than later ones? What does that mean for projections?

Show answer

The people with the strongest need or interest buy first. Later customers are less eager, so projecting the early conversion rate onto the whole market will likely overstate demand.

11. Challenge You need 80 sales to cover your costs. A test of 30 people gave 6 buyers. How many similar people must you reach? If your cautious plan cuts the rate by a quarter, how many then?

Show answer

Rate 20%: $80/0.20 = 400$. Cautious rate 15%: $80/0.15 \approx 534$.

COMMON MISTAKES

- Counting compliments or "maybes" as sales.
- Projecting a tiny sample onto a huge market without caution.
- Taking deposits without being sure you can deliver.

Make it a game · Watches Nobody Ordered. Invent a small pretend product and write a pre-order slip for it. Offer slips to as many family members as you can in three minutes, honestly describing the product. Count how many say yes and compute your conversion rate. Then say why a sample of five could mislead you, and how Richard Sears tested demand with his unwanted watches in 1886.

Scripture. "The simple believeth every word: but the prudent man looketh well to his going." (Proverbs 14:15, KJV)

The simple entrepreneur believes every compliment about his idea; the prudent one tests it with real offers and counts the results before taking the next step.

2.5 Pivoting: The Wright Brothers' Bicycle Shop and LEGO's Wooden Toys

OBJECTIVES

- Tell how the Wright brothers' bicycle business funded and shaped their work on flight, and how Ole Kirk Christiansen's wooden-toy workshop became the LEGO brick.
- Define a pivot and distinguish it from giving up or from stubbornly persevering.
- Use marginal thinking to avoid the sunk-cost trap when deciding whether to continue.

> **Warm-up.** You have spent $40 and six hours on a project that is not working. A friend says, "You can't quit now, you've put too much in." Write whether the friend is right, and why.

WATCH

The Wright Brothers' Cycle Shop | The Henry Ford's Innovation Nation

The Henry Ford · 4:17

https://www.youtube.com/watch?v=_dxaU6izBlY

> **WHEN TO WATCH**
> After the Wright brothers' story, before LEGO.

BACKUP VIDEO

The Story of LEGO: How It All Started 📖 | LEGO Mini Movie | LEGO

LEGO · 17:10

https://www.youtube.com/watch?v=qr_dTySMl7s

After the LEGO story; the company's animated history of Ole Kirk Christiansen.

KEY TERMS

pivot

A deliberate change in one part of a business (product, customer, channel or model) based on what has been learned, keeping what works.

persevere

To continue on the same course because the evidence says it is working or will work.

sunk cost

Money or time already spent that cannot be recovered, whatever you decide now.

marginal thinking

Deciding by comparing the extra benefits and extra costs of the next step, ignoring sunk costs.

core competence

A skill or asset a business does especially well and can carry into new products.

CORE IDEAS

The story. In 1892, in Dayton, Ohio, Wilbur and Orville Wright opened a bicycle shop during the national bicycle craze. They sold, rented and repaired bicycles and from 1896 built their own models. The shop paid their bills and taught them to work with light frames, chains, sprockets and precise machining. From 1899 they used its profits and its tools to study flight: they built gliders, tested them at Kitty Hawk, North Carolina, and in 1901, when their data proved wrong, built a small wind tunnel in the shop and measured about two hundred wing shapes. Their mechanic, Charlie Taylor, built an engine. On December 17, 1903, Orville flew the Wright Flyer for twelve seconds and 120 feet.

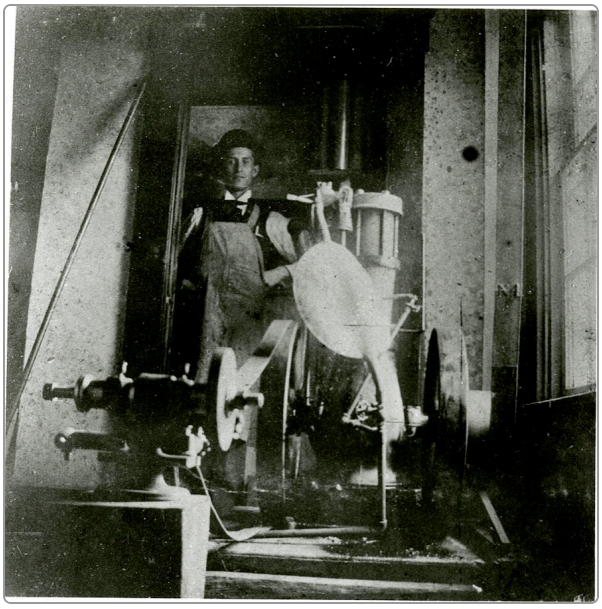
How they figured it out. Ole Kirk Christiansen was a carpenter in Billund, Denmark, who built houses and furniture. When the Depression dried up his trade in the early 1930s, he began making wooden toys: yo-yos, pull ducks and toy trucks. In 1934 he named his company LEGO, from the Danish *leg godt*, "play well." In 1947 he took a large risk and bought a plastic injection-molding machine; in 1949 the company made plastic "Automatic Binding Bricks." His son Godtfred saw that the bricks could become a whole system of play, and in 1958 the company patented the stud-and-tube design that let bricks lock firmly. After a fire destroyed the wooden-toy warehouse in 1960, LEGO stopped making wooden toys and focused on the brick.

The big idea. A **pivot** is a deliberate change of course based on evidence, keeping what works. The Wrights carried their mechanical skill (their **core competence**) from bicycles to airplanes; Christiansen carried his craftsmanship and his toy customers from wood to plastic. Neither pivot was a sudden leap. Each came from testing, measuring and learning. The opposite errors are giving up too soon and refusing to change at all.

Sunk costs and the margin. Money and time already spent are **sunk costs**: they are gone whatever you choose now. Wise decisions use **marginal thinking**, comparing only the future benefits and costs of each option. The question is never "How much have I put in?" but "From here, which path is likely to do the most good for the least additional cost?" The Wrights abandoned their 1900 and 1901 calculations when the data proved them wrong, even though they had worked hard on them. That is the courage a pivot requires.

In business today. Many lasting companies began doing something else. Pivots are common because the first plan almost never survives contact with real customers. Keep your values fixed and your methods flexible: "A man's heart deviseth his way: but the LORD directeth his steps" (Proverbs 16:9).

PICTURE STUDY



Orville Wright at the Wright Cycle Company, Unknown photographer (Wright Brothers Collection), about 1890s · Photograph · Special Collections and Archives, Wright State University (Wikimedia Commons)

Image: Wikimedia Commons, public domain

Before they were famous, the Wright brothers were small businessmen. This photograph shows Orville in his work apron in the bicycle shop, the place where the profits, the tools and the skills for the first airplane all came from.

Look closely

- Find the machines and tools. Which might also be useful for building a flying machine?
- Look at Orville's clothes. What do they tell you about his daily work?
- Look for anything that shows this was a business: stock, parts, a counter.

Talk about it

1. Why was a bicycle shop a good place to learn about flying machines?
2. How would you feel as a customer of the Wrights if you knew they spent their spare time on gliders?
3. What skill or tool do you have now that could carry into a future venture?

PROJECT

Pivot or Persevere? A Decision Review

Using the results from your interviews (Lesson 2.2), MVP (Lesson 2.3) and demand test (Lesson 2.4), you will hold a formal "pivot or persevere" review with a parent and decide your next step with marginal reasoning.

You will need

- Your Unit 2 notebook pages and results
- A spreadsheet or ledger page for the decision table

Steps

1. Gather your evidence: interview tallies, MVP results, demand-test conversion rate and comments.
2. List what is working (keep) and what is not (change).
3. List your sunk costs, and then cross them out: they will not enter the decision.
4. Write three options: persevere, pivot (state exactly what changes: product, customer, price or channel) and stop.
5. For each, estimate future benefit, future cost and probability of success. Calculate the expected net value.
6. Present your table to a parent as if to a partner, and ask for one hard question.
7. Choose an option and write the next test you will run.
8. Write a sentence: what did you have to let go of to make this decision?

Tips

- A pivot keeps something. Name what you keep.
- If all options look poor, stopping is a legitimate and honorable decision.

Check your work

☐ I can explain pivot, persevere, sunk cost and marginal thinking.

☐ My decision table ignores sunk costs and shows expected values.

☐ I chose and justified a next step.

LEDGER NOTEBOOK

1. Draw two paths: bicycles → gliders → wind tunnel → Flyer (1903); carpentry → wooden toys (1932) → LEGO name (1934) → plastic machine (1947) → stud-and-tube patent (1958).
2. Copy your decision table with sunk costs crossed out.
3. List three of your own skills that could carry into a pivot.

KEY FORMULAS

Continue if expected future benefit $>$ expected future cost

From history. The Wrights did not sell an airplane until 1908, when they signed contracts with the U.S. Army and a French syndicate. The Army accepted their Military Flyer in 1909 after trials at Fort Myer, Virginia. The Dayton bicycle shop building was later moved to Greenfield Village in Dearborn, Michigan, by Henry Ford.

WORKED EXAMPLES

Example 1. You have spent \$300 on a T-shirt printing setup. Selling shirts from here is expected to bring \$200 more revenue but cost \$260 more in shirts and ink. Alternatively, using the same press for printed tote bags would bring \$350 more revenue and cost \$180 more. What should you do?

Show solution

1. The \$300 is sunk in both cases; ignore it.
2. T-shirts: $\$200 - \$260 = -\$60$.
3. Tote bags: $\$350 - \$180 = +\$170$.
4. Stopping: \$0.

Answer: Pivot to tote bags: +\$170 beats stopping (\$0) and continuing with shirts (−\$60). The press (your core competence and equipment) is kept; the product changes.

Example 2. Classify each as pivot, persevere or quit, and explain: (a) LEGO stops wooden toys in 1960; (b) the Wrights rebuild their wing data in 1901 with a wind tunnel; (c) a lemonade stand that sold nothing in three tests switches to selling hot cider in autumn to the same neighbors.

Show solution

1. (a) Pivot (a product narrowing): the company keeps its toy customers and focuses on the brick system that the evidence favored.
2. (b) Persevere on the goal, pivot on method: they keep the aim of flight but discard wrong data and change how they test.
3. (c) Pivot (product): same customers and location, a different product suited to the season.

Answer: (a) pivot; (b) persevere in purpose with a pivot in method; (c) pivot.

PRACTICE

1. Easy Where and when did the Wright brothers open their bicycle shop?

   Show answer

   Dayton, Ohio, 1892.

2. Easy What does LEGO mean, and when was the name chosen?

   Show answer

   From Danish *leg godt*, “play well”; 1934.

3. Easy Define sunk cost.

   Show answer

   Money or time already spent that cannot be recovered whatever you decide now.

4. Medium How did the bicycle shop help the Wrights invent the airplane? Give three ways.

   Show answer

   Its profits paid for the experiments; its tools and lathe built gliders, the wind tunnel and parts; and bicycle work taught them about light structures, chains, balance and control. Their mechanic built the engine there.

5. Medium Name the key LEGO dates: plastic machine, first plastic bricks, stud-and-tube patent, end of wooden toys.

Show answer

1947, 1949, 1958, 1960.

6. Medium You have spent $80. Continuing will cost $50 more and bring $40 of benefit. What should you do, ignoring the $80?

Show answer

Stop (or find a different use): continuing loses $\$40 - \$50 = -\$10$.

7. Medium Explain the difference between a pivot and quitting.

Show answer

A pivot changes one part of the business based on evidence while keeping what works (skills, customers, tools). Quitting abandons the venture.

8. Hard Why is "we've invested too much to stop now" a dangerous argument? Give an example.

Show answer

It lets sunk costs, which cannot be recovered, drive decisions about the future. Example: pouring more money into a store in a failing location because of what the build-out cost, instead of moving.

9. Hard Christiansen bought an expensive plastic-molding machine in 1947 when plastic toys were unproven. Use expected value and downside to explain how a wise owner might weigh such a decision.

Show answer

He would estimate the chance plastic toys would sell and the profit if they did, against the cost of the machine and whether the firm could survive if they did not. Keeping the wooden-toy line while testing plastic reduced the downside.

10. Hard What is a core competence? Name the Wrights' and LEGO's.

Show answer

A skill or asset a business does especially well and can carry to new products. The Wrights: precision machining and light mechanical design. LEGO: careful toy craftsmanship and quality ("only the best is good enough"), later precise plastic molding.

11. **Challenge** Option A: continue (future benefit $500 with probability 0.4, else $0; future cost $150). Option B: pivot (future benefit $300 with probability 0.7, else $0; future cost $120). $400 is already spent. Which option has the better expected net value?

    Show answer

    A: $0.4(500) - 150 = \$50$; B: $0.7(300) - 120 = \$90$. Pivot (B). The $400 is sunk and does not enter.

COMMON MISTAKES

- Letting sunk costs decide. Only future costs and benefits matter.
- Pivoting at random. A good pivot follows evidence and keeps what works.
- Confusing persistence with stubbornness. Persevere in purpose; change methods when evidence says so.

Make it a game · Pivot, Persevere, Quit. Mark three corners of a room: Pivot, Persevere, Quit. Your parent reads a short invented business problem, such as a bicycle shop whose repair work outsells its bicycles. Walk to the corner you choose and defend it in twenty seconds, using sunk cost and core competence. Then do the same for the Wright brothers and for LEGO's wooden toys.

Scripture. "A man's heart deviseth his way: but the LORD directeth his steps." (Proverbs 16:9, KJV)

Entrepreneurs must plan, but plans change as evidence comes in. Holding plans humbly, and trusting God with the outcome, makes it easier to pivot when the evidence calls for it.

UNIT 2

Finding and Testing an Idea

Most new ventures fail not because they are badly run but because they make something too few people want. This unit teaches the habits that guard against that: seeing real needs, as Clarence Birdseye did when he watched fish freeze in the Labrador winter; asking customers about their lives instead of pitching to them, as Charles Coolidge Parlin did when he counted soup cans in Philadelphia's trash; and building the smallest thing that can teach you something, as Henry Ford did with his Quadricycle in a backyard shed.

Then you will test demand with real money, as Richard Sears did with a box of unwanted watches, and learn when and how to change course, following the Wright brothers from bicycles to the airplane and Ole Kirk Christiansen from wooden toys to the LEGO brick. By the end of the unit you will have interviewed real people, built a simple prototype and run a small, honest demand test for an idea of your own.

PREREQUISITES

- Knows what entrepreneurs do and the six stakeholders (Unit 1)
- Can compute percents and simple averages
- Can make a simple table and bar chart

MASTERY CHECKLIST

- ☐ I can find and describe real needs by observing problems, workarounds and complaints.
- ☐ I can plan and conduct a customer interview that asks about past behavior rather than opinions of my idea.
- ☐ I can design a minimum viable product and state what it is meant to teach.
- ☐ I can run a small demand test and calculate conversion rates and a projected demand.
- ☐ I can decide between persevering and pivoting using evidence, and avoid the sunk-cost trap.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Kauffman Foundation entrepreneurship resources**: Free articles and research from the Ewing Marion Kauffman Foundation on starting and testing new businesses. A parent may preview; useful throughout the course. Ages 14+.
- **U.S. Small Business Administration, "Plan your business"**: Free government guide to market research and competitive analysis, with links to free data. Use with Lessons 2.2 and 2.4. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

2.1 Seeing Needs: Clarence Birdseye and the Fish That Froze in Labrador

3 sessions of 50 minutes

2.2 Customer Interviews: Charles Coolidge Parlin and the First Market Research

3 sessions of 50 minutes

2.3 The Minimum Viable Product: Henry Ford's Quadricycle 3 sessions of 50 minutes

2.4 Testing Demand: Richard Sears and a Box of Unwanted Watches

3 sessions of 50 minutes

2.5 Pivoting: The Wright Brothers' Bicycle Shop and LEGO's Wooden Toys

3 sessions of 50 minutes

Unit 2 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   What did Clarence Birdseye observe in Labrador, and what scientific fact explained it?

2. **5 pts**

   Define a workaround and a job to be done, and give an example of each.

3. **6 pts**

   A town has 8,000 households; 20% have the need; 25% of those would pay $12 a month. What is the monthly market?

4. **6 pts**

   Describe Parlin's soup-can study and explain why it was more persuasive than a survey of opinions.

5. **6 pts**

   Rewrite as good interview questions: (a) "Would you use my snow-shoveling service?" (b) "Isn't shoveling exhausting?"

6. **5 pts**

   Of 18 people interviewed, 12 had the problem in the past month. What percent? Is this enough to build a factory? Explain.

7. **5 pts**

   Describe Ford's Quadricycle and explain why it was an MVP rather than a product.

8. **5 pts**

   Name the build–measure–learn steps and apply them to a homemade-candle idea.

9. **6 pts**

   A test costs $90 and tests 3 assumptions; another costs $24 and tests 2. Find the cost per assumption for each.

10. **6 pts**

    You offer a product to 40 people and 10 buy. Find the conversion rate and the projected buyers among 500 similar people, and a cautious projection one-third lower.

11. **6 pts**

    Tell how Richard Sears tested demand in 1886 and why his first market was well chosen.

12. **5 pts**

    Test A: 3 of 8 buy. Test B: 24 of 120 buy. Compute both rates and say which you would plan on.

13. **6 pts**

    You have spent $250 on a venture. Continuing costs $100 more for an expected $80 benefit; pivoting costs $60 more for an expected $140 benefit. What should you do?

14. **6 pts**

    Explain how the Wright brothers' bicycle business made their airplane possible.

15. **6 pts**

    Trace LEGO's pivot from wooden toys to the brick with four dates.

16. **16 pts**

    Essay: Using at least two stories from this unit, explain why entrepreneurs should test small before building big, and describe the honesty a test owes to customers.

ANSWER KEY

1. Fish frozen almost instantly at about −40° tasted nearly fresh later; fast freezing forms small ice crystals that do little damage to cells, while slow freezing forms large crystals that tear them.
2. Workaround: a makeshift way of coping with a problem (salting fish). Job to be done: the progress a customer seeks (serve good vegetables all winter).
3. $8{,}000 \times 0.20 \times 0.25 = 400$; $400 \times 12 = \$4{,}800$.
4. He had trash from different Philadelphia neighborhoods collected and counted soup cans, finding working-class families bought more canned soup than wealthy ones. It measured real purchases rather than what people said.
5. Samples: (a) “Tell me about the last big snow. Who cleared your driveway, and how?” (b) “How do you usually handle snow on your walk? What has that cost you?”
6. $12/18 \approx 67\%$. No: it suggests a real need in a small sample; next run an MVP and a demand test before investing heavily.
7. A light gasoline vehicle on four bicycle wheels with a two-cylinder engine, tiller and no reverse, built in a shed in 1896. Its purpose was to test whether such a vehicle would work and to learn, not to sell in quantity.
8. Build: make ten candles. Measure: offer them at a family event and count sales and comments. Learn: decide what to change (scent, size, price) and test again.
9. $90/3 = \$30$; $24/2 = \$12$.
10. 25%; $500 \times 0.25 = 125$; cautious about 83.
11. He bought a refused shipment of watches and offered them to other railroad station agents by telegraph and mail; they sold at a profit. The agents needed accurate watches and were reachable cheaply through his own network.
12. A 37.5%, B 20%. Plan on about B’s rate: its larger sample is far more reliable.
13. Ignore the sunk $250. Continue: $80 - 100 = -\$20$; pivot: $140 - 60 = +\$80$. Pivot.
14. Profits funded experiments; shop tools built gliders, a wind tunnel and parts; bicycle work taught light structures, chains and balance; their mechanic Charlie Taylor built the engine.
15. 1932 wooden toys begin; 1934 LEGO name; 1947 plastic molding machine; 1949 Automatic Binding Bricks; 1958 stud-and-tube patent; 1960 wooden toys end after a warehouse fire. (Any four accurate.)

16. Graded on a clear thesis, accurate use of two or more stories (Birdseye's first failure, Parlin's count, the Quadricycle, Sears's watches, the Wrights or LEGO), correct use of terms (MVP, conversion, sunk cost, pivot), and specific duties: honest offers, delivering or refunding, protecting testers' safety and privacy.

PORTFOLIO PIECE: THE IDEA FILE

Assemble the evidence for one idea: your need-finding log and market estimate, your interview guide and tally, your MVP and its build–measure–learn log, your demand-test report, and your pivot-or-persevere decision. Add a one-page summary: the customer, the job to be done, what you tested, what the numbers showed and what you will do next.

LOOK FOR	WHAT IT MEANS
Evidence	Every claim about customers is backed by observations, interviews or test results, with numbers.
Method	Interviews avoid leading questions; the MVP tests the riskiest assumption; the decision ignores sunk costs.
Honesty	Weak or disappointing results are reported plainly; every promise to testers was kept.
Clarity	The summary is clear, organized and states a decision with reasons.

UNIT 3

The Business Model and Plan

A tested idea is not yet a business. This unit turns it into one. You will state a clear **value proposition**, as the tailor Jacob Davis and the merchant Levi Strauss did with riveted work pants for miners in 1873; design a **business model** that explains how the venture earns money, with King C. Gillette's safety razor and its replaceable blades; and size up the **market and the competition**, following Isaac Singer and Edward Clark through the "sewing machine war" and the installment plan that opened the home market.

Then you will choose a **legal form**, starting with the 1837 partnership of a candlemaker and a soapmaker named Procter and Gamble, and write a short **business plan**, learning from Frederic Tudor, the Boston "Ice King," whose first cargo melted in the Caribbean because he had not planned for what happened after the ship arrived. By the end of the unit you will have a one-page business model canvas and a five-page plan for your own venture.

PREREQUISITES

- Has a tested idea or need from Unit 2 (interviews, MVP, demand test)
- Can compute percents, simple averages and products
- Knows the six stakeholders (Lesson 1.5)

MASTERY CHECKLIST

- ☐ I can write a value proposition that names the customer, the job, the pains relieved and the gains created.
- ☐ I can draw a business model canvas and explain how a business earns money and what it costs to run.
- ☐ I can estimate a market from the top down and the bottom up, and analyze direct competitors and substitutes.
- ☐ I can compare sole proprietorships, partnerships, LLCs and corporations, including liability and who owns what.
- ☐ I can write a short business plan whose numbers and assumptions are honest and checkable.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **U.S. Small Business Administration, "Write your business plan"**: Free government guide with sample plans and a simple lean-plan outline. Use with Lesson 3.5. Ages 14+.
- **SCORE business plan templates**: SCORE is a nonprofit of volunteer business mentors partnered with the SBA. Its free templates (start-up costs, financial projections) are useful for Units 3 and 4. A parent should create any account. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

3.1 The Value Proposition: Jacob Davis, Levi Strauss and Pants That Would Not Tear

3 sessions of 50 minutes

3.2 The Business Model: King Gillette's Razor and Blades 3 sessions of 50 minutes

3.3 Competition and Market Size: Singer and the Sewing Machine War

3 sessions of 50 minutes

3.4 Legal Forms: Procter & Gamble's Partnership and the Corporation

3 sessions of 50 minutes

3.5 The Written Plan: Frederic Tudor, the Ice King 3 sessions of 50 minutes

Unit 3 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Tell how Jacob Davis and Levi Strauss came to share a patent in 1873.

2. **6 pts**
   A $45 jacket lasts 3 years; a $20 jacket lasts 1 year. Find each cost per year and the savings over 3 years.

3. **5 pts**
   Write a value proposition (customer, job, benefit, difference) for a pet-sitting service for families you know.

4. **5 pts**
   Name the nine boxes of the business model canvas.

5. **6 pts**
   A printer sells for $80; ink cartridges cost $25 and a customer uses 6 a year. Find the revenue per customer over 3 years.

6. **5 pts**

   What does recent historical research show about Gillette's pricing while its patent was in force?

7. **6 pts**

   Top-down: 15,000 households, 25% buy the service, spending $80 a year. Bottom-up: 120 households reachable, 12% buy, $80 a year. Compute both.

8. **5 pts**

   Define direct competitor and substitute, with an example of each for a tutoring service.

9. **6 pts**

   How did Edward Clark open the household market for Singer machines?

10. **6 pts**

    Partners split profits 70/30. Profit is $4,200. Find each share. What if they lose $1,000?

11. **6 pts**

    Compare a sole proprietorship and a corporation on liability, ownership and taxes.

12. **5 pts**

    Why did Procter & Gamble incorporate in 1890?

13. **6 pts**

    150 tons are shipped with a 35% loss. Ice sells at $0.04 a pound (2,000 lb per ton). Find the revenue.

14. **6 pts**

    Name four things Tudor did that turned his failed 1806 voyage into a lasting business.

15. **6 pts**

    Write two milestones and one contingency for a summer car-washing venture.

16. **16 pts**

Essay: Using two stories from this unit, explain why an idea that customers want can still fail without a good business model and plan. Then describe the most important assumption in your own plan and how you will test it.

ANSWER KEY

1. Davis, a Reno tailor, riveted pocket corners on work pants; fearing copies but unable to pay the $68 patent fee, he wrote to Strauss, his cloth supplier, proposing to share the patent if Strauss paid. They received Patent 139,121 on May 20, 1873.
2. $15 vs $20; savings $3 \times 5 = \$15$.
3. Sample: “For families at our church who travel, our pet-sitting service feeds and walks your pets twice a day at home, so they stay calm and you need not board them; unlike a kennel, we are people you know, for $15 a day.”
4. Customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, cost structure.
5. $80 + 3 \times 6 \times 25 = 80 + 450 = \$530$
6. Razors were not given away cheaply; both razors and blades sold at good prices. The cheap-razor, profitable-blade model came after the patent expired in 1921.
7. Top-down $15{,}000 \times 0.25 \times 80 = \$300{,}000$; bottom-up $120 \times 0.12 \times 80 = \$1{,}152$.
8. Direct: another tutor or tutoring center. Substitute: free online lessons, or a parent helping.
9. An 1856 installment (rent-to-own) plan with a small down payment and monthly payments, plus showrooms, demonstrations, repair service and trade-ins.
10. $2,940 and $1,260; losses $700 and $300.
11. Sole proprietorship: one owner, unlimited personal liability, profits taxed once as the owner’s income. Corporation: shareholders own it, limited liability, profits may be taxed at the company level and again as dividends.
12. To raise capital through shares for growth and to give owners limited liability.
13. $150 \times 0.65 = 97.5$ tons $= 195{,}000$ lb; $195{,}000 \times 0.04 = \$7{,}800$.
14. Built ice houses at ports; used sawdust insulation; gave away ice and taught customers how to use it; secured supply and exclusive rights; used Wyeth’s uniform-block cutter. (Any four.)
15. Sample milestones: 10 regular customers by June 15; $300 revenue by July 31 with complete books. Contingency: if it rains, call each customer and reschedule within two days at no charge.

16. Graded on a clear thesis, accurate use of two stories (Tudor's melted cargo, Gillette's slow start, Singer's market, Davis and Strauss, P&G), correct use of terms, and a specific, testable assumption with a test plan.

PORTFOLIO PIECE: THE BUSINESS PLAN FILE

Assemble your value proposition (both versions), your business model canvas and model comparison, your market estimates and competition grid, your legal-form table and signed agreement, and your five-page lean plan with the mentor's questions and your revisions. This file is the foundation for the numbers in Unit 4 and the venture in Unit 10.

LOOK FOR	WHAT IT MEANS
Coherence	Value proposition, model, market, operations and numbers fit together and tell one story.
Evidence	Numbers come from tests, real prices and data; assumptions are marked.
Realism	Market and sales estimates are bottom-up and modest; risks have contingencies.
Clarity	The plan is short, organized and easy for a banker or parent to follow.

3.1 The Value Proposition: Jacob Davis, Levi Strauss and Pants That Would Not Tear

OBJECTIVES

- Tell how Jacob Davis and Levi Strauss built a business on riveted work pants beginning in 1873.
- Write a value proposition naming the customer, the job to be done, the pains relieved and the gains created.
- Quantify a value proposition by comparing the customer's cost with and without the product.

> **Warm-up.** Finish this sentence for three products your family buys: "We buy ___ instead of ___ because ___." What does each answer say about what the product is really worth to you?

WATCH

Quantified Value Proposition - Bill Aulet and Erdin Beshimov – MIT – Part 1

MIT Bootcamps · 5:35

https://www.youtube.com/watch?v=EllUtlxc-eg

> **WHEN TO WATCH**
> After the story of Davis and Strauss, before you write your value proposition.

Note: From MIT Bootcamps; Bill Aulet teaches MIT's course on new enterprises.

KEY TERMS

value proposition

A clear statement of what a product does for a specific customer, and why it is better than the alternatives.

customer segment

A group of customers with similar needs, situations and willingness to pay.

pain reliever

A feature that removes or reduces a problem the customer has.

gain creator

A feature that produces a benefit the customer wants.

quantified value

The value proposition stated in numbers: time or money saved, output gained, risk reduced.

CORE IDEAS

The story. In about 1870 a customer in Reno, Nevada, asked the tailor Jacob Davis, a Latvian-born immigrant, to make a pair of pants for her husband, a laborer, that would not fall apart. Work pants tore at the pockets and seams when men stuffed them with tools and ore samples. Davis made them of heavy cotton duck and fastened the pocket corners with copper rivets, the kind he used on horse blankets. Word spread, and soon he could not keep up with orders. He bought his cloth from Levi Strauss, a Bavarian-born dry-goods wholesaler in San Francisco who had come west in 1853.

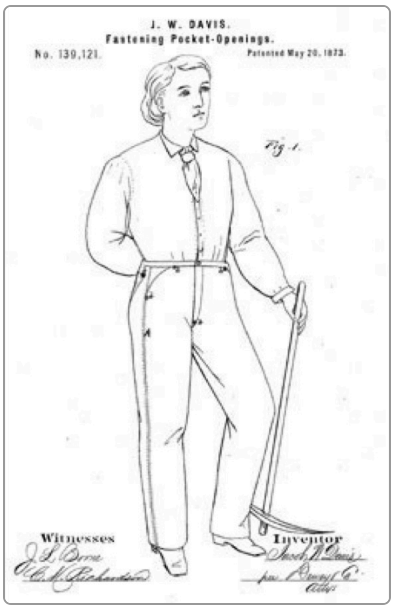
How they figured it out. Davis feared that others would copy the rivets, but he could not afford the $68 fee to file a patent. In 1872 he wrote to Strauss and proposed a deal: if Strauss paid for the patent, they would share it. On May 20, 1873, they received U.S. Patent No. 139,121 for "an improvement in fastening pocket-openings." Davis moved to San Francisco to run the production, and Levi Strauss & Co. began making riveted "waist overalls" of brown duck and blue denim. Miners, farmers, lumbermen and railroad workers bought them because they lasted far longer than ordinary pants.

The big idea. A **value proposition** answers the customer's question, "Why should I buy this instead of what I do now?" It names a **customer segment** (working men in hard jobs), the job to be done (wear sturdy clothing all day at heavy work), the **pain relievers** (pockets that do not rip, fewer repairs) and the **gain creators** (longer life, less time sewing, a good fit). It is strongest when it is **quantified**: if riveted pants last three times as long as ordinary ones and cost less than three times as much, the customer is better off in plain dollars.

Writing one. A useful template: "For [customer] who [need or job], our [product] is a [category] that [main benefit]. Unlike [alternative], it [key difference]." Every word should be something you can check with customers. Avoid vague words such as "quality" and "innovative" unless you can say what they mean in numbers or in a demonstration.

In business today. The value proposition guides everything else: whom you sell to, what you make, how you price it and what you say in an advertisement. Many failed businesses could not say in one sentence why a customer should choose them. A good one is honest: it promises what the product truly does and no more.

PICTURE STUDY



Davis and Strauss's Patent for Fastening Pocket-Openings, Jacob W. Davis (inventor); U.S. Patent Office drawing, 1873 · Patent drawing, U.S. Patent 139,121 · U.S. Patent and Trademark Office (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This drawing comes from the 1873 patent that Jacob Davis and Levi Strauss shared. Look how small the change is: a few metal rivets at the points where pockets tore. A small improvement that solves a real pain can carry a whole business.

Look closely

- Find the rivets. Where are they placed, and why there?
- Look at the pants. What kind of work were they made for?
- Look for labels or numbers. What do they point to?

Talk about it

1. How would you explain the value of these rivets to a miner in one sentence?
2. Why was a patent worth $68 to Davis even though he could not afford it?
3. What small improvement could you make to a product you use every day?

PROJECT

A Quantified Value Proposition

You will write and test a value proposition for your venture, put numbers to it, and revise it after showing it to five potential customers.

You will need

- Ledger notebook or a spreadsheet
- Your Unit 2 interview notes and test results
- Index cards

Steps

1. From your Unit 2 notes, name your main customer segment and the job to be done.
2. List the customer's top three pains and top three hoped-for gains, using their own words where possible.
3. For each, list the feature of your product that relieves the pain or creates the gain.
4. Quantify at least two: money saved, time saved, cost per use compared with the current alternative.
5. Write your value proposition with the template in no more than 40 words.
6. Write it on an index card and show it to five potential customers you know. Ask: "What does this say to you? What is missing? Would it make you choose this over what you do now?"
7. Record their responses and revise the statement.
8. Write both versions and explain the changes.

Tips

- Use customers' own words; they recognize their problems faster that way.
- Cut every word that does not help a customer decide.

Check your work

☐ I can write a value proposition with customer, job, pains, gains and difference.

- ☐ My statement includes at least two numbers I can defend.
- ☐ I revised it after real feedback.

LEDGER NOTEBOOK

1. Draw a value-proposition map: a square for your product (features, pain relievers, gain creators) facing a circle for the customer (jobs, pains, gains), with lines connecting them.
2. Copy your cost-per-use comparison table.
3. Write your first and revised value propositions side by side.

KEY FORMULAS

$$\text{Cost per use} = \frac{\text{price}}{\text{number of uses (or months of life)}}$$

From history. Levi Strauss never married; he left much of his fortune to orphanages, schools and scholarships in San Francisco. The company's early records were destroyed in the 1906 San Francisco earthquake and fire, which is why some details of its first years are uncertain.

WORKED EXAMPLES

Example 1. Ordinary work pants cost \$1.00 and last 4 months. Riveted pants cost \$1.50 and last 12 months. (Round teaching numbers.) Find each pair's cost per month of wear and the yearly savings.

Show solution

1. Ordinary: $\$1.00/4 = \$0.25$ per month.
2. Riveted: $\$1.50/12 = \$0.125$ per month.
3. Yearly: ordinary $12 \times 0.25 = \$3.00$; riveted \$1.50; savings \$1.50.

Answer: Riveted pants cost half as much per month of wear, saving \$1.50 a year, plus the time and trouble of repairs. That is a quantified value proposition.

Example 2. Write a value proposition for a student's lawn-edging service for older neighbors, using the template.

Show solution

1. Customer: older homeowners in our neighborhood who want a neat yard but find edging hard on their backs.
2. Product and category: a weekly lawn-edging and sweeping service.
3. Main benefit: a tidy yard every week without bending or heavy tools.
4. Difference: unlike a lawn company, we come on a set day, charge a flat $12 and are neighbors you already know.

Answer: "For older homeowners in our neighborhood who want a neat yard but find edging hard, our weekly edging service keeps your walks and beds tidy without bending or heavy tools. Unlike a lawn company, we come every Saturday for a flat $12 and are neighbors you know."

PRACTICE

1. Easy What did Jacob Davis add to work pants, and why?

   Show answer

   Copper rivets at the pocket corners and stress points, so the pockets would not tear.

2. Easy Why did Davis write to Levi Strauss in 1872?

   Show answer

   He could not afford the $68 patent fee and proposed that Strauss pay it in exchange for a share of the patent.

3. Easy Define customer segment.

   Show answer

   A group of customers with similar needs, situations and willingness to pay.

4. Medium A $24 pair of boots lasts 2 years; a $60 pair lasts 6 years. Find the cost per year of each.

   Show answer

   $24/2 = \$12$; $60/6 = \$10$. The dearer boots cost less per year.

5. Medium Name one pain reliever and one gain creator for riveted work pants.

Show answer

Pain reliever: pockets that do not rip. Gain creator: pants that last much longer, saving money and repair time.

6. Medium Rewrite this weak value proposition: “We make high-quality, innovative cookies.”

Show answer

Sample: “For busy families who want homemade treats for Sunday guests, our cookies are baked Saturday from real butter and delivered by noon, unlike store cookies that sit on a shelf for weeks.”

7. Medium A tool saves a customer 3 hours a month. If the customer values his time at $15 an hour and the tool costs $90, how many months until it pays for itself?

Show answer

Saves $3 \times 15 = \$45$ a month; $90/45 = 2$ months.

8. Hard Why might two customer segments need two different value propositions for the same product? Use work pants as an example.

Show answer

Their jobs and pains differ. Miners care about durability under heavy loads; a city shopper might care about comfort, look or price. One message rarely fits both.

9. Hard Explain why Davis and Strauss each needed the other.

Show answer

Davis had the invention and tailoring skill but not money or a sales network; Strauss had capital, cloth and a wholesale business but not the idea. The partnership combined Say’s factors of production.

10. Hard Why should a value proposition avoid promises you cannot check?

Show answer

Unverifiable claims cannot guide decisions or be tested with customers, and they tempt the seller to exaggerate. Honest, checkable claims build trust and can be proven in a demonstration.

11. **Challenge** A $3 product lasts 6 months; a competitor's $2 product lasts 3 months. A customer also spends 30 minutes (valued at $10 an hour) each time he replaces it. Compare the yearly costs.

    Show answer

    Yours: 2 buys, $2(3 + 5) = \$16$; competitor: 4 buys, $4(2 + 5) = \$28$. Yours saves $12 a year.

COMMON MISTAKES

- Describing the product instead of the customer's benefit.
- Trying to serve "everyone." A value proposition needs a specific customer.
- Using vague praise ("high quality") instead of checkable facts.

Make it a game · Pants That Would Not Tear. Your parent secretly picks a household object. Give a one-sentence value proposition for it that names the customer, the job, the pain relieved and the gain created, and includes a number. Your parent guesses the object. Swap roles. Whoever guesses with the fewest clues wins. Then explain which pain the rivets solved for Jacob Davis and Levi Strauss.

Scripture. "Two are better than one; because they have a good reward for their labour." (Ecclesiastes 4:9, KJV)

Davis had the idea and Strauss had the means. Many lasting businesses have begun with two people whose gifts fit together.

3.2 The Business Model: King Gillette's Razor and Blades

OBJECTIVES

- Tell how King C. Gillette and William Nickerson built the safety-razor business, and what the "razor and blades" model really was in its early years.
- Draw a business model canvas with its nine parts.
- Calculate the lifetime revenue and profit from a product with repeat purchases.

> **Warm-up.** List five things your family buys over and over (refills, subscriptions, ink, filters). For each, who sells the item you buy once, and who sells the refills?

WATCH

The Explainer: What is a Business Model?

Harvard Business Review · 2:05

https://www.youtube.com/watch?v=_C-vGu2mL38

> **WHEN TO WATCH**
> After the story, before the canvas.

Note: A short explainer from Harvard Business Review.

BACKUP VIDEO

The Business Model Canvas - 9 Steps to Creating a Successful Business Model - Startup Tips

The Business Channel · 9:41

https://www.youtube.com/watch?v=IP0cUBWTgpY

Before the project, to walk through the canvas in more detail.

KEY TERMS

business model

How a business creates value for customers, delivers it and captures part of it as revenue to cover costs and earn a profit.

business model canvas

A one-page chart of nine parts of a business model, developed by Alexander Osterwalder in the 2000s.

revenue stream

A source of money from customers: one-time sales, repeat sales, subscriptions, fees, rentals.

recurring revenue

Money that comes in again and again from the same customers.

complementary goods

Products used together, such as razors and blades or printers and ink.

CORE IDEAS

The story. King Camp Gillette was a traveling salesman for the Crown Cork and Seal Company, whose founder, William Painter, had invented the crimped bottle cap. Painter advised him to invent something people would use and throw away, so they would come back and buy more. In 1895, shaving with a straight razor that had to be stropped and honed, Gillette pictured a thin, cheap blade clamped in a holder, used until dull and then replaced. Experts told him steel could not be made thin, hard and cheap enough.

How they figured it out. Gillette spent years trying. In 1901 he and partners formed the American Safety Razor Company (soon renamed for him), and an MIT-trained engineer, William Nickerson, designed machines to harden, grind and sharpen thin sheet steel. Sales began in 1903; that year the company sold only 51 razors and 168 blades. Then advertising and word of mouth took hold, and in 1904 it sold about 91,000 razors and over 120,000 blades. Gillette received a patent in November 1904. Historians have found that while the patent lasted, Gillette did not give razors away cheaply; razors and blades both sold at healthy prices. Only after the patent expired in 1921, when rivals could copy the design, did the company sell cheap razors and earn its profit on blades.

The big idea. A **business model** explains how a business creates value, delivers it and captures enough of it to pay its costs and earn a profit. The **business model canvas** lays it out in nine boxes: customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners and cost structure. Gillette's model paired a durable product with a **recurring revenue** stream from **complementary goods**. Many businesses use some form of it: printers and ink, coffee machines and pods, water filters and cartridges.

Honest models. A recurring-revenue model is fair when the customer knows the full cost and gets good value from every refill. It becomes unfair when the seller hides the true cost or makes it artificially hard to use other suppliers. Ask: would my customer still be glad of the deal if he saw the whole bill for a year?

In business today. Two businesses can sell the same product with different models: one sells a lawn mower; another rents it; another sells mowing as a weekly service. Choosing the model is as important as choosing the product. Sketch your canvas in pencil; you will change it as you learn.

PICTURE STUDY



Gillette Safety Razor Advertisement, Gillette Safety Razor Company (advertiser), 1907 · Printed advertisement · Wikimedia Commons

Image: Wikimedia Commons, public domain

Gillette printed his own face on every blade wrapper, so customers would remember whom to buy refills from. This advertisement appeared a few years after sales began.

Look closely

- Find the razor, the blades and the case. Which part does the customer buy only once?
- Find the price or any mention of blades. How does the ad describe the cost of shaving?
- Find the main promise. Is it something a customer could check?
- Look for Gillette's portrait. Why put it there?

Talk about it

1. What pain does this ad promise to relieve?
2. How does the ad prepare the customer to keep buying blades?
3. If you wrote this ad today, what would you add to tell the customer the full yearly cost?

PROJECT

The Business Model Canvas

You will draw a business model canvas for your venture, design two alternative models, and compare their revenue per customer over a year.

You will need

- A large sheet of paper or poster board, sticky notes
- Ledger notebook or spreadsheet

Steps

1. Draw the nine boxes on a large sheet.
2. Fill each box with sticky notes for your current model, using your value proposition from Lesson 3.1.
3. Mark each note as tested (from Unit 2 evidence) or assumed.
4. Design two alternatives by changing the revenue stream or channel (for example, one-time sale vs subscription vs rental vs service).
5. For each model, estimate revenue per customer over one year and the main costs.
6. Compare the three models in a table and choose one, with reasons.
7. Photograph or redraw the final canvas in your notebook.
8. List the two most important untested assumptions and how you will test them.

Tips

- Sticky notes make it easy to change your mind; do not draw in ink yet.
- A simple model you can explain beats a clever one you cannot.

Check your work

- ☐ I can name and fill in all nine canvas boxes.
- ☐ I compared three models with numbers.
- ☐ I marked which parts of my model are tested and which are assumed.

LEDGER NOTEBOOK

1. Copy your final canvas.
2. Draw Gillette's model as a picture: one razor, many blades, money flowing back each month.
3. Write a timeline: 1895 idea; 1901 company; 1903 sales begin (51 razors); 1904 patent and about 91,000 razors; 1921 patent expires.

KEY FORMULAS

$$\text{Lifetime revenue} = \text{first sale} + (\text{repeat purchases per year} \times \text{price} \times \text{years})$$

From history. Gillette's razors became famous when the U.S. Army issued shaving kits to soldiers in the First World War. Gillette himself lost most of his fortune in real-estate speculation and the 1929 crash, and died in 1932 with little left.

WORKED EXAMPLES

Example 1. A razor sells for \$5 with 12 blades. Extra blades cost \$1 for 6. A customer uses 1 blade a week. What is the first-year and five-year revenue from that customer? (Illustrative numbers.)

Show solution

1. Blades used in a year: 52. The first 12 come with the razor, so 40 more are needed in year 1: about $40/6 \approx 7$ packs.
2. Year 1: $\$5 + 7 \times \$1 = \$12$.
3. Years 2–5: $52/6 \approx 9$ packs a year; $4 \times 9 \times \$1 = \$36$.
4. Five-year total: $\$12 + \$36 = \$48$.

Answer: About \$12 in the first year and \$48 over five years; blades bring in three times as much as the razor.

Example 2. Fill in a business model canvas for a student's weekly bread delivery to families she knows.

Show solution

1. Customer segments: families at church and in the neighborhood who like homemade bread but lack time to bake.
2. Value proposition: two fresh loaves every Saturday morning, baked Friday night.
3. Channels: a sign-up sheet at church; delivery by bicycle with a parent.
4. Customer relationships: personal; text a parent to change an order.
5. Revenue streams: $9 a week per family, paid monthly.
6. Key resources: home oven, recipe, a parent's help, bicycle basket.
7. Key activities: buying flour, baking, delivering, keeping accounts.
8. Key partners: a local mill or store for flour; parents.
9. Cost structure: flour, yeast and other ingredients, bags, electricity; her time.

Answer: A complete nine-box canvas. Note the recurring revenue: a weekly subscription is more predictable than one-time sales.

PRACTICE

1. Easy Who advised Gillette to invent something people would use and throw away?

   Show answer

   William Painter, founder of Crown Cork and Seal and inventor of the bottle cap.

2. Easy Who designed the machines to make Gillette's blades?

   Show answer

   William Nickerson, an MIT-trained engineer.

3. Easy Name the nine boxes of the business model canvas.

   Show answer

   Customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, cost structure.

4. Medium How did Gillette's pricing change after its patent expired in 1921, and why?

Show answer

It began selling razors cheaply and earning more on blades, because rivals could now copy the razor and the company wanted customers using its blades.

5. Medium A coffee machine costs $60 and pods cost $0.50 each. A customer uses 2 a day. What is the revenue from pods in a year?

Show answer

$2 \times 365 \times 0.50 = \$365$

6. Medium Give three different business models for the same product: a bicycle.

Show answer

Sell bicycles; rent them by the hour or day; sell repair and tune-up services (or a yearly maintenance plan).

7. Medium Gillette sold 51 razors in 1903 and about 91,000 in 1904. By what factor did sales grow?

Show answer

$91{,}000 / 51 \approx 1{,}784$, nearly 1,800 times.

8. Hard When does a refill-based model become unfair to customers? Give two signs.

Show answer

When the full cost is hidden or the seller blocks reasonable alternatives without good reason. Signs: refills priced far above their value with no warning at purchase; deliberately disabling compatible refills.

9. Hard Why is recurring revenue valuable to a small business? Name one risk.

Show answer

It is predictable, helps plan purchases and cash, and lowers the cost of finding new customers. Risk: customers may cancel if quality slips, and a business can grow complacent.

10. Hard A product sells for $40 once. An alternative model rents it for $4 a month. If an average customer keeps renting for 14 months, which brings more revenue per customer?

Show answer

Rental: $14 \times 4 = \$56$, more than $40, though with more costs (pickup, repairs) and risk.

11. Challenge A razor costs $3 to make and sells for $3; blades cost $0.10 each to make and sell for $0.40. A customer buys 50 blades a year for 4 years. Find the company's profit from this customer.

Show answer

Razor: $0. Blades: $200 \times (0.40 - 0.10) = \$60$. Total $60.

COMMON MISTAKES

- Confusing the product with the model. The same product can be sold several ways.
- Forgetting the cost side. Revenue is only half the model.
- Repeating the "they gave away razors" legend without checking. Early Gillette razors were not cheap.

Make it a game · Nine Boxes From Memory. Draw a blank business model canvas from memory on one sheet and label all nine parts. Set a five-minute timer and fill it in for King Gillette's safety razor. Your parent checks it against the lesson and awards a point for each part correct. Circle the revenue streams and say whether the early razor and blades story was as simple as it sounds.

Scripture. "Prepare thy work without, and make it fit for thyself in the field; and afterwards build thine house." (Proverbs 24:27, KJV)

First make sure the work brings in a living, then build. A business model is that preparation: how the venture will earn its keep before it spends on the house.

3.3 Competition and Market Size: Singer and the Sewing Machine War

OBJECTIVES

- Tell how I. M. Singer & Co. competed in the "sewing machine war" of the 1850s, joined a patent pool, and opened the home market with Edward Clark's installment plan.
- Estimate a market top-down and bottom-up and distinguish total, serviceable and obtainable market.
- Analyze direct competitors, indirect competitors and substitutes in a competition grid.

> **Warm-up.** Name every way your family could get a birthday cake: bake it, buy it at a grocery, order from a bakery, ask a friend. Each is a competitor of the others. Which wins most often, and why?

WATCH

The Forgotten History of Sewing Machines

The History Guy: History Deserves to Be Remembered · 13:16

https://www.youtube.com/watch?v=3144SpUGbng

> **WHEN TO WATCH**
> After the story of the sewing machine war, before market sizing.

KEY TERMS

direct competitor

A business selling a similar product to the same customers.

substitute

A different product or way of doing the job (sewing by hand instead of by machine).

total addressable market (TAM)

The total yearly spending on the job you serve, if everyone who could buy did.

serviceable obtainable market (SOM)

The part of the market you can realistically win in the next year or two.

patent pool

An agreement among patent holders to license one another's patents, usually sharing fees.

CORE IDEAS

The story. By 1850 several inventors had built sewing machines, but none worked well. Isaac Merritt Singer, a mechanic and former actor, improved one in Boston in 1850 and patented his design in 1851. Elias Howe, who had patented a key lockstitch mechanism in 1846, sued Singer and other makers, and they sued each other. For years the "sewing machine war" tied up the industry in court. In 1856 the leading makers (Singer, Wheeler & Wilson, Grover & Baker) and Howe formed the Sewing Machine Combination, a **patent pool**: each could use the others' patents, and every maker paid a fee per machine to the pool.

How they figured it out. With the lawsuits settled, the makers competed on quality, price and selling. Singer's partner, the lawyer Edward Clark, saw that the largest market was not tailors and factories but households, where women sewed the family's clothing by hand. A machine cost about $100, far more than most families could pay at once. In 1856 Clark offered a plan to rent a machine with a small payment down and monthly payments that would count toward ownership. Singer also opened company showrooms with trained demonstrators and repairmen, and accepted old machines of any make as trade-ins. By the 1870s Singer was the largest sewing machine maker in the world, with factories in America and Scotland.

The big idea. Before entering a market, estimate its size and know your competitors. The **total addressable market** is everything that is spent on the job; the **serviceable** market is the part your product and location can serve; the **obtainable** market is what you can realistically win soon. Estimate it two ways: top-down from population and spending, and bottom-up from customers you can actually reach and convert. If the two disagree wildly, find out why.

Competition. Your competitors include **direct competitors** (other machines), indirect competitors (ready-made clothing from stores) and **substitutes** (sewing by hand, hiring a seamstress). Make a grid comparing yourself with them on price, quality, convenience and service. Competition is good for customers: it pushes sellers to improve and lower prices. Singer won not by suing but by finding a larger

segment and serving it better: payments a family could afford, demonstrations and repairs.

In business today. Many small ventures overestimate their market by quoting the total and forget the substitutes. Be humble with the numbers: a student venture might win a few dozen customers, and that is enough to learn and earn. Compete honestly; never disparage a rival falsely.

PICTURE STUDY



Singer Sewing Machines in the Home and in the Factory, Singer Manufacturing Company (advertiser), 1892 · Color lithograph advertisement · Wikimedia Commons

Image: Wikimedia Commons, public domain

By 1892 Singer was selling to both of its main markets, families and factories. This advertisement shows both on one page. Notice how the company speaks to two customer segments at once.

Look closely

- Find the home scene and the factory scene. How do the machines differ?
- Who is using the machine in each scene?
- Find the Singer trademark. Why repeat it on every ad?
- Look for any words about price or payment.

Talk about it

1. Which segment was larger, homes or factories? Which was more profitable per sale?
2. What substitutes for a sewing machine would a family in 1892 have had?
3. How might a small competitor have tried to win customers from Singer?

PROJECT

Market Size and Competition Grid

You will estimate your venture's market top-down and bottom-up, and build a competition grid from real observation of competitors and substitutes.

You will need

- Ledger notebook or spreadsheet
- Prices from at least three competitors (stores, websites, flyers)
- Free population data (your town's or county's figures from the U.S. Census Bureau website, with a parent)

Steps

1. Look up your town's or county's population and number of households.
2. Make a top-down estimate of the yearly market for the job your venture serves. Show every assumption.
3. Make a bottom-up estimate from the customers you can actually reach, using your Unit 2 conversion rate.
4. Compare the two and explain the difference.
5. List at least three direct or indirect competitors and two substitutes.
6. Gather real prices and features for each (visit a store with a parent, read flyers, check websites).
7. Build a grid rating each on price, quality, convenience and service, including your own venture.
8. Write a paragraph: where can you honestly win, and where should you not try to compete?

Tips

- Always include "do nothing" or "do it yourself" as a substitute.
- Do not insult competitors; learn from them.

Check your work

☐ I can define TAM, serviceable and obtainable market, and compute each.

☐ My grid uses real prices and features.

- [ ] I identified where my venture can honestly win.

LEDGER NOTEBOOK

1. Draw three nested circles labeled total, serviceable and obtainable market, with your dollar figures.
2. Copy your competition grid.
3. Write a short timeline of the sewing machine war: 1846 Howe patent; 1851 Singer patent; lawsuits; 1856 the Combination and Clark's installment plan.

KEY FORMULAS

Top-down: market = population × share who buy × annual spending
Bottom-up: sales = customers you can reach × conversion × purchases × price

From history. Edward Clark ran much of the Singer business after Isaac Singer retired in the 1860s. Clark later built the Dakota apartment building in New York. The Singer Building in Manhattan, finished in 1908, was briefly the tallest building in the world.

WORKED EXAMPLES

Example 1. Top-down: a town has 6,000 households. 40% buy a birthday cake each year, spending an average of $30 on 2 cakes. Bottom-up: you can reach 150 families through church and the neighborhood; 10% would order from you, 2 cakes a year at $25. Compare.

Show solution

1. TAM (top-down): $6{,}000 \times 0.40 \times 2 \times \$30 = \$144{,}000$.
2. Bottom-up: $150 \times 0.10 \times 2 \times \$25 = \$750$.
3. Your obtainable share: $750 / 144{,}000 \approx 0.5\%$.

Answer: The town spends about $144,000 a year on cakes, but a realistic first-year plan is about $750. Plan on the bottom-up number.

Example 2. A sewing machine costs $100. A family can save $2 a month. Under Clark's plan (illustrative terms), it pays $5 down and $3 a month. How long does it take to buy the machine each way?

Show solution

1. Saving first: $100/2 = 50$ months before the family has a machine.
2. Installments: $(100 - 5)/3 \approx 32$ months of payments, but the family uses the machine from the first month.
3. If the machine lets the mother save or earn even $3 a month in sewing, it pays for itself as it goes.

Answer: Saving takes about 50 months with no machine; installments take about 32 months with the machine in use from day one. (Real installment prices were higher than cash prices, so the plan also cost more in total.)

PRACTICE

1. Easy Who sued Singer over sewing machine patents?

   Show answer

   Elias Howe, among others.

2. Easy What was the Sewing Machine Combination of 1856?

   Show answer

   A patent pool in which the leading makers and Howe shared patents and collected a fee on each machine.

3. Easy Define a substitute and give one for a sewing machine.

   Show answer

   A different way of doing the same job; sewing by hand or buying ready-made clothes.

4. Medium Top-down: 20,000 people; 30% have a dog; owners spend $60 a year on grooming. What is the market?

   Show answer

   $20{,}000 \times 0.30 \times 60 = \$360{,}000$

5. **Medium** Bottom-up: you can reach 80 dog owners; 15% book you 4 times a year at $20. What is your expected revenue?

Show answer

$80 \times 0.15 \times 4 \times 20 = \$960$

6. **Medium** Name a direct competitor, an indirect competitor and a substitute for a teenager's lawn-mowing service.

Show answer

Direct: a professional lawn company or another teen. Indirect: a landscaping company that installs low-maintenance yards. Substitute: the homeowner mowing himself.

7. **Medium** How did Edward Clark enlarge Singer's market?

Show answer

He targeted households and offered an installment (rent-to-own) plan so families could afford a $100 machine, plus showrooms, demonstrations, repairs and trade-ins.

8. **Hard** Why might a top-down and a bottom-up estimate differ by a factor of 100? Which should guide your plan?

Show answer

Top-down counts the whole town's spending; bottom-up counts only the customers you can reach and convert with your limited time and network. Plan with bottom-up.

9. **Hard** Explain one benefit and one danger of a patent pool for customers.

Show answer

Benefit: ends costly lawsuits so makers can build better machines. Danger: if members use it to keep out new rivals or fix prices, customers pay more.

10. Hard Installment buyers paid more in total than cash buyers. Was the plan fair? Argue one side with reasons.

Show answer

Sample: fair, if the total price and terms were disclosed plainly, because the family got the machine's use years earlier and could earn with it; unfair if terms were hidden or machines repossessed harshly. Strong answers mention disclosure.

11. Challenge Build a competition grid for your venture with at least three competitors or substitutes and four criteria (price, quality, convenience, service). Where are you strongest?

Show answer

Answers vary. Credit for honest ratings with evidence and a clear statement of the one or two criteria on which the venture can win.

COMMON MISTAKES

- Quoting the total market as your sales forecast.
- Forgetting substitutes, especially "do it yourself."
- Assuming you have no competition. Every job is already being done somehow.

> **Make it a game · Market Size Duel.** Each of you secretly estimates how many bakeries a town of twenty thousand could support. One of you works top-down, the other bottom-up. Compare results and name your total, serviceable and obtainable markets. Whoever can defend their numbers better wins. Then say how Singer's patent pool and Edward Clark's installment plan changed the sewing machine market.

3.4 Legal Forms: Procter & Gamble's Partnership and the Corporation

OBJECTIVES

- Tell how William Procter and James Gamble formed a partnership in Cincinnati in 1837 and why the company later became a corporation.
- Compare sole proprietorships, general partnerships, limited liability companies and corporations on ownership, liability, taxes and paperwork.
- Calculate how profits and losses are shared among partners.

> **Warm-up.** Suppose you and a friend start a car-washing business and a customer's car is scratched. Who should pay? You? Your friend? Your parents? Write your answer and your reason.

WATCH

Corporations and limited liability | Taxes | Finance & Capital Markets | Khan Academy

Khan Academy · 9:57

https://www.youtube.com/watch?v=VnTlKcIigyY

> **WHEN TO WATCH**
> After the story of Procter and Gamble, before the comparison table.

BACKUP VIDEO

Procter & Gamble - Bigger Than You Know

Company Man · 12:32

https://www.youtube.com/watch?v=rnaUmFht0w4

Optional, a history of Procter & Gamble.

KEY TERMS

sole proprietorship

A business owned by one person, with no separate legal existence; the owner gets all profits and is personally liable for all debts.

general partnership

A business owned by two or more people who share profits, decisions and unlimited personal liability.

limited liability

Protection that limits an owner's losses to what he invested; personal property cannot be taken for the business's debts (with exceptions).

corporation

A legal entity separate from its owners (shareholders), with limited liability, a board of directors and shares that can be sold.

limited liability company (LLC)

A business form that gives owners limited liability with simpler rules than a corporation; first allowed by Wyoming in 1977.

CORE IDEAS

The story. William Procter, a candlemaker from England, and James Gamble, a soapmaker from Ireland, both settled in Cincinnati, Ohio, a river city whose meatpacking houses produced plenty of animal fat, the raw material for both candles and soap. They married sisters, Olivia and Elizabeth Norris. Their father-in-law, Alexander Norris, pointed out that the two men were competing for the same fat and suggested they join forces. On October 31, 1837, they formed a partnership, Procter & Gamble, each putting in a similar amount of capital, in the same year as a severe financial panic.

How they figured it out. As partners they shared profits and decisions, and each was personally responsible for all the firm's debts. Procter handled the office and sales; Gamble ran the manufacturing. The partnership survived the Panic of 1837, grew by supplying candles and soap to the Union army in the Civil War, and passed to their sons. By 1890 the business was large, with many family members and a need for new capital to build factories, so it was incorporated as The Procter & Gamble Company. Incorporation let it sell shares to raise money and gave owners **limited liability**: they could lose what they invested, but not their homes, if the company failed.

The big idea. Every business has a legal form. A **sole proprietorship** is simplest: you are the business; profits are yours and so are all debts. A **general partnership** adds partners and their skills and money, but each partner is liable for what any partner does in the business, so choose partners carefully and write an agreement. A **corporation** is a separate legal person: shareholders own it, directors oversee it, and owners have limited liability; it costs more to form and run, and its profits may

be taxed at the company level and again when paid out as dividends. A **limited liability company** combines limited liability with simpler rules and is popular for small firms.

A partnership agreement. Before sharing a venture, write down: who contributes what (money, time, equipment); how profits and losses are split; who decides what; how a partner can leave; and what happens to the business if it ends. Most partnership quarrels come from things never written down. Amos 3:3 asks, "Can two walk together, except they be agreed?"

In business today. Most very small businesses start as sole proprietorships and form an LLC or corporation as they grow or take on risk. Minors usually cannot sign binding contracts or form companies on their own, so a student venture runs under a parent's supervision, and any agreement should be written and signed with a parent. For anything more than a tiny venture, adults should consult an attorney or accountant about which form fits.

PICTURE STUDY



The Shipbuilder and His Wife, Rembrandt van Rijn, 1633 · Oil on canvas · Royal Collection, Buckingham Palace, London

Image: Wikimedia Commons, public domain

Rembrandt painted the Amsterdam shipbuilder Jan Rijcksen and his wife, Griet Jans, at work together: he at his drawing desk, she bringing an urgent letter. Many early businesses, like the Procter and Gamble families, were partnerships of relatives who shared both the work and the risk.

Look closely

- Find the ship drawing and the compasses. What is the shipbuilder doing?
- Look at the wife's motion and the letter. What might it say?
- Look at their faces. How well do these partners seem to know each other?

Talk about it

1. What does each partner bring to this business?
2. Why might family partnerships be strong, and what could strain them?
3. What would you want in writing before going into business with a relative?

Safety first. Do not register a business, open an account or sign any contract on your own. A parent should handle any filing and should consult a qualified professional for anything beyond a small family venture.

PROJECT

Choosing a Legal Form and Writing a Partnership Agreement

You will compare legal forms for your venture and draft a simple partnership or family agreement, even if you plan to work alone with a parent's supervision.

You will need

- Ledger notebook or a spreadsheet
- Your state's secretary of state or small-business website (with a parent) for basic information

Steps

1. Make a comparison table of sole proprietorship, general partnership, LLC and corporation, with rows for owners, liability, taxes, paperwork and cost to form. Fill it in from the lesson and your state's website.
2. Decide which form fits your venture now and which it might need if it grew. Explain why.
3. Draft an agreement (with a partner, or with your parent as supervising partner) covering contributions, profit and loss split, decisions, money handling, leaving and ending.
4. Include a rule for keeping records and a rule for settling disagreements.
5. Calculate how a sample profit of $400 and a sample loss of $120 would be divided under your agreement.
6. Have every party read it, discuss it, revise it and sign it with a parent.
7. File it in your portfolio.

Tips

- Write it in plain language; you should be able to read it aloud in three minutes.
- Agree on what happens when things go badly before they do.

Check your work

☐ I can compare the four legal forms on liability, taxes and paperwork.

☐ My agreement covers contributions, splits, decisions, leaving and ending.

- [ ] Every party, including a parent, has read and signed it.

LEDGER NOTEBOOK

1. Copy your comparison table.
2. Draw the P&G timeline: 1837 partnership; Civil War contracts; 1879 Ivory soap; 1890 incorporation.
3. Write your agreement's profit-split calculation.

KEY FORMULAS

$$\text{Partner's share} = \text{profit} \times \frac{\text{partner's agreed percentage}}{100}$$

From history. Procter & Gamble's moon-and-stars mark began as a symbol that dockworkers painted on boxes of candles so illiterate workers could tell them apart; it became one of the earliest American trademarks, registered in 1882.

WORKED EXAMPLES

Example 1. Two partners agree to split profits 60/40 because one contributed more money. The business earns $2,500 in a year. How much does each receive? If instead it loses $800, how is the loss shared?

Show solution

1. Profit: $0.60 \times 2{,}500 = \$1{,}500$; $0.40 \times 2{,}500 = \$1{,}000$.
2. Loss (same ratio unless agreed otherwise): $0.60 \times 800 = \$480$; $0.40 \times 800 = \$320$.

Answer: $1,500 and $1,000 of profit; or $480 and $320 of a loss.

Example 2. A business fails owing \$30,000 and has only \$10,000 of assets. The owner has \$15,000 in personal savings. What can creditors collect if the business is (a) a sole proprietorship, (b) a corporation?

Show solution

1. Unpaid debt after business assets: $30{,}000 - 10{,}000 = \$20{,}000$.
2. (a) The owner is personally liable: creditors may claim his \$15,000 savings, and he still owes \$5,000.
3. (b) Limited liability: creditors collect the \$10,000 of business assets; the owner's savings are protected (unless he personally guaranteed a loan or committed fraud).

Answer: (a) Up to \$25,000 total, including all his savings, with \$5,000 still owed; (b) \$10,000, the business assets only. Honest owners still feel a moral duty to creditors (Psalm 37:21), and Lesson 9.5 returns to this.

PRACTICE

1. Easy When and where did Procter and Gamble form their partnership?

   Show answer

   October 31, 1837, in Cincinnati, Ohio.

2. Easy Why did Alexander Norris suggest the partnership?

   Show answer

   His sons-in-law were competing for the same raw material (animal fat) for candles and soap; together they would be stronger.

3. Easy Define limited liability.

   Show answer

   An owner's losses are limited to his investment; personal property cannot be taken for the business's debts (with exceptions).

4. Medium Three partners split profits 50/30/20. Profit is \$9,000. Find each share.

   Show answer

   \$4,500, \$2,700 and \$1,800.

5. Medium Name two advantages and two disadvantages of a sole proprietorship.

Show answer

Advantages: simple and cheap to start; owner keeps all profits and makes all decisions. Disadvantages: unlimited personal liability; limited money and skills.

6. Medium Why did Procter & Gamble incorporate in 1890?

Show answer

To raise capital by selling shares for growth and to give owners limited liability as the business grew large.

7. Medium List five things a partnership agreement should cover.

Show answer

Contributions; profit and loss split; decision-making; how a partner leaves or is bought out; what happens if the business ends.

8. Hard A corporation earns $100,000 and pays 21% tax; it then pays all remaining profit as dividends, taxed at 15% to shareholders. How much do shareholders keep? (Simplified rates.)

Show answer

After corporate tax: $79,000. After dividend tax: $79{,}000 \times 0.85 = \$67{,}150$.

9. Hard Why can't a 15-year-old usually form an LLC or sign a lease alone? What should a student venture do instead?

Show answer

Minors generally cannot make binding contracts. The student should run the venture under a parent's supervision, with a parent signing any needed agreements.

10. Hard In a general partnership, one partner signs a $5,000 contract without telling the other. Who is liable?

Show answer

Generally both: each partner is personally liable for business debts incurred by any partner acting for the business. That is why trust and a written agreement matter.

11. **Challenge** You and a friend start a venture: you put in $300 and 5 hours a week; she puts in $100 and 10 hours a week. Propose and justify a profit split.

    Show answer

    Answers vary. Sample: value hours at $5 for 10 weeks (you $250, she $500) plus money ($300 and $100): contributions $550 and $600, so roughly a 48/52 split. Credit for a clear, fair method written in advance.

COMMON MISTAKES

- Starting a partnership on a handshake. Write it down.
- Assuming an LLC or corporation protects against everything. Personal guarantees, fraud and your own negligence can still reach you.
- Splitting equally by default when contributions are unequal, without discussing it.

> **Make it a game · Pick Your Paperwork.** Write four cards: sole proprietorship, general partnership, LLC and corporation, and spread them on the floor. Your parent reads a made-up business situation, such as two friends opening a bakery. Slap the best card, then explain the liability and the tax trade-off in one breath. Finish by telling why Procter and Gamble began as a partnership.

3.5 The Written Plan: Frederic Tudor, the Ice King

OBJECTIVES

- Tell how Frederic Tudor's first ice cargo failed in 1806 and how planning for storage, customers and costs later made his ice trade succeed.
- Name the sections of a lean business plan and what each must show.
- Write a short plan for your venture with honest, checkable numbers and assumptions.

> **Warm-up.** Plan a family picnic in five minutes: what, where, who brings what, what it costs, and what you will do if it rains. You have just written a small plan with a contingency.

WATCH

Writing a Business Plan: What You Need to Know | It's a Money Thing

Red Canoe Credit Union · 3:43

https://www.youtube.com/watch?v=7ykkhepT9aE

> **WHEN TO WATCH**
> After the story of the Ice King, before you outline your plan.

Note: From a credit union's financial-education series.

KEY TERMS

business plan

A written description of a venture: what it offers, to whom, how it will be run and financed, and the expected numbers.

lean plan

A short plan (a few pages) focused on the key assumptions, numbers and next steps rather than long description.

milestone

A specific, dated goal used to measure progress (first 10 customers by March 1).

contingency

A plan for what to do if something goes wrong.

assumption

A belief the plan depends on but that has not been proven; good plans list them openly.

CORE IDEAS

The story. Frederic Tudor was a young Boston man from a well-to-do family who, in 1805, had an idea that his friends thought absurd: cut ice from New England ponds in winter and sell it in the hot Caribbean. In 1806 he sent a brig, the *Favorite*, with about 130 tons of ice to Martinique. The ice arrived largely intact, but there was nowhere to store it and no one knew what to do with it. It melted, and Tudor lost thousands of dollars. Over the next years he was jailed for debt more than once and kept a journal of his troubles on the cover of which he wrote that it was a record of his struggles.

How they figured it out. Tudor learned that selling ice required a whole system. He built insulated ice houses at his ports and tested materials until he found that sawdust, a cheap waste product of sawmills, kept ice well both in the ship's hold and in storage. He won exclusive rights from some island governments, taught bartenders and hotel keepers to serve cold drinks, gave away ice at first so customers could try it, and showed families how to keep food in ice chests. His supplier Nathaniel Wyeth invented a horse-drawn ice cutter in the 1820s that cut uniform blocks that packed tightly and melted less. In 1833 Tudor's ship *Tuscany* carried ice four months to Calcutta, India, and much of it arrived. By the 1840s he was rich and was known as the Ice King.

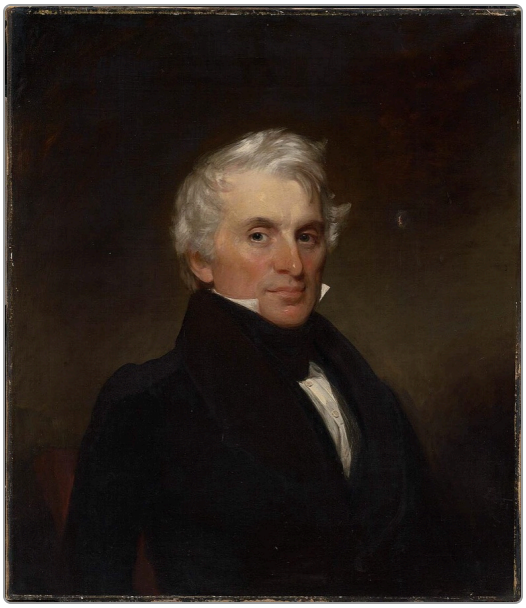
The big idea. A **business plan** forces you to think through the whole venture before you spend: the customer and value proposition, the business model, the market and competition, operations (how the product is made, stored and delivered), the team and legal form, the numbers (start-up costs, prices, sales and costs), the money needed, the **milestones** and the risks with **contingencies**. A **lean plan** of a few pages, with honest numbers and openly listed **assumptions**, is better than a long document full of hopes.

Plans and humility. Tudor's first voyage had a product and a market but no plan for what happened after the ship docked. His later success came from planning the whole chain, from pond to glass. Yet no plan survives unchanged; Tudor kept

adjusting for decades. Write the plan, test it, and revise it as evidence comes in. “Which of you, intending to build a tower, sitteth not down first, and counteth the cost” (Luke 14:28).

In business today. Banks, investors and mentors read business plans, and the discipline helps even if no one else does. The best small-business plans fit on a few pages, use real prices and real test results, and say plainly what is known and what is guessed.

PICTURE STUDY



Frederic Tudor, Francis Alexander, about 1830 · Oil on canvas · Museum of Fine Arts, Boston

Image: Wikimedia Commons, public domain

Francis Alexander painted Frederic Tudor around 1830, when the ice trade was finally paying after twenty years of losses, debts and experiments. The confident man in the portrait had been jailed for debt more than once.

Look closely

- Look at Tudor's expression. What qualities did the painter want to show?
- Look at his clothes. What do they tell you about his position by 1830?
- Notice what the painting leaves out: no ice, no ships, no ledgers. Why might a businessman want a portrait like this?

Talk about it

1. What would you ask Tudor about his first voyage if you could?
2. Which of his later plans (ice houses, sawdust, free samples) would you have thought of first?
3. Is persistence always a virtue in business? When might Tudor have been wiser to stop?

PROJECT

A Five-Page Lean Plan

You will write a lean business plan for your venture, using your work from Units 2 and 3, and present it to a parent or mentor as if to a banker.

You will need

- Your Unit 2 and Unit 3 notebook pages
- A word processor or notebook; a spreadsheet for the numbers
- A parent or mentor to read and question the plan

Steps

1. Page 1: the customer, the job, the value proposition and the business model (one paragraph each).
2. Page 2: market size (top-down and bottom-up) and the competition grid.
3. Page 3: operations: how the product is made or the service delivered, stored, sold and paid for; the legal form and who does what.
4. Page 4: numbers: start-up costs, price, cost per unit, expected sales for three months (you will refine these in Unit 4).
5. Page 5: milestones with dates, the top five assumptions, the top three risks with contingencies, and what help you need.
6. Read the plan aloud to a parent or mentor, who asks at least five hard questions. Record them.
7. Revise the plan to answer the questions, and mark every number as tested or assumed.

Tips

- Use short paragraphs and tables; a plan is a working tool, not an essay.
- If you cannot explain a number, either test it or mark it as a guess.

Check your work

- ☐ I can name the parts of a lean plan.
- ☐ My plan has dated milestones, listed assumptions and contingencies.
- ☐ I revised it after a mentor’s questions.

LEDGER NOTEBOOK

1. Draw Tudor's supply chain: pond → ice cutter → ice house → ship with sawdust → port ice house → hotel, bar and home.
2. Copy your milestones and contingencies.
3. List the five hardest questions your mentor asked and your answers.

KEY FORMULAS

$$\text{Delivered quantity} = \text{shipped quantity} \times (1 - \text{loss rate})$$

From history. The ice trade Tudor began grew into a major American export. By the mid-1800s ice from New England ponds, including Walden Pond, was shipped to the Caribbean, the American South, South America and India. Henry David Thoreau watched Tudor's workers cut ice at Walden in the winter of 1846–47 and wrote about it in *Walden*.

WORKED EXAMPLES

Example 1. A ship carries 180 tons of ice on a long voyage, and 40% melts on the way. In port, ice sells for $0.05 a pound (2,000 pounds per ton). Shipping and harvesting cost $5,000. What is the revenue and profit? (Illustrative numbers.)

Show solution

1. Delivered: $180 \times (1 - 0.40) = 108$ tons.
2. Pounds: $108 \times 2{,}000 = 216{,}000$ lb.
3. Revenue: $216{,}000 \times \$0.05 = \$10{,}800$.
4. Profit: $\$10{,}800 - \$5{,}000 = \$5{,}800$, before storage and selling costs.

Answer: 108 tons delivered, $10,800 revenue, $5,800 profit before storage and selling. Reducing the loss rate (sawdust, better ice houses) was worth a great deal.

Example 2. Write three milestones and one contingency for a student's Saturday bread-delivery venture.

Show solution

1. Milestone 1: by February 1, bake three test batches and record cost per loaf.
2. Milestone 2: by February 15, sign up 8 families with a parent's help.
3. Milestone 3: by March 31, complete six weeks of deliveries with written books and fewer than one late delivery.
4. Contingency: if the oven breaks or I am sick, a parent texts all customers by Friday 6 p.m. and no one is charged that week.

Answer: Milestones are specific, dated and measurable; the contingency says exactly what happens and protects customers.

Example 3. If better insulation cuts the melt rate in the first example from 40% to 25% and costs \$600 more, is it worth it?

Show solution

1. Delivered at 25% loss: $180 \times 0.75 = 135$ tons.
2. Extra ice: $135 - 108 = 27$ tons $= 54{,}000$ lb.
3. Extra revenue: $54{,}000 \times 0.05 = \$2{,}700$, against \$600 of cost.

Answer: Yes: \$2,700 of extra revenue for \$600, a gain of \$2,100.

PRACTICE

1. Easy Where did Tudor send his first ice cargo, and what went wrong?

   Show answer

   Martinique, in 1806; there was no place to store the ice and no customers ready to use it, so it melted.

2. Easy What cheap material did Tudor find kept ice from melting?

   Show answer

   Sawdust.

3. Easy Define a milestone and give an example.

Show answer

A specific, dated, measurable goal, such as “ten paying customers by April 1.”

4. Medium Name the main sections of a lean business plan.

Show answer

Customer and value proposition; business model; market and competition; operations; team and legal form; numbers (costs, prices, projections); money needed; milestones; risks and contingencies.

5. Medium 200 tons shipped with a 30% loss rate. How much is delivered?

Show answer

$200 \times 0.70 = 140$ tons

6. Medium Name three things Tudor did to create demand for ice where none existed.

Show answer

Gave away ice so people could try it; taught bartenders to serve cold drinks; showed families and hotels how to keep food in ice chests. Also: built ice houses so ice was always available.

7. Medium Why should a plan list its assumptions openly?

Show answer

So the writer and readers know what must be tested, can check them, and will notice when one proves wrong.

8. Hard Revenue is $8,000 if 25% of cargo melts. What would it be if 10% melts? (Revenue is proportional to delivered ice.)

Show answer

$8{,}000 \times 0.90 / 0.75 = \$9{,}600$.

9. Hard Tudor's first plan had a product and a market. What was missing? What is the equivalent danger for a student baker?

Show answer

Storage, delivery and customer education (the operations after arrival). A student baker might plan the recipe and the customers but forget packaging, delivery timing, food-safety rules or payment collection.

10. Hard Why is a five-page plan with real test results usually more useful than a forty-page plan with none?

Show answer

It is read and used, it focuses on what matters, and it rests on evidence rather than hopes. Long plans often hide untested assumptions behind detail.

11. Challenge Write one sentence for each part of a lean plan for a venture you might run. Include at least three numbers drawn from your Unit 2 tests.

Show answer

Answers vary; credit for covering every section in a sentence with real numbers and listed assumptions.

COMMON MISTAKES

- Planning the product and the sale but not what happens in between (storage, delivery, payment).
- Hiding guesses inside confident-looking numbers.
- Writing the plan once and never revising it.

Make it a game · Ice Cargo Plan Match. Make a memory match set. On one pile of cards write the sections of a lean business plan from memory; on the other, write what each section must show. Mix both piles face down and play for pairs with your parent. Then name three things Frederic Tudor's 1806 ice cargo needed in a plan, covering storage, customers and costs.

Scripture. "For which of you, intending to build a tower, sitteth not down first, and counteth the cost, whether he have sufficient to finish it?" (Luke 14:28, KJV)

Jesus uses a builder's plan to teach about counting the cost of discipleship; the illustration works because every listener knew that wise builders plan before they start.

UNIT 3

The Business Model and Plan

A tested idea is not yet a business. This unit turns it into one. You will state a clear **value proposition**, as the tailor Jacob Davis and the merchant Levi Strauss did with riveted work pants for miners in 1873; design a **business model** that explains how the venture earns money, with King C. Gillette's safety razor and its replaceable blades; and size up the **market and the competition**, following Isaac Singer and Edward Clark through the "sewing machine war" and the installment plan that opened the home market.

Then you will choose a **legal form**, starting with the 1837 partnership of a candlemaker and a soapmaker named Procter and Gamble, and write a short **business plan**, learning from Frederic Tudor, the Boston "Ice King," whose first cargo melted in the Caribbean because he had not planned for what happened after the ship arrived. By the end of the unit you will have a one-page business model canvas and a five-page plan for your own venture.

PREREQUISITES

- Has a tested idea or need from Unit 2 (interviews, MVP, demand test)
- Can compute percents, simple averages and products
- Knows the six stakeholders (Lesson 1.5)

MASTERY CHECKLIST

- ☐ I can write a value proposition that names the customer, the job, the pains relieved and the gains created.
- ☐ I can draw a business model canvas and explain how a business earns money and what it costs to run.
- ☐ I can estimate a market from the top down and the bottom up, and analyze direct competitors and substitutes.
- ☐ I can compare sole proprietorships, partnerships, LLCs and corporations, including liability and who owns what.
- ☐ I can write a short business plan whose numbers and assumptions are honest and checkable.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **U.S. Small Business Administration, "Write your business plan"**: Free government guide with sample plans and a simple lean-plan outline. Use with Lesson 3.5. Ages 14+.
- **SCORE business plan templates**: SCORE is a nonprofit of volunteer business mentors partnered with the SBA. Its free templates (start-up costs, financial projections) are useful for Units 3 and 4. A parent should create any account. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

3.1 The Value Proposition: Jacob Davis, Levi Strauss and Pants That Would Not Tear

3 sessions of 50 minutes

3.2 The Business Model: King Gillette's Razor and Blades 3 sessions of 50 minutes

3.3 Competition and Market Size: Singer and the Sewing Machine War

3 sessions of 50 minutes

3.4 Legal Forms: Procter & Gamble's Partnership and the Corporation

3 sessions of 50 minutes

3.5 The Written Plan: Frederic Tudor, the Ice King 3 sessions of 50 minutes

Unit 3 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Tell how Jacob Davis and Levi Strauss came to share a patent in 1873.

2. **6 pts**
   A $45 jacket lasts 3 years; a $20 jacket lasts 1 year. Find each cost per year and the savings over 3 years.

3. **5 pts**
   Write a value proposition (customer, job, benefit, difference) for a pet-sitting service for families you know.

4. **5 pts**
   Name the nine boxes of the business model canvas.

5. **6 pts**
   A printer sells for $80; ink cartridges cost $25 and a customer uses 6 a year. Find the revenue per customer over 3 years.

6. **5 pts**

   What does recent historical research show about Gillette's pricing while its patent was in force?

7. **6 pts**

   Top-down: 15,000 households, 25% buy the service, spending $80 a year. Bottom-up: 120 households reachable, 12% buy, $80 a year. Compute both.

8. **5 pts**

   Define direct competitor and substitute, with an example of each for a tutoring service.

9. **6 pts**

   How did Edward Clark open the household market for Singer machines?

10. **6 pts**

    Partners split profits 70/30. Profit is $4,200. Find each share. What if they lose $1,000?

11. **6 pts**

    Compare a sole proprietorship and a corporation on liability, ownership and taxes.

12. **5 pts**

    Why did Procter & Gamble incorporate in 1890?

13. **6 pts**

    150 tons are shipped with a 35% loss. Ice sells at $0.04 a pound (2,000 lb per ton). Find the revenue.

14. **6 pts**

    Name four things Tudor did that turned his failed 1806 voyage into a lasting business.

15. **6 pts**

    Write two milestones and one contingency for a summer car-washing venture.

16. **16 pts**

Essay: Using two stories from this unit, explain why an idea that customers want can still fail without a good business model and plan. Then describe the most important assumption in your own plan and how you will test it.

ANSWER KEY

1. Davis, a Reno tailor, riveted pocket corners on work pants; fearing copies but unable to pay the $68 patent fee, he wrote to Strauss, his cloth supplier, proposing to share the patent if Strauss paid. They received Patent 139,121 on May 20, 1873.
2. $15 vs $20; savings $3 \times 5 = \$15$.
3. Sample: “For families at our church who travel, our pet-sitting service feeds and walks your pets twice a day at home, so they stay calm and you need not board them; unlike a kennel, we are people you know, for $15 a day.”
4. Customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, cost structure.
5. $80 + 3 \times 6 \times 25 = 80 + 450 = \$530$
6. Razors were not given away cheaply; both razors and blades sold at good prices. The cheap-razor, profitable-blade model came after the patent expired in 1921.
7. Top-down $15{,}000 \times 0.25 \times 80 = \$300{,}000$; bottom-up $120 \times 0.12 \times 80 = \$1{,}152$.
8. Direct: another tutor or tutoring center. Substitute: free online lessons, or a parent helping.
9. An 1856 installment (rent-to-own) plan with a small down payment and monthly payments, plus showrooms, demonstrations, repair service and trade-ins.
10. $2,940 and $1,260; losses $700 and $300.
11. Sole proprietorship: one owner, unlimited personal liability, profits taxed once as the owner’s income. Corporation: shareholders own it, limited liability, profits may be taxed at the company level and again as dividends.
12. To raise capital through shares for growth and to give owners limited liability.
13. $150 \times 0.65 = 97.5$ tons $= 195{,}000$ lb; $195{,}000 \times 0.04 = \$7{,}800$.
14. Built ice houses at ports; used sawdust insulation; gave away ice and taught customers how to use it; secured supply and exclusive rights; used Wyeth’s uniform-block cutter. (Any four.)
15. Sample milestones: 10 regular customers by June 15; $300 revenue by July 31 with complete books. Contingency: if it rains, call each customer and reschedule within two days at no charge.

16. Graded on a clear thesis, accurate use of two stories (Tudor's melted cargo, Gillette's slow start, Singer's market, Davis and Strauss, P&G), correct use of terms, and a specific, testable assumption with a test plan.

PORTFOLIO PIECE: THE BUSINESS PLAN FILE

Assemble your value proposition (both versions), your business model canvas and model comparison, your market estimates and competition grid, your legal-form table and signed agreement, and your five-page lean plan with the mentor's questions and your revisions. This file is the foundation for the numbers in Unit 4 and the venture in Unit 10.

LOOK FOR	WHAT IT MEANS
Coherence	Value proposition, model, market, operations and numbers fit together and tell one story.
Evidence	Numbers come from tests, real prices and data; assumptions are marked.
Realism	Market and sales estimates are bottom-up and modest; risks have contingencies.
Clarity	The plan is short, organized and easy for a banker or parent to follow.

UNIT 4

The Numbers

Good intentions do not pay the bills; numbers tell an entrepreneur whether a venture can stand. This unit teaches the arithmetic every small business needs. You will list and total **start-up costs**, as Bill Hewlett and Dave Packard did when they started in a Palo Alto garage with $538 in 1939; choose a **pricing strategy**, with Frank Woolworth's five-and-ten-cent stores; and work out **unit economics and break-even**, following Josiah Wedgwood, who in a slump of 1772 sat down with his books and discovered which of his costs did not change when output did.

Then you will build a **projected income statement**, using Benjamin Day's penny newspaper of 1833, which sold below the cost of its paper and made its money from advertising, and learn to **manage cash**, the lesson Henry Ford learned in the slump of 1920–21, when a profitable company nearly ran out of money. By the end of the unit you will have a complete financial model for your own venture in a spreadsheet.

PREREQUISITES

- Has a lean plan from Unit 3
- Can use percents, simple equations and a spreadsheet (sums and simple formulas)
- Knows profit = revenue − costs

MASTERY CHECKLIST

- ☐ I can list and total start-up costs, separating one-time costs, inventory, and working capital, with a contingency.
- ☐ I can explain cost-plus, value-based, competitive, penetration and skimming pricing and choose one with reasons.
- ☐ I can calculate contribution margin, break-even units and break-even revenue, and use them to make decisions.
- ☐ I can build a three-month projected income statement from stated assumptions.
- ☐ I can build a cash-flow forecast and explain why a profitable business can run out of cash.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **SCORE financial projections template**: SCORE, a nonprofit of volunteer mentors partnered with the SBA, offers a free spreadsheet template for start-up costs and three-year projections. A parent should handle any download or account. Ages 14+.
- **LibreOffice (free office suite with the Calc spreadsheet)**: Free spreadsheet software for the models in this unit, if you do not use Google Sheets. A parent should install it.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

4.1	**Start-Up Costs: Hewlett, Packard and $538 in a Garage**	3 sessions of 50 minutes
4.2	**Pricing Strategies: Frank Woolworth's Five-and-Ten**	3 sessions of 50 minutes
4.3	**Unit Economics and Break-Even: Wedgwood's Cost Book of 1772**	3 sessions of 50 minutes
4.4	**The Projected Income Statement: Benjamin Day's Penny Paper**	3 sessions of 50 minutes
4.5	**Managing Cash: Henry Ford and the Slump of 1920–21**	3 sessions of 50 minutes

Unit 4 Test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   How did Hewlett and Packard keep their start-up costs low in 1939?

2. **6 pts**
   Equipment $220, inventory $130, setup $60, working capital $90. Add a 15% contingency. Find the total.

3. **6 pts**

   Cash $1,000; monthly costs $450; monthly sales $200. Find the burn rate and runway.

4. **5 pts**

   Tell why Woolworth's first store failed and what he changed.

5. **6 pts**

   Cost $9, price $15. Find markup percent and margin percent.

6. **6 pts**

   Cost $12; target margin 40%. Find the price.

7. **5 pts**

   Define penetration and skimming pricing with an example of each.

8. **5 pts**

   What did Wedgwood discover about his costs in 1772?

9. **7 pts**

   F = $420, P = $15, V = $8. Find contribution margin, break-even units and profit at 100 units.

10. **6 pts**

    In problem 9, what price is needed to break even at 42 units?

11. **6 pts**

    Revenue $2,000; COGS $800; operating expenses $650. Find gross profit, gross margin and net income.

12. **5 pts**

    Explain Benjamin Day's business model for *The Sun*.

13. **6 pts**

    Start $250. Month 1: in $150, out $420. Month 2: in $380, out $160. Find ending cash each month.

14. **6 pts**

Inventory $4,000, receivables $1,000, payables $1,800. Find cash tied up; how much is freed by cutting inventory to $2,500?

15. **4 pts**

Name two ways Ford raised cash in 1921 and one stakeholder who paid a price.

16. **16 pts**

Essay: “Profit is an opinion; cash is a fact.” Explain what this business saying means, using Ford in 1921 and one other example, and describe two honest ways a small venture can protect its cash.

ANSWER KEY

1. They started with $538 in a rented garage, used household tools (even Packard's oven), built a simple, cheap product, took small jobs and grew from profits.
2. $500 \times 1.15 = \$575$
3. $250 a month; 4 months.
4. Utica was too small and the selection too limited; in Lancaster he chose a busier town and added ten-cent goods.
5. Markup $6/9 \approx 67\%$; margin $6/15 = 40\%$.
6. $12/0.60 = \$20$
7. Penetration: low price to win customers quickly (a new café's $1 coffee). Skimming: high launch price lowered later (a new gadget).
8. Many costs were fixed whatever the output, so making and selling more spread them and cut cost per piece; his books also exposed a thieving clerk.
9. CM $7; $420/7 = 60$ units; profit $7 \times 100 - 420 = \$280$.
10. $P - 8 = 420/42 = 10 \Rightarrow P = \$18$.
11. $1,200; 60%; $550.
12. He sold a lively paper for a penny through newsboys who bought at a discount; the price barely covered paper and ink, but large circulation attracted advertisers, whose payments supplied much of the profit.
13. Month 1: −$20; month 2: $200.
14. $3,200 tied up; $1,500 freed.
15. Using up inventory, selling surplus, shortening production, cash-on-delivery to dealers; the dealers.
16. Graded on a clear explanation that accounting profit depends on timing and estimates while cash is what pays bills; accurate use of the Ford story and another example (the wreath venture, Hershey's debts, a growing business); and two honest practices (deposits, lean inventory, a reserve, forecasting, paying bills on time).

PORTFOLIO PIECE: THE FINANCIAL MODEL

Combine your work into one spreadsheet file with tabs: start-up costs (with sources and contingency), pricing study, break-even analysis and chart, three-month projected income statement (expected, best and worst cases), and six-month cash-flow forecast. Add a one-page summary that a banker could read in five minutes: how much money you need, when you break even, your expected profit and your lowest cash point.

LOOK FOR	WHAT IT MEANS
Accuracy	Formulas are correct and linked; totals check.
Evidence	Prices, costs and sales come from real sources and tests.
Realism	Break-even and projections are compared with what can actually be sold; worst cases are shown.
Clarity	The summary page is clear and honest about risks.

4.1 Start-Up Costs: Hewlett, Packard and $538 in a Garage

OBJECTIVES

- Tell how Bill Hewlett and Dave Packard started their company in 1939 with $538 and a garage, and how their first product and first big customer shaped it.
- List start-up costs in categories: equipment, initial inventory, legal and setup, and working capital, plus a contingency.
- Estimate how long start-up money will last at a given monthly burn rate.

> **Warm-up.** List everything you would need to buy or borrow to start a small baking or lawn-care venture next week. Put a price beside each item you know; put a question mark beside each you would have to look up.

WATCH

Startup costs: understanding the costs for your business | Start your business

Intuit QuickBooks · 4:12

https://www.youtube.com/watch?v=EAx49SZyDkk

> **WHEN TO WATCH**
> After the story, before the start-up cost sheet.

Note: From a software company's small-business series; the teaching is general and no purchase is needed.

BACKUP VIDEO

City Beat History Corner: The Hewlett Packard Garage

Palo Alto Historical Association · 2:41

https://www.youtube.com/watch?v=4V_edFofjsY

Optional, a short history of the Hewlett-Packard garage.

KEY TERMS

start-up costs

Money needed before and during the first months of a venture: equipment, first inventory, setup, and cash to cover early expenses.

capital expenditure

Money spent on equipment or property that lasts more than a year.

working capital

Cash kept on hand to pay ongoing bills until sales bring in enough money.

burn rate

How much cash a new business spends each month beyond what it brings in.

runway

How many months the start-up money will last at the current burn rate.

CORE IDEAS

The story. Bill Hewlett and Dave Packard became friends as engineering students at Stanford University, where their professor Frederick Terman encouraged students to start companies near the university instead of moving east. On January 1, 1939, they formed a partnership (a coin toss decided whose name came first) and set up shop in the one-car garage behind the house Packard rented at 367 Addison Avenue in Palo Alto, California. Their starting capital was $538. They used Packard's kitchen oven to bake the paint on their first instrument panels.

How they figured it out. Their first product was an audio oscillator, an instrument that produces precise tones for testing sound equipment, based on Hewlett's graduate research. His clever design used an ordinary light bulb to keep the signal stable, so the instrument was simpler and far cheaper than its competitors. One of their first large customers was Walt Disney's studio, which bought eight oscillators to test the sound system for the film *Fantasia*. Hewlett and Packard kept their costs low, took small jobs to pay the bills, and paid for growth out of profits. By 1940 they had moved out of the garage into a rented building, and the company grew into one of the great electronics firms.

The big idea. Before you sell anything, you spend. **Start-up costs** fall into categories: equipment and tools (**capital expenditures**), the first stock of materials or products (inventory), setup costs (permits, a sign, a simple website, insurance), and **working**

capital, the cash to pay ongoing bills until sales catch up. Add a **contingency** of 10–20% for what you forgot, because you will forget something. Then compute the **burn rate** and the **runway**: how many months the money lasts if sales are slow.

Keeping start-up costs low. Borrow or rent equipment before buying it. Use what you already have (a kitchen, a garage, a bicycle). Buy small quantities of inventory at first, even if the unit price is higher. Do the work yourself at first. Hewlett and Packard's $538 and borrowed oven are the opposite of the venture that spends thousands on equipment and logos before its first sale.

In business today. Many small businesses fail not because the idea is bad but because the owners underestimated start-up costs or ran out of working capital before customers came. A careful cost sheet, built from real prices and kept honest with a contingency, is one of the most valuable pages in any plan. "Be thou diligent to know the state of thy flocks" (Proverbs 27:23).

PICTURE STUDY



Workers Outside the Main Laboratory at Menlo Park, Unknown photographer, about 1880 · Photograph · Thomas Edison National Historical Park (Wikimedia Commons)

Image: Wikimedia Commons, public domain

Sixty years before the Hewlett-Packard garage, Thomas Edison built a plain wooden laboratory in the New Jersey countryside, where land was cheap. Both are famous small beginnings: a modest building, a few skilled people and tools bought or built as they were needed.

Look closely

- Look at the building. What would it have cost compared with a city office?
- Count the workers. How many people does a start-up need?
- Look for tools, wagons or supplies. What were Edison's start-up costs likely to include?

Talk about it

1. Why might a cheap, plain building be a wise first home for a venture?
2. What did Edison and the HP founders spend money on first, and what did they borrow or make?
3. What is your "garage" or "Menlo Park": the place you could start without rent?

PROJECT

The Start-Up Cost Sheet

You will build a start-up cost sheet for your venture in a spreadsheet using real prices, compare buying with renting or borrowing, and calculate your runway.

You will need

- A spreadsheet (Google Sheets or LibreOffice Calc)
- Real prices from stores, catalogs or websites (with a parent)
- Your Unit 3 plan

Steps

1. List every item your venture needs before its first sale, grouped as equipment, inventory, setup and working capital.
2. Find a real price for each; record the source and date.
3. For each piece of equipment over $50, find a cheaper option (used, rented, borrowed, already owned) and record the savings.
4. Choose the lean option for each item and total the sheet; add a 15% contingency.
5. Estimate your monthly costs and early monthly sales; calculate the burn rate and runway.
6. Use spreadsheet formulas (SUM, multiplication) rather than typing totals, so changes update automatically.
7. Write a paragraph: what is your total, where will the money come from (see Unit 5), and what is the first thing you would cut if you had half as much?

Tips

- Check unit prices: a big package is cheaper per item only if you will use it before it spoils.
- Ask family first. Many tools are sitting unused in a relative's garage.

Check your work

☐ I can name and total the categories of start-up costs with a contingency.

☐ Every price on my sheet has a source.

- [ ] I calculated my runway and identified what I would cut first.

LEDGER NOTEBOOK

1. Copy your start-up cost sheet (or paste a printout) with totals.
2. Draw a bar chart comparing the "buy everything new" total with your lean total.
3. Write the HP timeline: 1939 partnership and garage; oscillators; Disney order for *Fantasia*; 1940 move to a rented building.

KEY FORMULAS

$$\text{Total start-up} = \text{equipment} + \text{inventory} + \text{setup} + \text{working capital} + \text{contingency}$$

$$\text{Runway (months)} = \frac{\text{cash available}}{\text{monthly burn rate}}$$

From history. The Palo Alto garage where Hewlett and Packard began is now a California historical landmark and is listed on the National Register of Historic Places as the "birthplace of Silicon Valley." The partners were known for "management by walking around" and for sharing profits with employees.

WORKED EXAMPLES

Example 1. A student's cookie venture needs: a used stand mixer $60, baking sheets and cooling racks $35, first ingredients $80, bags and labels $25, a county cottage-food permit $50, and $100 of working capital. Add a 15% contingency. What is the total?

Show solution

1. Subtotal: $60 + 35 + 80 + 25 + 50 + 100 = \$350$.
2. Contingency: $0.15 \times 350 = \$52.50$.
3. Total: $\$350 + \$52.50 = \$402.50$.

Answer: About $403. (Permit fees vary by place; check your own county's rules.)

Example 2. A venture has $1,200 in start-up cash left after buying equipment. In the first months it spends $500 a month and brings in $200 a month. What is the burn rate and the runway? How does the runway change if sales rise to $350 a month?

Show solution

1. Burn rate: $500 - 200 = \$300$ a month.
2. Runway: $1{,}200 / 300 = 4$ months.
3. With sales of $350: burn $500 - 350 = \$150$; runway $1{,}200 / 150 = 8$ months.

Answer: Burn $300 a month, 4 months of runway; with higher sales, 8 months.

Example 3. Option A: buy a $900 pressure washer. Option B: rent one for $45 a day. You expect to use it 2 days a month. After how many months does buying become cheaper?

Show solution

1. Rental per month: $2 \times 45 = \$90$.
2. Months to equal purchase: $900 / 90 = 10$.

Answer: After 10 months. For an untested venture, renting first keeps start-up costs low; buy later if demand proves steady.

PRACTICE

1. Easy How much starting capital did Hewlett and Packard have in 1939, and where did they work?

   Show answer

   $538; in a garage behind 367 Addison Avenue, Palo Alto.

2. Easy Name the four main categories of start-up costs.

   Show answer

   Equipment (capital expenditures), initial inventory, setup costs, and working capital (plus a contingency).

3. Easy Define runway.

Show answer

How many months start-up cash will last at the current burn rate.

4. Medium Costs: tools \$150, supplies \$60, flyers \$20, working capital \$120. Add 10% contingency. Find the total.

Show answer

$350 \times 1.10 = \$385$.

5. Medium Cash \$900; monthly costs \$400; monthly sales \$250. Find the runway.

Show answer

Burn \$150; $900/150 = 6$ months.

6. Medium What made Hewlett's oscillator cheaper than competitors'?

Show answer

A simple design that used an ordinary light bulb to stabilize the signal, needing fewer costly parts.

7. Medium Give three ways to cut start-up costs.

Show answer

Rent or borrow equipment; use what you already have; buy small first batches; do the work yourself; skip nonessential items such as fancy logos.

8. Hard Why is a contingency line honest rather than padding?

Show answer

Every new plan misses some costs; a contingency acknowledges that openly instead of pretending the estimate is complete. It protects lenders, partners and the owner.

9. Hard A \$600 machine lasts 3 years. Renting costs \$25 a week, used 30 weeks a year. Compare the cost over 3 years.

Show answer

Buy \$600; rent $25 \times 30 \times 3 = \$2{,}250$. Buying is cheaper if demand lasts; rent while testing.

10. Hard Why does a venture need working capital even if it has all its equipment?

Show answer

Bills (materials, fees, transport) come before customers pay, and early sales are slow; without cash for that gap the business cannot operate.

11. Challenge You have $800. Equipment costs $350, inventory $150. Monthly costs are $200; sales start at $50 and rise by $50 each month. In which month does monthly cash flow turn positive, and do you run out of cash first?

Show answer

Cash after purchases: $300. Net by month: −150, −100, −50, 0, +50. Cash: 150, 50, 0, 0, 50. Cash reaches zero in month 3 but does not go negative; month 5 is the first positive month. It is dangerously tight, so add working capital or cut costs.

COMMON MISTAKES

- Forgetting working capital: equipment alone does not run a business.
- Leaving out small items (bags, labels, fees, gas) that add up.
- Buying new equipment for an untested venture.

> **Make it a game · The Garage Budget.** Pretend you are starting a lawn-care business in a garage, as Hewlett and Packard did. In ninety seconds, list your start-up costs under equipment, initial inventory, legal and setup, and working capital, then add a contingency. Your parent gives you a pretend monthly burn rate and you calculate your runway. Beat your own total tomorrow with a tighter list.

4.2 Pricing Strategies: Frank Woolworth's Five-and-Ten

OBJECTIVES

- Tell how Frank W. Woolworth built a chain of five-and-ten-cent stores after his first store failed in 1879.
- Explain cost-plus, value-based, competitive, penetration and skimming pricing, and price points.
- Calculate markup and margin and set a price for your product with reasons.

> **Warm-up.** Look at three prices in a store flyer or receipt. For each, guess what the seller paid for the item. What share of the price do you think is profit? Write your guesses to check later.

WATCH

Pricing Strategies Explained

Two Teachers · 7:17

https://www.youtube.com/watch?v=xTw7JUxWsYM

> **WHEN TO WATCH**
> After the story of Woolworth, before the pricing strategies.

KEY TERMS

markup

The amount added to cost to set a price, often stated as a percent of cost.

margin

Profit as a percent of the selling price.

cost-plus pricing

Setting price by adding a fixed markup to cost.

value-based pricing

Setting price by what the product is worth to the customer.

penetration pricing

Setting a low price to win customers quickly; skimming is the opposite, starting high and lowering over time.

CORE IDEAS

The story. Frank Winfield Woolworth grew up on a farm in northern New York and became a clerk in a dry-goods store in Watertown, where he was considered a poor salesman. In 1878 the store set up a table of odds and ends, all priced at five cents, and they sold out in a day. Woolworth borrowed $300 worth of goods from his employer and in February 1879 opened his own "Great Five Cent Store" in Utica, New York. It failed within a few months: the town was too small and the goods too few.

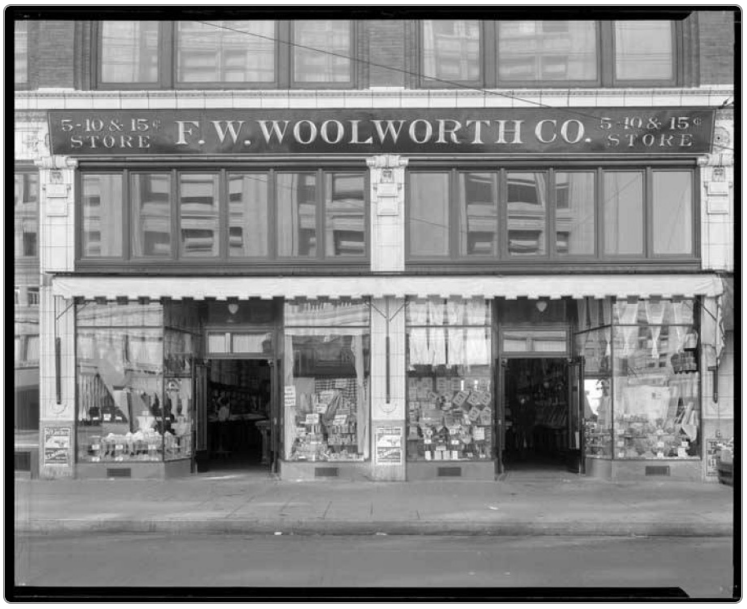
How they figured it out. Woolworth tried again in June 1879 in Lancaster, Pennsylvania, a busier town, and added ten-cent goods so he could offer more useful items. That store succeeded. He then bought directly from manufacturers in huge quantities, often abroad, which let him sell good-quality items at those fixed prices and still earn a profit. He opened more stores with partners who shared the profits. By 1912 there were about six hundred Woolworth stores, and in 1913 he opened the Woolworth Building in New York, then the tallest in the world, paid for in cash.

The big idea. Pricing is a decision with strategy behind it. **Cost-plus** pricing adds a markup to cost; it is simple and ensures every sale covers its cost. **Value-based** pricing asks what the product is worth to the customer. **Competitive** pricing looks at what rivals charge. **Penetration** pricing starts low to win customers; **skimming** starts high for eager early buyers. Woolworth used **price points**: fixed prices customers could remember, and then found products good enough to sell at them, working backward from price to cost.

Markup and margin. These are often confused. If an item costs $4 and sells for $5, the **markup** is $1 on a cost of $4, or 25%; the **margin** is $1 on a price of $5, or 20%. To hit a target margin, divide cost by one minus the margin. Every price must cover not only the item's direct cost but also a share of rent, fees and your own time; otherwise you are losing money one sale at a time.

In business today. Dollar stores still use price points; software and many new products use skimming; a new bakery may use penetration pricing to win its first customers. A fair price tells the truth: no hidden fees, no bait-and-switch, and the same price for every customer in the same situation. Under-pricing to "be nice" can also be unwise, because a business that cannot cover its costs cannot keep serving anyone.

PICTURE STUDY



Woolworth's Five and Ten Cent Store, Unknown photographer, about 1922 · Photograph · Museum of History and Industry, Seattle (Wikimedia Commons)

Image: Wikimedia Commons, public domain

By the 1920s nearly every American town had a Woolworth store with a red-and-gold sign. Customers knew before they walked in that most goods would cost five or ten cents.

Look closely

- Find the sign. What does it promise before you enter?
- Look at the windows. How are goods displayed?
- Look at the people. Who do you think the store's main customers were?

Talk about it

1. Why does a fixed price point make shopping easier for customers?
2. What would Woolworth have had to do when costs rose but prices could not?
3. What price point might work for your own product, and why?

Safety first. A parent supervises all test sales and handles the money. Sell only to people you know or at events your parent approves.

PROJECT

A Price Study and Pricing Decision

You will compute your full cost per unit, survey competitors' prices, test two or three prices with real customers you know, and choose a price with a written strategy.

You will need

- Spreadsheet
- Your start-up cost sheet and cost records
- Competitor prices from stores, websites or flyers (with a parent)

Steps

1. Calculate the direct cost of one unit (materials and packaging) from your test batches.
2. Add a value for your time per unit at a wage you choose.
3. Record prices for similar products from at least four competitors or substitutes.
4. Compute the price at a 30%, 40% and 50% margin on your full cost.
5. Choose two or three test prices and offer the product at each to similar groups of people you know (for example, on different weeks or at different events). Record sales.
6. Compute profit at each price and pick the best.
7. Write your pricing strategy in one paragraph: which approach you used, your markup and margin, and why the price is fair to both you and the customer.

Tips

- Keep the offer the same except for the price so the test is fair.
- Include your time. If you do not, you are working for free without knowing it.

Check your work

☐ I can calculate markup, margin and a target-margin price.

- ☐ I tested at least two prices with real customers and recorded results.
- ☐ My chosen price covers full cost and is explained.

LEDGER NOTEBOOK

1. Copy your cost-per-unit breakdown.
2. Make a table of competitors' prices and your test results.
3. Draw a number line showing your cost, your price and the competitors' prices.

KEY FORMULAS

$$\text{Markup \%} = \frac{\text{price} - \text{cost}}{\text{cost}} \times 100\%$$

$$\text{Margin \%} = \frac{\text{price} - \text{cost}}{\text{price}} \times 100\%$$

$$\text{Price} = \frac{\text{cost}}{1 - \text{target margin}}$$

From history. Woolworth's chain spread to Britain in 1909 with "threepence and sixpence" stores. The Woolworth Building, designed by Cass Gilbert and finished in 1913, was nicknamed the "Cathedral of Commerce."

WORKED EXAMPLES

Example 1. A candle costs \$3.20 to make. (a) What price gives a 50% markup? (b) What price gives a 50% margin? (c) Compare.

Show solution

1. (a) Markup 50%: $3.20 \times 1.50 = \$4.80$.
2. (b) Margin 50%: $3.20 / (1 - 0.50) = \$6.40$.
3. (c) A 50% markup gives a margin of $1.60/4.80 = 33\%$, while a 50% margin requires a 100% markup.

Answer: \$4.80 for a 50% markup; \$6.40 for a 50% margin. Always say which one you mean.

Example 2. Working backward like Woolworth: you want to sell an item at a $10 price point with a 40% margin. What is the most it can cost you?

Show solution

1. Margin 40% means cost is 60% of price: $0.60 \times \$10 = \$6.00$.

Answer: No more than $6.00. Find or make a product good enough to sell at $10 for $6 or less.

Example 3. A student tests three prices for bread: at $5, 30 loaves sell a month; at $6, 24 sell; at $7, 15 sell. Each loaf costs $2.50. Which price brings the most profit?

Show solution

1. $5: $30 \times (5 - 2.50) = \$75$.
2. $6: $24 \times (6 - 2.50) = \$84$.
3. $7: $15 \times (7 - 2.50) = \$67.50$.

Answer: $6 earns the most ($84). The highest price is not always the most profitable, nor is the lowest.

PRACTICE

1. Easy Where was Woolworth's first store, and what happened to it?

   Show answer

   Utica, New York, 1879; it failed within a few months.

2. Easy What change helped the Lancaster store succeed?

   Show answer

   A busier town and adding ten-cent goods to the five-cent ones.

3. Easy Define margin.

   Show answer

   Profit as a percent of the selling price.

4. Medium Cost $8, price $12. Find the markup percent and margin percent.

   Show answer

   Markup $4/8 = 50\%$; margin $4/12 \approx 33\%$.

5. Medium Cost $15; target margin 25%. Find the price.

Show answer

$15/0.75 = \$20$

6. Medium Match each strategy to an example: (a) a new phone priced high at launch; (b) a new café offering $1 coffee for its first month; (c) a store pricing to match the shop across the street.

Show answer

(a) skimming; (b) penetration; (c) competitive.

7. Medium How did buying directly from manufacturers help Woolworth?

Show answer

Large direct purchases lowered his cost per item, letting him sell good goods at five and ten cents and still profit.

8. Hard At $4, 50 sell; at $5, 42 sell; at $6, 30 sell. Cost is $2.40 each. Which price maximizes profit?

Show answer

$4: $80; $5: $109.20; $6: $108. $5 is best (just barely).

9. Hard Why might pricing very low “to be nice” hurt customers in the long run?

Show answer

If the price does not cover costs, the business loses money and may close, leaving customers without the product; it may also cut quality to survive.

10. Hard What is bait-and-switch, and why is it dishonest?

Show answer

Advertising a low price to attract customers and then refusing to sell at it and pushing a dearer item. It deceives customers with a false promise.

11. Challenge Your product costs $3 in materials and takes 20 minutes. You want to earn $12 an hour for your time and a 20% margin on the total cost. What price should you charge?

Show answer

Time: $4. Total cost $7. Price $7/0.80 = \$8.75$.

COMMON MISTAKES

- Mixing up markup and margin.
- Leaving your time and overhead out of cost.
- Pricing by guesswork instead of testing.

Make it a game · Name That Price. Your parent holds up three household items and gives each a pretend cost. You have twenty seconds per item to set a price using cost-plus, value-based or penetration pricing, then say the markup and the margin out loud. Your parent plays a customer and may refuse. Finish by explaining why Woolworth's fixed price points helped his stores.

Scripture. “Ye shall do no unrighteousness in judgment, in meteyard, in weight, or in measure. Just balances, just weights, a just ephah, and a just hin, shall ye have:” (Leviticus 19:35-36, KJV)

A fair price is part of a just measure. Honest pricing means the customer gets what the price promises, every time.

4.3 Unit Economics and Break-Even: Wedgwood's Cost Book of 1772

OBJECTIVES

- Tell how Josiah Wedgwood analyzed his costs during the slump of 1772 and what he learned about fixed and variable costs.
- Calculate contribution margin per unit, break-even units and break-even revenue.
- Use break-even analysis to decide on prices and volumes.

> **Warm-up.** A lemonade stand pays $10 to rent a table for the day, and each cup costs 25 cents to make. If cups sell for $1, how many must be sold before the stand makes any profit? Try it before reading on.

WATCH

Break even analysis

The Finance Storyteller · 3:34

https://www.youtube.com/watch?v=r8BIz5I-aDc

> **WHEN TO WATCH**
> After the story, before the worked examples.

BACKUP VIDEO

Cost Volume Profit Analysis (CVP): calculating the Break Even Point

Edspira · 7:14

https://www.youtube.com/watch?v=Nw2IioaF6Lc

Optional, for a more formal treatment of cost-volume-profit analysis.

KEY TERMS

fixed costs

Costs that do not change with the amount produced over a period: rent, insurance, salaries, equipment payments.

variable costs

Costs that rise with each unit made: materials, packaging, piece wages.

contribution margin

Price minus variable cost per unit: what each sale contributes toward fixed costs and profit.

break-even point

The number of units (or dollars of sales) at which total revenue equals total costs.

economies of scale

Falling cost per unit as output rises, because fixed costs are spread over more units.

CORE IDEAS

The story. Josiah Wedgwood was the most inventive English potter of the 1700s. He developed a durable cream-colored earthenware that Queen Charlotte allowed him to call "Queen's Ware," and he built a model factory, Etruria, in Staffordshire. In 1772 a financial crisis swept Britain, orders fell and unsold pottery piled up in his warehouses. Wedgwood wrote to his partner Thomas Bentley that he must find out exactly what each kind of ware cost to make.

How they figured it out. Wedgwood sat down with his books and worked through every cost: clay, fuel, the wages of each kind of worker, the modelers, the rent, the clerks, the packing. He saw that many costs (rent, salaries, the kilns, the modelers' wages) were the same whether he made a little or a lot, while others (clay, glaze, the wages of throwers and turners paid by the piece) rose with every piece. The more he made, the more widely the fixed costs were spread and the cheaper each piece became. He concluded that he should make more of his best-selling lines, cut prices to sell them, and keep the workers busy. His careful accounts also revealed something unpleasant: his chief clerk had been stealing, and Wedgwood had to tighten his controls.

The big idea. Costs come in two kinds. **Fixed costs** (F) stay the same over a period whatever you produce; **variable costs** (V per unit) rise with each unit. Each sale at price P brings a **contribution margin** of $P - V$ toward paying the fixed costs; once they are covered, the rest is profit. The **break-even point** is $Q_{BE} = F/(P - V)$. This is the heart of **unit economics**: does each unit earn more than it costs, and how many must you sell to cover everything else?

Using break-even. Break-even answers practical questions. Is my plan realistic: can I sell that many? What happens if I raise the price (higher contribution, fewer sales) or cut it? What if I rent a cheaper space (lower fixed costs)? Wedgwood's insight about **economies of scale** explains why large producers can often charge less, and why a small producer must compete on quality, service or a special niche rather than on price alone.

In business today. Every serious business plan has a break-even analysis. Lenders and investors look at it first. If your contribution margin is negative (each unit costs more to make than its price), more sales only bring bigger losses, and no amount of hard work will save the plan until the unit economics are fixed.

PICTURE STUDY



Josiah Wedgwood, George Stubbs, 1780 · Enamel on Wedgwood earthenware plaque · Wedgwood Museum, Barlaston

Image: Wikimedia Commons, public domain

Josiah Wedgwood was painted by some of the best artists of his day, including George Stubbs, who painted on plaques made at Wedgwood's own factory. Wedgwood was a craftsman, a scientist and a businessman who kept careful accounts and wrote thousands of letters to his partner about costs, prices and customers.

Look closely

- Look at Wedgwood's face and posture. What kind of man does he seem to be?
- Look at his clothes. Was he trying to look like a craftsman or a gentleman? Why might that matter to customers?
- Look for anything in the picture connected with his trade.

Talk about it

1. Wedgwood started as a potter's apprentice. What habits do you think turned him into a great businessman?
2. Why might a craftsman resist studying his costs in a ledger?
3. What would Wedgwood ask about your venture's costs?

PROJECT

Break-Even Analysis and a Test

You will separate your venture's costs into fixed and variable, compute contribution margin and break-even, chart it in a spreadsheet, and compare it with your demand-test results.

You will need

- Spreadsheet
- Your cost sheet, price study and demand-test results

Steps

1. List all costs for one season (or three months) and label each fixed or variable.
2. Compute variable cost per unit and total fixed cost.
3. Compute the contribution margin and break-even in units and dollars.
4. In a spreadsheet, make columns for quantity (0 to twice break-even), total revenue, total cost and profit; draw a line chart of revenue and total cost.
5. Mark the break-even point on the chart.
6. Compare break-even with the number of sales your Unit 2 test suggests you can make. Is the plan realistic?
7. Test two changes (a price change and a fixed-cost change) and record the new break-even.
8. Write a paragraph: what is the single change that most improves your unit economics?

Tips

- If you are unsure whether a cost is fixed or variable, ask: does it go up if I make one more?
- Use formulas referring to cells so you can test changes instantly.

Check your work

- ☐ I can compute contribution margin and break-even.
- ☐ My chart shows revenue, total cost and the break-even point.

- [ ] I compared break-even with realistic sales and tested improvements.

LEDGER NOTEBOOK

1. Copy your break-even chart and label fixed cost, total cost, revenue, loss region and profit region.
2. Make a table of fixed and variable costs.
3. Write Wedgwood's 1772 lesson in one sentence of your own.

KEY FORMULAS

$$\text{CM} = P - V$$

$$Q_{BE} = \frac{F}{P - V}$$

$$\text{Profit} = (P - V)Q - F$$

From history. Wedgwood was also a leading promoter of the Trent and Mersey Canal, opened in 1777, which carried clay in and fragile pottery out far more cheaply and safely than packhorses. Lower transport costs were another way to cut variable cost per piece.

WORKED EXAMPLES

Example 1. A student makes candles. Fixed costs for the season are \$180 (molds, a used hot plate, a table fee). Each candle costs \$2.50 in wax, wick and jar and sells for \$8. Find the contribution margin and the break-even quantity. What is the profit if 60 candles sell?

Show solution

1. Contribution margin: $8 - 2.50 = \$5.50$.
2. Break-even: $180 / 5.50 \approx 32.7$, so 33 candles.
3. Profit at 60: $5.50 \times 60 - 180 = 330 - 180 = \$150$.

Answer: CM \$5.50; break-even 33 candles; profit \$150 at 60 candles.

Example 2. A pottery (illustrative numbers in pounds) has weekly fixed costs of £60. A plate's variable cost is 2 shillings and it sells for 3 shillings (20 shillings = £1). Find weekly break-even. Then find the cost per plate at 1,500 and at 3,000 plates a week.

Show solution

1. Convert: $F = 60 \times 20 = 1{,}200$ shillings.
2. CM: $3 - 2 = 1$ shilling; break-even $1{,}200/1 = 1{,}200$ plates.
3. Cost per plate at 1,500: $2 + 1{,}200/1{,}500 = 2.8$ shillings.
4. At 3,000: $2 + 1{,}200/3{,}000 = 2.4$ shillings.

Answer: Break-even 1,200 plates a week; average cost falls from 2.8 to 2.4 shillings as output doubles. That is Wedgwood's discovery: volume spreads fixed costs.

Example 3. In the candle example, should the student raise the price to \$10 if sales would fall from 60 to 45?

Show solution

1. At \$10: $(10 - 2.50) \times 45 - 180 = 337.50 - 180 = \$157.50$.
2. At \$8 with 60: \$150.
3. New break-even: $180/7.50 = 24$ candles.

Answer: Yes, slightly: \$157.50 vs \$150, with a lower break-even (24) and less work. But test it: if sales fell to 40, profit would be \$120.

PRACTICE

1. Easy What event in 1772 led Wedgwood to study his costs?

   Show answer

   A financial crisis that cut orders and left unsold pottery in his warehouses.

2. Easy Classify as fixed or variable: rent, clay, insurance, packaging, piece wages, a salaried clerk.

   Show answer

   Fixed: rent, insurance, salaried clerk. Variable: clay, packaging, piece wages.

3. Easy Write the break-even formula.

Show answer

$$Q_{BE} = F/(P - V)$$

4. Medium F = \$300, P = \$12, V = \$7. Find break-even units and revenue.

Show answer

$300/5 = 60$ units; $60 \times 12 = \$720$.

5. Medium In problem 4, find the profit at 90 units.

Show answer

$5 \times 90 - 300 = \$150$

6. Medium F = \$500, V = \$4. What price is needed to break even at 100 units?

Show answer

$P - 4 = 500/100 = 5$, so $P = \$9$.

7. Medium Explain economies of scale using Wedgwood's example.

Show answer

Fixed costs such as rent, kilns and salaried staff are spread over more pieces as output grows, so the cost per piece falls.

8. Hard A product sells for \$6 and costs \$6.50 in materials. What happens as sales rise? What must change?

Show answer

Contribution margin is −\$0.50, so each sale adds a loss; more sales mean bigger losses. Raise the price, cut variable cost, or stop.

9. Hard Fixed costs \$240, P = \$10, V = \$4. You can sell 30 at most. Should you proceed? What change would make it work?

Show answer

Break-even $240/6 = 40$, above 30, so you would lose \$60. Cut fixed costs below \$180, raise price above \$12, or lower variable costs.

10. Hard Why did Wedgwood's cost study also help him catch a dishonest clerk?

Show answer

Detailed accounts showed where money and goods should be; when the numbers did not match, the gap pointed to theft. Careful books are a guard against fraud.

11. Challenge Two plans: A has F = $200, V = $5, P = $9; B (a bigger mold) has F = $350, V = $3, P = $9. At what quantity do they earn equal profit? Which is better above that?

Show answer

$4Q - 200 = 6Q - 350 \Rightarrow Q = 75$. Above 75 units, B earns more.

COMMON MISTAKES

- Calling a cost fixed when it actually rises with output (or the reverse).
- Forgetting that break-even must be realistic: compare it with how many you can actually sell.
- Rounding break-even down. If the answer is 32.7, you need 33 units.

Make it a game · Break-Even Race. Your parent writes a price, a fixed cost and a variable cost per unit on a card. Race to calculate contribution margin, break-even units and break-even revenue. First correct answer scores a point, and a wrong answer loses one. Play four cards, each harder than the last. Then tell what Wedgwood learned about fixed and variable costs in 1772.

Scripture. "Be thou diligent to know the state of thy flocks, and look well to thy herds." (Proverbs 27:23, KJV)

Wedgwood's cost study was this verse put into practice: he could not manage what he did not know, and knowing his numbers saved his business and exposed a thief.

4.4 The Projected Income Statement: Benjamin Day's Penny Paper

OBJECTIVES

- Tell how Benjamin Day launched *The Sun* in New York in 1833 as a one-cent newspaper paid for largely by advertising, and what its 1835 "Moon Hoax" teaches about honesty.
- Build a projected income statement: revenue, cost of goods sold, gross profit, operating expenses and net income.
- Write and defend the assumptions behind a projection, and run a best-case and worst-case version.

> **Warm-up.** A newspaper costs more to print than its price. How could it possibly make money? Write two guesses.

WATCH

The INCOME STATEMENT for BEGINNERS

Accounting Stuff · 5:09

https://www.youtube.com/watch?v=0--AvwZabIQ

> **WHEN TO WATCH**
> After the story of the penny press, before you build a projected income statement.

KEY TERMS

income statement
A report of revenue, expenses and profit (net income) over a period such as a month or year.

cost of goods sold (COGS)
The direct cost of the products actually sold in the period.

gross profit
Revenue minus cost of goods sold.

operating expenses
Costs of running the business that are not part of making each product: rent, advertising, insurance, fees.

projection

An estimate of future results built from stated assumptions.

CORE IDEAS

The story. In 1833 most New York newspapers cost six cents a copy, sold by yearly subscription to merchants and the well-to-do, and were full of shipping news and public affairs. Benjamin Day, a 23-year-old printer whose job-printing business was struggling, had a different idea. On September 3, 1833, he published the first issue of *The Sun*: a small, lively paper with local news, police-court stories and human-interest items, sold for one cent a copy on the street by newsboys.

How they figured it out. Day's model had two revenue streams. Newsboys bought papers in bundles at a discount (by one account, 100 copies for 67 cents) and sold them at a penny, so they earned a profit for every copy and had a reason to hustle. The price barely covered the paper and ink, but a large readership made *The Sun* valuable to advertisers, whose payments provided much of the profit. Within a few years it was among the most widely read papers in the country, and steam presses let it print faster. But in August 1835 *The Sun* ran a series of invented articles claiming that an astronomer had discovered life on the Moon. Sales jumped. The articles were a hoax, and the episode is still remembered as an example of a newspaper deceiving readers for profit.

The big idea. An **income statement** shows whether a business earns a profit over a period. Start with revenue (from every stream), subtract **cost of goods sold** to get **gross profit**, then subtract **operating expenses** to get net income. A **projection** builds this statement for future months from assumptions: how many units, at what price, at what cost. The penny paper shows why each line matters: a gross loss on each copy sold was turned into a net profit by advertising revenue, which depended on readership.

Assumptions and honesty. A projection is only as good as its assumptions. List them openly (units sold per week, price, cost per unit, ad revenue), base them on tests, and show a best case, an expected case and a worst case. Never inflate a projection to impress a lender or partner; that is a form of the Moon Hoax. "Lying lips are abomination to the LORD: but they that deal truly are his delight" (Proverbs 12:22).

In business today. Many businesses still sell one product below cost and earn their profit elsewhere: free apps with advertising, low-priced printers with ink, magazines with ads. A projected income statement for three to twelve months is a standard part of any business plan, and comparing it with actual results each month is how owners learn.

PICTURE STUDY



THE SUN.

NEW YORK, TUESDAY, SEPTEMBER 3, 1833. [PRICE ONE PENNY

PUBLISHED DAILY,

AN ODD CAPTAIN.

The First Issue of The Sun, Benjamin H. Day (publisher), September 3, 1833 · Printed newspaper · Wikimedia Commons

Image: Wikimedia Commons, public domain

This is the front page of the first issue of Benjamin Day's *Sun*. Look closely: some of the first columns are advertisements, which were essential to the paper's business model.

Look closely

- Find the title and the date. What does the motto under the title say the paper offers?
- Find the advertisements. What kinds of businesses advertised?
- Compare the size of this paper with a modern newspaper or magazine. Why so small?
- Look for any price printed on the page.

Talk about it

1. Who were the Sun's customers: readers, advertisers, or both?
2. Why did advertisers care how many copies were sold each day?
3. What would you include in a projected income statement for this paper's first year?

PROJECT

A Three-Month Projected Income Statement

You will build a monthly projected income statement for your venture for three months in a spreadsheet, with expected, best and worst cases, and list every assumption.

You will need

- Spreadsheet
- Your price, cost and break-even work from Lessons 4.1–4.3
- Your demand-test results from Unit 2

Steps

1. Write your assumptions in a block at the top: units per month, price, COGS per unit, each operating expense, and the source of each number.
2. Build rows: revenue (by stream), COGS, gross profit, operating expenses (each on its own row), net income.
3. Fill three monthly columns and a total, using formulas that refer to the assumption cells.
4. Copy the sheet twice and change the assumptions for a best case and a worst case.
5. Compute gross margin and net margin for each case.
6. Write a paragraph comparing the three cases. In the worst case, does the venture survive?
7. Ask a parent or mentor to challenge two assumptions, and note your answers.

Tips

- Linking every number to an assumption cell makes the model easy to test and honest to read.
- Use your actual test results, not hopes, for the expected case.

Check your work

☐ I can build and read an income statement.

- ☐ My projection has expected, best and worst cases with stated assumptions.
- ☐ Every number traces back to a source.

LEDGER NOTEBOOK

1. Draw the income statement as a waterfall: revenue, minus COGS, equals gross profit, minus operating expenses, equals net income.
2. Copy your assumption block.
3. Write the Sun's business model in two sentences, and one sentence about the Moon Hoax.

KEY FORMULAS

$$\text{Gross profit} = \text{revenue} - \text{COGS}$$

$$\text{Net income} = \text{gross profit} - \text{operating expenses}$$

$$\text{Gross margin} = \frac{\text{gross profit}}{\text{revenue}} \times 100\%$$

From history. The penny press spread quickly: James Gordon Bennett's *New York Herald* followed in 1835. Newsboys, many of them poor children, became a familiar sight in American cities, and later reformers worked to protect them and get them into school.

WORKED EXAMPLES

Example 1. A penny paper sells 5,000 copies a day for 6 days a week at \$0.01, but newsboys buy at \$0.0067 each (100 for 67¢). Paper and ink cost \$0.005 a copy. Advertising brings \$40 a week. Wages and rent are \$45 a week. Find the weekly income statement. (Illustrative numbers.)

Show solution

1. Copies per week: $5{,}000 \times 6 = 30{,}000$.
2. Circulation revenue (sold to newsboys): $30{,}000 \times 0.0067 = \$201$; ad revenue \$40; total revenue \$241.
3. COGS: $30{,}000 \times 0.005 = \$150$. Gross profit: $241 - 150 = \$91$.
4. Operating expenses \$45. Net income: $91 - 45 = \$46$.

Answer: Revenue \$241, COGS \$150, gross profit \$91, operating expenses \$45, net income \$46 a week. Without the \$40 of ads, net income would be only \$6.

Example 2. Build a three-month projection for a bread venture: month 1, 40 loaves; month 2, 60; month 3, 80; price \$6; ingredients and bags \$2.25 a loaf; operating expenses \$30 a month (permit spread over months, gas, flyers). Find net income each month and total.

Show solution

1. Revenue: \$240, \$360, \$480. COGS at \$2.25: \$90, \$135, \$180.
2. Gross profit: \$150, \$225, \$300.
3. Net income after \$30: \$120, \$195, \$270. Total \$585.
4. Gross margin: $(6 - 2.25)/6 = 62.5\%$.

Answer: \$120, \$195 and \$270; \$585 over three months, with a 62.5% gross margin. (Labor is not counted as an expense here; the profit is the student's pay for her time.)

Example 3. Run a worst case for the bread projection: sales are 30% lower and ingredient costs 10% higher. What is the three-month net income?

Show solution

1. Loaves: 28, 42, 56 (total 126). Cost per loaf: $2.25 \times 1.10 = \$2.475$.
2. Gross profit: $126 \times (6 - 2.475) = 126 \times 3.525 \approx \$444.15$.
3. Net income: $444.15 - 90 = \$354.15$.

Answer: About \$354 over three months. Even the worst case is profitable, which makes the plan more credible.

PRACTICE

1. Easy When did *The Sun* first appear, and what did it cost?

   Show answer

   September 3, 1833; one cent.

2. Easy What were the Sun's two main revenue streams?

   Show answer

   Sales of papers (through newsboys) and advertising.

3. Easy Write the formula for gross profit and net income.

Show answer

Gross profit = revenue − COGS; net income = gross profit − operating expenses.

4. Medium Revenue $1,200; COGS $500; operating expenses $350. Find gross profit, gross margin and net income.

Show answer

$700; $700/1200 \approx 58\%$; $350.

5. Medium Classify as COGS or operating expense: flour, a booth fee, cookie boxes, flyers, butter, insurance.

Show answer

COGS: flour, cookie boxes, butter. Operating: booth fee, flyers, insurance.

6. Medium Why could a paper sold below its printing cost still make a profit?

Show answer

Advertising revenue, earned because of its large readership, more than covered the gap.

7. Medium Projected sales: 50 units at $8; COGS $3 a unit; operating expenses $120. Find net income.

Show answer

$400 - 150 - 120 = \$130$

8. Hard What was the Moon Hoax, and what does it teach about projections and reports?

Show answer

In 1835 the Sun printed invented stories of life on the Moon, which boosted sales. Reports and projections must be truthful; inflating them to win readers, lenders or partners is deception.

9. Hard In problem 7, what is net income if sales fall 20% and operating expenses stay the same?

Show answer

40 units: $320 - 120 - 120 = \$80$.

10. Hard Why should a projection include best, expected and worst cases?

Show answer

Because the future is uncertain; the range shows how much risk the plan carries and whether the business survives a bad case.

11. Challenge A free newsletter has 2,000 readers. Printing and mailing cost $0.40 per reader per month; other costs $150 a month. An advertiser pays $X per 1,000 readers. What must X be to break even?

Show answer

Costs: $800 + 150 = \$950$; ad revenue $2X = 950 \Rightarrow X = \$475$.

COMMON MISTAKES

- Counting operating expenses as COGS or the reverse, which distorts gross margin.
- Hiding assumptions inside the numbers.
- Presenting only the best case.

> **Make it a game · Quiz Your Parent.** Teach your parent how to build a projected income statement for a small paper route, line by line: revenue, cost of goods sold, gross profit, operating expenses, net income. Your parent will slip in one wrong fact; call out the error. Switch roles once. Then tell why Benjamin Day's Moon Hoax matters to honest projections.

4.5 Managing Cash: Henry Ford and the Slump of 1920–21

OBJECTIVES

- Tell how the Ford Motor Company faced a cash crisis in the slump of 1920–21 and how it raised cash without new loans, including the costs to its dealers.
- Explain why profit and cash are different, and the roles of inventory, receivables and payables.
- Build a monthly cash-flow forecast and find the lowest cash balance.

> **Warm-up.** You sell $100 of cookies to a church event that will pay you next month. You spent $40 on ingredients this week. Did you make a profit? How much cash do you have today?

WATCH

The CASH FLOW STATEMENT for BEGINNERS

Accounting Stuff · 15:10

https://www.youtube.com/watch?v=DiVPAjgmnj0

> **WHEN TO WATCH**
> After the story of Ford's crisis, before you build your cash forecast.

KEY TERMS

cash flow

Money actually coming into and going out of a business over a period.

accounts receivable

Money customers owe the business for sales already made.

accounts payable

Money the business owes suppliers for things already received.

inventory

Materials and goods the business holds to make or sell; cash tied up until sold.

cash-flow forecast

A month-by-month estimate of cash in, cash out and the cash balance.

The story. In 1919 Henry Ford borrowed heavily from banks to buy out the other shareholders of the Ford Motor Company, so that he and his family owned it outright. A year later a sharp postwar slump struck the country. Car sales collapsed. Ford cut the price of the Model T in September 1920 to keep cars moving, but by the end of the year the company had a large stock of materials and unsold cars and big payments coming due in the spring of 1921, including its bank loans and taxes. On paper Ford was rich, with huge factories and a strong product; in cash it was short.

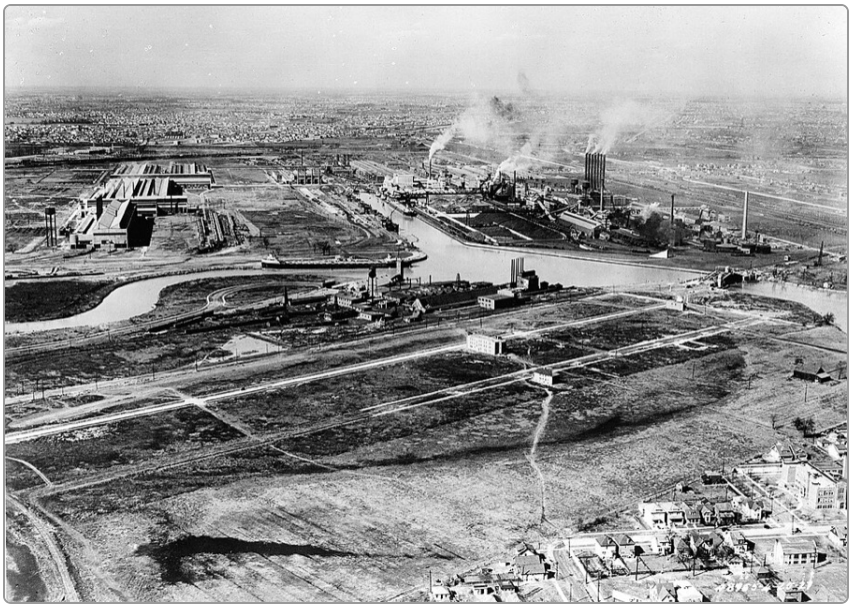
How they figured it out. Ford refused to borrow more from bankers. Instead the company closed its plants for several weeks over the winter and then used up the materials it already had, buying almost nothing new. It sold off unneeded equipment and supplies and cut office staff sharply. It shortened the time from raw material to finished car so that far less cash sat in inventory. And it shipped finished cars to its dealers and required them to pay on delivery, which forced many dealers to borrow from their own local banks. By April 1921 Ford had enough cash to pay its obligations. The method worked for Ford, but it shifted much of the burden to the dealers, a stakeholder who had little choice.

The big idea. Profit and **cash** are different. A sale counts as revenue when it is made, but the cash may come weeks later (**accounts receivable**). Materials bought now sit as **inventory**, cash that is tied up until the product sells. Bills you owe suppliers (**accounts payable**) let you keep cash a while longer. A business can show a profit and still run out of cash if it buys too much inventory, waits too long to be paid, or grows faster than its cash. The tool for seeing this coming is a monthly **cash-flow forecast**: beginning cash, plus cash in, minus cash out, equals ending cash.

Managing cash honestly. Keep inventory lean. Collect promptly: ask for payment at delivery or a deposit for large orders. Pay your own bills on time; delaying payment to suppliers to fix your cash problem shifts your problem onto them (Proverbs 3:27-28). Keep a cash reserve for surprises. Watch the lowest point of your forecast: that is the month when the business is most at risk.

In business today. Many small businesses that close were profitable on paper but ran out of cash. Owners who track cash weekly and forecast it monthly see trouble early, while there is still time to act.

PICTURE STUDY



The Ford River Rouge Plant from the Air, Unknown photographer, 1927 · Aerial photograph · Library of Congress (Wikimedia Commons)

Image: Wikimedia Commons, public domain

Ford was building this huge complex, the River Rouge plant, in the same years as the cash crisis. Every building, furnace and rail car here was capital. A company with assets like this can still run short of cash if too much money is tied up and bills come due.

Look closely

- Find the rail yards and the boat slip. What came in and went out?
- Look for piles of materials. What do they represent in cash terms?
- Count the smokestacks and long buildings. How much cash did this plant require?

Talk about it

1. Why could a company owning all this be short of cash?
2. What would you sell or stop buying first in a cash crisis here?
3. How might a dealer in a small town have felt about being forced to pay for cars in 1921?

PROJECT

A Six-Month Cash-Flow Forecast

You will build a monthly cash-flow forecast for your venture for six months, find its lowest point and redesign the plan so cash never goes negative.

You will need

- Spreadsheet
- Your start-up costs, pricing and projected income statement

Steps

1. List your starting cash and its source.
2. For each month, enter cash in by source (cash sales, collections of earlier credit sales, deposits).
3. Enter cash out by item (start-up purchases, inventory, fees, supplies, any repayments).
4. Compute ending cash for each month with formulas; the ending cash of one month is the beginning of the next.
5. Highlight the lowest balance and the month it occurs.
6. If any month is negative, redesign: smaller batches, deposits, lower start-up costs, delayed purchases. Recalculate.
7. Compare total cash change with total projected profit and explain the difference.
8. Write a cash rule for your venture (for example, “We never let cash fall below $50”).

Tips

- Cash comes in when the customer pays, not when you deliver; plan accordingly.
- Keep a reserve: surprises almost always cost money.

Check your work

☐ I can explain why profit and cash differ.

☐ My six-month forecast has no negative months after redesign.

- [ ] I wrote a cash rule for my venture.

LEDGER NOTEBOOK

1. Draw the cash cycle: cash → materials (inventory) → product → sale (receivable) → cash.
2. Copy your forecast and circle the lowest point.
3. Write a short account of Ford's 1921 crisis and one lesson from it, including the dealers' side.

KEY FORMULAS

$$\text{Ending cash} = \text{beginning cash} + \text{cash in} - \text{cash out}$$
$$\text{Cash tied up} \approx \text{inventory} + \text{receivables} - \text{payables}$$

From history. Henry Ford told the story of the 1921 crisis in his book *My Life and Work* (1922), describing how the company cut the time from ore to finished car. Critics then and since have pointed out how much of the burden fell on Ford dealers. Ford's distrust of bankers was lifelong.

WORKED EXAMPLES

Example 1. A student's holiday-wreath venture begins November with $150. November: buys $300 of materials, sells $120 cash, delivers $200 to a church bazaar that will pay December 10. December: buys $100 more, sells $350 cash, receives the $200. Build the forecast.

Show solution

1. November: $150 + 120 - 300 = -\$30$. Cash goes negative!
2. December: $-30 + 350 + 200 - 100 = \$420$.
3. Profit over the two months: sales $120 + 200 + 350 = \$670$, minus materials $400, equals $270.

Answer: Profitable ($270), but cash falls to −$30 in November. Fixes: buy materials in two batches, ask the bazaar for a deposit, or start with more cash.

Example 2. A shop holds $6,000 of inventory, is owed $1,500 by customers, and owes suppliers $2,000. How much cash is tied up in working capital? If it cuts inventory to $3,500, how much cash is freed?

Show solution

1. Tied up: $6{,}000 + 1{,}500 - 2{,}000 = \$5{,}500$.
2. After cut: $3{,}500 + 1{,}500 - 2{,}000 = \$3{,}000$.
3. Freed: $5{,}500 - 3{,}000 = \$2{,}500$.

Answer: $5,500 tied up; cutting inventory frees $2,500, the same kind of move Ford made in 1921.

PRACTICE

1. Easy Why did Ford borrow heavily in 1919?

   Show answer

   To buy out the other shareholders so that he and his family owned the company outright.

2. Easy Define accounts receivable and accounts payable.

   Show answer

   Receivable: money customers owe the business. Payable: money the business owes suppliers.

3. Easy Write the formula for ending cash.

   Show answer

   Ending cash = beginning cash + cash in − cash out.

4. Medium Beginning cash $200; cash in $450; cash out $520. Find ending cash.

   Show answer

   $200 + 450 - 520 = \$130$

5. Medium Name three ways Ford raised cash in 1921 without new loans.

   Show answer

   Used up existing materials and bought little; sold unneeded equipment and supplies; shortened production time to cut inventory; required dealers to pay on delivery; cut office staff.

6. Medium How can a business show a profit but have no cash?

Show answer

Its sales may be on credit (not yet collected), or its cash may be tied up in inventory or equipment, while bills come due now.

7. Medium Month 1: start $100, in $80, out $250. Month 2: in $300, out $90. Find each ending balance and the lowest point.

Show answer

Month 1: −$70 (lowest); month 2: $140.

8. Hard Who bore the cost of Ford's cash solution, and was it fair? Give a reasoned answer.

Show answer

The dealers, who had to pay cash on delivery for cars they had not ordered in those numbers, often by borrowing. Strong answers weigh Ford's need against the pressure placed on a weaker stakeholder.

9. Hard Why is delaying payment to suppliers not an honest fix for a cash shortage?

Show answer

It breaks your promise and shifts your cash problem onto them; Scripture warns against withholding what is due (Proverbs 3:27-28). Negotiate openly instead.

10. Hard A venture plans to buy $600 of inventory in one batch. Sales will be $200 a month. Beginning cash $250; other costs $50 a month. When does cash go negative? Suggest a fix.

Show answer

Month 1: $250 - 600 + 200 - 50 = -\$200$. Buy in three batches of $200 instead: month 1 ends at $200.

11. **Challenge** Customers pay 30 days after sale. Sales: Jan $400, Feb $600, Mar $800. Materials (paid in the month of sale) are 40% of sales; other costs $150 a month. Beginning cash $300. Find ending cash for Jan–Mar.

    Show answer

    Cash in: Jan $0, Feb $400, Mar $600. Out: Jan $310, Feb $390, Mar $470. Ending: Jan −$10, Feb $0, Mar $130. A profitable, growing business goes slightly negative in January.

COMMON MISTAKES

- Treating profit as cash in the bank.
- Buying all inventory at once to get a discount and running out of cash.
- Fixing a cash problem by paying suppliers late instead of planning ahead.

Make it a game · Cash Is Not Profit. Use buttons as pretend cash. Run a four-week shop: you buy inventory with cash, sell some items for cash, and sell some on credit that your parent pays in week four. After each week count the cash in hand and the profit on paper. Explain why they differ, and how Ford raised cash in 1920 and 1921.

Scripture. “Withhold not good from them to whom it is due, when it is in the power of thine hand to do it. Say not unto thy neighbour, Go, and come again, and to morrow I will give; when thou hast it by thee.” (Proverbs 3:27-28, KJV)

Planning your cash lets you pay what you owe on time. A business that keeps suppliers waiting while it has the money breaks this command.

UNIT 4

The Numbers

Good intentions do not pay the bills; numbers tell an entrepreneur whether a venture can stand. This unit teaches the arithmetic every small business needs. You will list and total **start-up costs**, as Bill Hewlett and Dave Packard did when they started in a Palo Alto garage with $538 in 1939; choose a **pricing strategy**, with Frank Woolworth's five-and-ten-cent stores; and work out **unit economics and break-even**, following Josiah Wedgwood, who in a slump of 1772 sat down with his books and discovered which of his costs did not change when output did.

Then you will build a **projected income statement**, using Benjamin Day's penny newspaper of 1833, which sold below the cost of its paper and made its money from advertising, and learn to **manage cash**, the lesson Henry Ford learned in the slump of 1920–21, when a profitable company nearly ran out of money. By the end of the unit you will have a complete financial model for your own venture in a spreadsheet.

PREREQUISITES

- Has a lean plan from Unit 3
- Can use percents, simple equations and a spreadsheet (sums and simple formulas)
- Knows profit = revenue − costs

MASTERY CHECKLIST

- ☐ I can list and total start-up costs, separating one-time costs, inventory, and working capital, with a contingency.
- ☐ I can explain cost-plus, value-based, competitive, penetration and skimming pricing and choose one with reasons.
- ☐ I can calculate contribution margin, break-even units and break-even revenue, and use them to make decisions.
- ☐ I can build a three-month projected income statement from stated assumptions.
- ☐ I can build a cash-flow forecast and explain why a profitable business can run out of cash.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **SCORE financial projections template**: SCORE, a nonprofit of volunteer mentors partnered with the SBA, offers a free spreadsheet template for start-up costs and three-year projections. A parent should handle any download or account. Ages 14+.
- **LibreOffice (free office suite with the Calc spreadsheet)**: Free spreadsheet software for the models in this unit, if you do not use Google Sheets. A parent should install it.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

4.1	**Start-Up Costs: Hewlett, Packard and $538 in a Garage**	3 sessions of 50 minutes
4.2	**Pricing Strategies: Frank Woolworth's Five-and-Ten**	3 sessions of 50 minutes
4.3	**Unit Economics and Break-Even: Wedgwood's Cost Book of 1772**	3 sessions of 50 minutes
4.4	**The Projected Income Statement: Benjamin Day's Penny Paper**	3 sessions of 50 minutes
4.5	**Managing Cash: Henry Ford and the Slump of 1920–21**	3 sessions of 50 minutes

Unit 4 Test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   How did Hewlett and Packard keep their start-up costs low in 1939?

2. **6 pts**
   Equipment $220, inventory $130, setup $60, working capital $90. Add a 15% contingency. Find the total.

3. **6 pts**

   Cash $1,000; monthly costs $450; monthly sales $200. Find the burn rate and runway.

4. **5 pts**

   Tell why Woolworth's first store failed and what he changed.

5. **6 pts**

   Cost $9, price $15. Find markup percent and margin percent.

6. **6 pts**

   Cost $12; target margin 40%. Find the price.

7. **5 pts**

   Define penetration and skimming pricing with an example of each.

8. **5 pts**

   What did Wedgwood discover about his costs in 1772?

9. **7 pts**

   F = $420, P = $15, V = $8. Find contribution margin, break-even units and profit at 100 units.

10. **6 pts**

    In problem 9, what price is needed to break even at 42 units?

11. **6 pts**

    Revenue $2,000; COGS $800; operating expenses $650. Find gross profit, gross margin and net income.

12. **5 pts**

    Explain Benjamin Day's business model for *The Sun*.

13. **6 pts**

    Start $250. Month 1: in $150, out $420. Month 2: in $380, out $160. Find ending cash each month.

14. **6 pts**

    Inventory $4,000, receivables $1,000, payables $1,800. Find cash tied up; how much is freed by cutting inventory to $2,500?

15. **4 pts**

    Name two ways Ford raised cash in 1921 and one stakeholder who paid a price.

16. **16 pts**

    Essay: “Profit is an opinion; cash is a fact.” Explain what this business saying means, using Ford in 1921 and one other example, and describe two honest ways a small venture can protect its cash.

ANSWER KEY

1. They started with $538 in a rented garage, used household tools (even Packard's oven), built a simple, cheap product, took small jobs and grew from profits.
2. $500 \times 1.15 = \$575$
3. $250 a month; 4 months.
4. Utica was too small and the selection too limited; in Lancaster he chose a busier town and added ten-cent goods.
5. Markup $6/9 \approx 67\%$; margin $6/15 = 40\%$.
6. $12/0.60 = \$20$
7. Penetration: low price to win customers quickly (a new café's $1 coffee). Skimming: high launch price lowered later (a new gadget).
8. Many costs were fixed whatever the output, so making and selling more spread them and cut cost per piece; his books also exposed a thieving clerk.
9. CM $7; $420/7 = 60$ units; profit $7 \times 100 - 420 = \$280$.
10. $P - 8 = 420/42 = 10 \Rightarrow P = \$18$.
11. $1,200; 60%; $550.
12. He sold a lively paper for a penny through newsboys who bought at a discount; the price barely covered paper and ink, but large circulation attracted advertisers, whose payments supplied much of the profit.
13. Month 1: −$20; month 2: $200.
14. $3,200 tied up; $1,500 freed.
15. Using up inventory, selling surplus, shortening production, cash-on-delivery to dealers; the dealers.
16. Graded on a clear explanation that accounting profit depends on timing and estimates while cash is what pays bills; accurate use of the Ford story and another example (the wreath venture, Hershey's debts, a growing business); and two honest practices (deposits, lean inventory, a reserve, forecasting, paying bills on time).

PORTFOLIO PIECE: THE FINANCIAL MODEL

Combine your work into one spreadsheet file with tabs: start-up costs (with sources and contingency), pricing study, break-even analysis and chart, three-month projected income statement (expected, best and worst cases), and six-month cash-flow forecast. Add a one-page summary that a banker could read in five minutes: how much money you need, when you break even, your expected profit and your lowest cash point.

LOOK FOR	WHAT IT MEANS
Accuracy	Formulas are correct and linked; totals check.
Evidence	Prices, costs and sales come from real sources and tests.
Realism	Break-even and projections are compared with what can actually be sold; worst cases are shown.
Clarity	The summary page is clear and honest about risks.

UNIT 5

Financing

Every venture needs money before it earns money, and the way you raise it shapes who owns the business, who bears the risk and who must be repaid. This unit walks through the main sources in roughly the order a small venture meets them: **bootstrapping** from savings and sales, as James L. Kraft did with $65 and a rented horse and wagon in Chicago in 1903; **loans**, with A. P. Giannini, who founded a bank for working people and kept lending from a plank on the waterfront after the 1906 San Francisco earthquake; and **partners and equity**, from the Medici Bank's branch partnerships to the Dutch East India Company's first shares in 1602.

Then you will meet **venture capital** through Georges Doriot, the Harvard professor whose firm invested $70,000 in Digital Equipment Corporation in 1957, and **crowdfunding and family investors**, beginning with the 1885 newspaper campaign that paid for the Statue of Liberty's pedestal with gifts from more than a hundred thousand people. Throughout, the emphasis is on honesty: clear agreements, full disclosure and keeping promises to those who trust you with their money.

PREREQUISITES

- Has start-up costs, projections and a cash forecast from Unit 4
- Knows the legal forms of business (Lesson 3.4)
- Can work with percents, exponents and simple formulas on a calculator

MASTERY CHECKLIST

- ☐ I can explain bootstrapping and estimate how growth can be paid for from profits.
- ☐ I can calculate simple interest and a loan payment, and explain the five C's of credit.
- ☐ I can calculate ownership shares, dilution and pre- and post-money valuation.
- ☐ I can explain how venture capital works and why most small businesses should not seek it.
- ☐ I can distinguish donation, reward, pre-order and equity crowdfunding and write an honest family-investment agreement.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Federal Reserve History: "The Panic of 1907" and other essays on banking**: Free essays from the Federal Reserve on the history of American banks and credit. Good background for Lesson 5.2. Ages 14+.
- **Investor.gov (U.S. Securities and Exchange Commission)**: Free SEC site explaining stocks, crowdfunding and how to recognize investment fraud. Use with Lessons 5.3–5.5. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

5.1 Bootstrapping: J. L. Kraft's Horse and Wagon — 3 sessions of 50 minutes

5.2 Loans and Banks: A. P. Giannini and the Bank of Italy — 3 sessions of 50 minutes

5.3 Partners and Equity: The Medici Branches and the Dutch East India Company
3 sessions of 50 minutes

5.4 Venture Capital: Georges Doriot and Digital Equipment — 3 sessions of 50 minutes

5.5 Crowdfunding and Family Investors: The Statue of Liberty's Pedestal
3 sessions of 50 minutes

Unit 5 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Describe how J. L. Kraft started and grew his business without outside investors.

2. **6 pts**
   Net income $320 a month; owner's draw $120. How long to fund a $1,000 purchase from retained earnings?

3. **5 pts**

   Give two advantages and two disadvantages of bootstrapping.

4. **6 pts**

   Find the simple interest and total repaid on $2,500 at 7% for 2 years.

5. **7 pts**

   Find the monthly payment on a $6,000 loan at 6% annual interest over 4 years.

6. **5 pts**

   Name the five C’s of credit and explain one.

7. **5 pts**

   What did Giannini do after the 1906 earthquake, and what does it show about lending?

8. **6 pts**

   Pre-money $9,000; investment $3,000. Find post-money and the investor’s percentage.

9. **6 pts**

   Founders own 2,000 shares. An investor buys 500 new shares, then another buys 500. Find each owner’s final percentage.

10. **5 pts**

    How did the Medici Bank organize its branches, and why?

11. **5 pts**

    What was new about the VOC’s financing in 1602, and what moral failings must be weighed against its success?

12. **6 pts**

    A fund invests $1 million in each of 10 companies; returns are $0 (6 companies), $1M (2), $3M (1) and $20M (1). Find the portfolio multiple.

13. **5 pts**

    Explain why most small businesses are not suited to venture capital.

14. **6 pts**

    A pre-order campaign sells 80 items at $20; fees are 4%; materials $7 each. Find the profit.

15. **6 pts**

    Describe the 1885 pedestal campaign and one lesson for honest crowdfunding today.

16. **16 pts**

    Essay: Compare bootstrapping, a loan and an equity investment for a venture you might start. Using at least two stories from this unit and one Scripture passage, explain which you would choose and what you would owe to those who funded you.

ANSWER KEY

1. He began in 1903 with $65 and a rented horse and wagon, buying cheese wholesale and selling to grocers; he reinvested earnings, added products customers wanted and later patented a long-keeping process cheese (1916).
2. $1000/200 = 5$ months.
3. Advantages: full control, no debt, discipline. Disadvantages: slower growth, cash strain, owner bears all risk.
4. $2500 \times 0.07 \times 2 = \$350$; $2,850.
5. $r = 0.005$, $n = 48$; $M = 6000 \times 0.005/(1 - 1.005^{-48}) \approx \$140.91$.
6. Character, capacity, capital, collateral, conditions. Example: capacity is the borrower's ability to make payments from expected income.
7. He saved the bank's gold, reopened on a waterfront plank desk and lent to people rebuilding, judging them by character; it shows lending rests on trust and that credit can help a community recover.
8. $12,000; 25%.
9. Total 3,000: founders 66.7%, each investor 16.7%.
10. Each branch was a separate partnership in which the local manager invested and shared profits, giving managers incentive and limiting the damage one branch's losses could do to the rest.
11. Public sale of shares with permanent capital and trading on an exchange. It used violence (the conquest of the Banda Islands) and bought and sold human beings as forced laborers.
12. $25/10 = 2.5\times$
13. Venture funds need a chance of very large, fast growth and an exit to earn big multiples; most good small businesses grow modestly and would lose control and freedom by taking such money.
14. $1600 - 64 - 560 = \$976$
15. Pulitzer's *World* raised over $100,000 from more than 120,000 donors, mostly under $1 each, by printing every donor's name. Lesson: transparency and gratitude to small backers build trust; promises must be kept.
16. Graded on accurate comparison (ownership, repayment, risk, control), correct use of two stories (Kraft, Giannini, the Medici, the VOC, Doriot, the pedestal),

thoughtful use of Scripture (Proverbs 22:7, Psalm 37:21, Ecclesiastes 5:5), and a clear, reasoned choice with specific duties of honesty.

PORTFOLIO PIECE: THE FINANCING PLAN

Assemble your bootstrap schedule, your practice loan request with calculations, your cap table and term sheet, your venture-capital analysis and your campaign plan. Add a one-page financing recommendation for your own venture: how much money it needs, where the money will come from, what each funder is promised in writing, and what you will do if the venture fails.

LOOK FOR	WHAT IT MEANS
Accuracy	Interest, payments, valuations and dilution are calculated correctly.
Fit	The recommended financing fits the size and nature of the venture.
Honesty	Agreements are written, risks are disclosed and promises are realistic.
Clarity	The recommendation is clear enough for a parent or banker to act on.

5.1 Bootstrapping: J. L. Kraft's Horse and Wagon

OBJECTIVES

- Tell how James L. Kraft started a cheese business in Chicago in 1903 with very little money and grew it from its own earnings.
- Explain bootstrapping and its sources: savings, sales, customer prepayments, supplier terms and sweat equity.
- Calculate how long it takes to fund growth from retained profits.

> **Warm-up.** Suppose you need $200 for a bigger batch of your product. List five ways to get it without borrowing or asking anyone for an investment.

WATCH

How to Bootstrap a Business

Greg Raiz · 5:26

https://www.youtube.com/watch?v=rVudlyWqo8Q

> **WHEN TO WATCH**
> After the story of Kraft's wagon, before the big idea.

BACKUP VIDEO

Bootstrapping... Explained.

Accounting to Scale · 3:03

https://www.youtube.com/watch?v=CKVdxD17ELs

Optional, a short definition of bootstrapping.

KEY TERMS

bootstrapping
Starting and growing a business with the founder's own savings and the business's own revenue, without outside investors.

retained earnings
Profits kept in the business instead of paid out to the owners.

sweat equity

The value an owner adds through unpaid work.

customer prepayment

Money paid by a customer before the product is delivered, such as a deposit or subscription.

trade credit

Time a supplier allows before its bill must be paid (for example, 30 days).

CORE IDEAS

The story. James Lewis Kraft was born in 1874 on a farm in Ontario, Canada, one of eleven children, and worked in a cheese and grocery business before coming to Chicago. In 1903, with $65 of capital, he rented a horse and wagon and began buying cheese from wholesalers each morning and selling it to small grocers around the city, sparing them a trip to the market. His company's history records that he lost money his first year and that his horse was named Paddy. He kept going, and in 1909 his brothers joined him in J. L. Kraft & Bros.

How they figured it out. Grocers had a problem: cheese spoiled quickly, and they lost money on what went bad. Kraft experimented for years with a way to make cheese keep. In 1916 he received a patent for a process that blended and heated cheese and sealed it in tins, so it would last without refrigeration. During the First World War the U.S. Army bought millions of pounds of it. Kraft grew mainly by reinvesting earnings and by adding products his grocers asked for. He was a lifelong Baptist and Sunday-school teacher who gave generously to Christian causes.

The big idea. Bootstrapping means building a business with your own savings and the business's own revenue rather than outside money. Its sources include personal savings; **retained earnings**; **customer prepayments** such as deposits and subscriptions; **trade credit** from suppliers; and the owner's **sweat equity**. Its advantages are that you keep full ownership and control, owe no one, and are forced to stay lean and close to customers. Its limits are slower growth and the risk of running short of cash if growth outpaces profits.

Growing from profits. If a venture earns $150 a month and the owner leaves it all in the business, a $600 piece of equipment can be bought in four months. Each improvement then raises profits, which speeds the next one. Many of the companies

in this course, from Hewlett-Packard to LEGO, grew this way for years before they took outside money, if they ever did.

In business today. Most small businesses are bootstrapped. For a student venture it is the right path: start with what you have, sell before you spend, take deposits for large orders, and grow step by step. “Wealth gotten by vanity shall be diminished: but he that gathereth by labour shall increase” (Proverbs 13:11).

PICTURE STUDY



A Delivery Wagon, Unknown photographer, 1913 · Photograph · Digital Public Library of America (Wikimedia Commons)

Image: Wikimedia Commons, public domain

Before trucks, city businesses delivered goods by horse and wagon. J. L. Kraft began in 1903 with one rented wagon much like this one, carrying cheese to grocers who were glad to be spared a trip to the wholesale market.

Look closely

- Find the horses and drivers. What did a business owner have to pay for each day?
- Look at the vehicle. How much could a wagon like this carry?
- Look at the street. How would a delivery wagon move through a busy city?

Talk about it

1. Why was renting a horse and wagon smarter for Kraft than buying them at first?
2. What service did a delivery man provide to small grocers besides the goods themselves?
3. What is the “rented wagon” in your own venture: the thing you can rent or borrow before you buy?

PROJECT

A Bootstrap Funding Plan

Using your Unit 4 start-up costs and cash forecast, you will design a plan to fund your venture entirely without outside money, and calculate when each step can be afforded.

You will need

- Spreadsheet
- Your start-up cost sheet and cash-flow forecast

Steps

1. List your start-up needs in order of priority: what you must have to make the first sale, and what can wait.
2. List every bootstrap source available to you (savings, things you could sell, deposits, borrowed tools, sweat equity) with dollar amounts.
3. Match the first-priority needs to sources so you can start with no outside money.
4. Add rows to your cash forecast for retained earnings and schedule each later purchase when cash allows.
5. Decide on an owner's draw (your pay) and show its effect on the schedule.
6. Identify the month when the venture could buy its most important piece of equipment.
7. Write a paragraph: what will you not be able to do because you are bootstrapping, and is that acceptable?

Tips

- Start with the smallest version that can earn money.
- Deposits are powerful but are promises: refund them promptly if you cannot deliver.

Check your work

☐ I can explain bootstrapping and its sources.

- ☐ My plan starts with no outside money and schedules later purchases from retained earnings.
- ☐ I explained the trade-offs.

LEDGER NOTEBOOK

1. Draw a staircase: each step is a purchase funded by the profits from the step below.
2. Copy your bootstrap schedule.
3. Write the Kraft timeline: 1903 wagon; 1909 brothers join; 1916 patent; First World War army orders.

KEY FORMULAS

$$\text{Months to fund} = \frac{\text{amount needed}}{\text{monthly profit retained}}$$

$$\text{Retained} = \text{net income} - \text{owner's draw}$$

From history. J. L. Kraft was an avid collector of jade and wrote a book about it. The Kraft company also became one of the first big sponsors of radio programs in the 1930s, marketing its products to a national audience.

WORKED EXAMPLES

Example 1. A student's venture earns $180 net income a month. She takes $60 a month as her own pay (owner's draw) and retains the rest. How long until she can buy a $480 commercial-grade mixer without borrowing?

Show solution

1. Retained: $180 - 60 = \$120$ a month.
2. Months: $480/120 = 4$.

Answer: Four months. If she takes no draw, $480/180 \approx 2.7$, so three months.

Example 2. A venture asks a 50% deposit on custom orders. In March it books 12 orders at $40 each, delivered in April. Materials cost $14 per order and must be bought in March. Does the deposit cover the materials?

Show solution

1. Deposits in March: $12 \times 0.50 \times 40 = \$240$.
2. Materials in March: $12 \times 14 = \$168$.
3. Cash left from deposits: $240 - 168 = \$72$.

Answer: Yes. The deposits more than cover materials, so the venture needs no outside money for these orders. Deposits must be refunded if the order cannot be filled.

PRACTICE

1. Easy With how much capital did Kraft start in 1903, and how did he sell?

   Show answer

   $65; he bought cheese wholesale and sold it to grocers from a rented horse-drawn wagon.

2. Easy Define bootstrapping.

   Show answer

   Starting and growing a business with the founder's savings and the business's own revenue, without outside investors.

3. Easy What problem did Kraft's 1916 process solve?

   Show answer

   Cheese spoiling quickly; his process made cheese that kept without refrigeration.

4. Medium Name five sources of bootstrap money.

   Show answer

   Savings, retained earnings, customer prepayments, trade credit, sweat equity (also selling unused assets).

5. Medium Net income $250 a month; owner's draw $100. How long to save $900?

Show answer

$900/150 = 6$ months

6. Medium Give two advantages and two disadvantages of bootstrapping.

Show answer

Advantages: full ownership and control; no debt; discipline. Disadvantages: slower growth; cash strain; owner bears all risk.

7. Medium A supplier gives 30 days to pay. You buy $200 of materials on March 1 and sell the products for $350 by March 20. Explain how trade credit helped.

Show answer

You sold the goods and collected $350 before the $200 bill was due, so the supplier's terms financed the materials at no cost.

8. Hard A venture reinvests all profits. Monthly profit starts at $100 and each $300 of equipment added raises monthly profit by $25. Roughly how much is monthly profit after 9 months if it buys equipment whenever it has $300?

Show answer

Months 1–3: $300 saved, buy (profit $125). Months 4–6: $375, buy, $75 left (profit $150). Months 7–8: $375, buy, $75 left (profit $175). Month 9: $250. Monthly profit is $175 after 9 months, with $250 saved.

9. Hard Why can growing too fast be dangerous for a bootstrapped business?

Show answer

Growth requires inventory and costs before sales are collected; without outside money, cash can run out even while profits look good (Lesson 4.5).

10. Hard Is sweat equity "free"? Explain.

Show answer

No. The owner's time has an opportunity cost (other work or study he gives up). It saves cash but should be counted when judging whether the venture is worth it.

11. **Challenge** A venture needs $1,200 for equipment. Option A: bootstrap at $200 a month retained. Option B: borrow now at 10% simple annual interest for one year, which lets it earn an extra $150 a month starting now. Compare the positions after 12 months.

    Show answer

    A: equipment bought after 6 months; extra $150 for months 7–12 = $900. B: extra $150 × 12 = $1,800, minus interest $120 = $1,680, but must repay $1,200 principal (from retained earnings). B earns $780 more if all goes as planned, with the risk of owing money if sales fall.

COMMON MISTAKES

- Thinking a business must raise money before it starts.
- Taking too large an owner's draw and starving the business.
- Treating customer deposits as profit before the order is delivered.

Make it a game · Five Ways to Bootstrap. Take turns drawing one of the five bootstrap sources on paper without words: savings, sales, customer prepayments, supplier terms or sweat equity. The other player guesses and explains how that source could have funded Kraft's horse and wagon. Score a point for each correct guess and explanation. Finish by saying what retained earnings are.

Scripture. "Wealth gotten by vanity shall be diminished: but he that gathereth by labour shall increase." (Proverbs 13:11, KJV)

Bootstrapping is gathering little by little. Wealth built through steady work and reinvestment tends to last.

5.2 Loans and Banks: A. P. Giannini and the Bank of Italy

OBJECTIVES

- Tell how A. P. Giannini founded the Bank of Italy in 1904 to serve working people and how he kept lending after the 1906 earthquake.
- Explain principal, interest, term, collateral and the five C's of credit.
- Calculate simple interest and the monthly payment on an installment loan.

> **Warm-up.** If you lent a friend $20, what would you want to know first? Write three questions. Banks ask the same ones.

WATCH

The Man Who Changed Global Finance Forever

Smithsonian Channel · 4:43

https://www.youtube.com/watch?v=UB1XE-biLMI

> **WHEN TO WATCH**
> After the story, before the loan arithmetic.

KEY TERMS

principal

The amount borrowed.

interest

The price of borrowing: money paid to the lender in addition to the principal.

term

The length of time over which a loan is repaid.

collateral

Property pledged to a lender that it may take if the loan is not repaid.

five C's of credit

What lenders weigh: character, capacity (ability to repay), capital (owner's own stake), collateral and conditions.

CORE IDEAS

The story. Amadeo Peter Giannini was born in 1870 in San Jose, California, to Italian immigrants. He built a successful produce-trading business and later served on the board of a small bank in San Francisco's North Beach, an Italian neighborhood. He saw that the big banks turned away farmers, fishermen, shopkeepers and laborers who wanted small loans, so in October 1904 he founded the Bank of Italy to serve them. He went door to door explaining what a bank could do, made loans of a few dozen dollars, and judged borrowers by their character and their work.

How they figured it out. Early on April 18, 1906, a great earthquake struck San Francisco, and fires spread through the city. Giannini loaded his bank's gold and records into produce wagons, covered them with crates of fruit and vegetables, and carried them to his home in San Mateo. While other banks stayed closed for weeks, he set up a desk of a plank across two barrels on a waterfront wharf and lent money to people who wanted to rebuild, often on a handshake and their reputation. The neighborhood was rebuilt quickly, and borrowers repaid. Giannini went on to open branches across California, lend to farmers and new industries, and in 1930 his bank took the name Bank of America.

The big idea. A loan lets a business use money now and repay it, with **interest**, later. The amount borrowed is the **principal**; the time to repay is the **term**. Simple interest is $I = Prt$; most business and consumer loans are repaid in equal monthly installments of principal and interest, given by the payment formula above, where r is the monthly rate and n the number of payments. Lenders weigh the **five C's of credit**: character, capacity, capital, collateral and conditions. A loan is wise when the money will earn more than it costs and the borrower can repay even if things go worse than planned.

Debt and Scripture. The Bible does not forbid borrowing, but it treats debt soberly: "the borrower is servant to the lender" (Proverbs 22:7), and "The wicked borroweth, and payeth not again" (Psalm 37:21). Borrow only for something that will earn the repayment, never for daily expenses, and never more than you could repay from other sources if the venture fails. Many failed small businesses were sunk not by a bad idea but by debt taken on too early.

In business today. Small businesses borrow from banks and credit unions, sometimes with partial guarantees from the U.S. Small Business Administration, as

well as through equipment loans and lines of credit. A student venture should not borrow from a bank; if a family loan is used, write it down with the amount, interest (if any), payment schedule and what happens if the venture fails, and have everyone sign.

PICTURE STUDY



A. P. Giannini, Agence Rol (photographer), 1928 · Photograph · Bibliothèque nationale de France (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This photograph of Giannini was taken in 1928 by a French press agency, when his bank had grown into one of the largest in the United States. He was famous for refusing great wealth for himself: he took a modest salary and gave much of his money away.

Look closely

- Look at Giannini's expression and posture. What would a borrower think about him?
- Look at his clothing. Does it suggest a showy man or a plain one?
- Notice the setting. Is anything in the picture about banking itself?

Talk about it

1. Would you trust this man with your savings? Why or why not?
2. Why might a banker who was once a produce trader understand small businesses well?
3. What does it mean for a bank to judge a borrower's "character"?

Safety first. This is a practice exercise. Students do not apply for bank loans or credit. Any real family loan must be written and approved by a parent.

PROJECT

A Loan Request and Repayment Plan

You will write a practice loan request for a piece of equipment your venture might need, compute the payments, test whether the venture can afford them, and present it to a parent acting as a lender.

You will need

- Spreadsheet (use the PMT function or the formula)
- Your financial model from Unit 4

Steps

1. Choose an item your venture might borrow to buy, and state its price and what it will earn.
2. Choose a rate (use a realistic rate a parent suggests) and two terms.
3. Calculate the monthly payment and total interest for each term.
4. Add the payment to your cash-flow forecast and check that cash never goes negative, even if sales are 20% lower.
5. Write a one-page loan request covering the five C's: who you are (character), how you will repay (capacity), what you are putting in (capital), what you pledge (collateral), and the conditions.
6. Present it to a parent acting as banker and answer questions.
7. Write a paragraph: should you borrow at all, or bootstrap instead? Why?

Tips

- A lender wants to see that you can repay even if things go worse than planned.
- This is practice; do not take on real debt without a parent.

Check your work

- ☐ I can calculate simple interest and loan payments.
- ☐ My request addresses all five C's.
- ☐ My cash forecast shows I could repay even with lower sales.

LEDGER NOTEBOOK

1. Draw a loan timeline: principal received, payments over the term, interest shaded on top.
2. Copy your loan calculations for both terms.
3. Write the Giannini timeline: 1904 Bank of Italy; 1906 earthquake and waterfront lending; branches; 1930 Bank of America.

KEY FORMULAS

$$I = Prt$$

$$M = P \cdot \frac{r}{1 - (1 + r)^{-n}}$$

From history. Giannini's bank also financed the building of the Golden Gate Bridge by buying its bonds in the 1930s, and lent to film studios for pictures such as Walt Disney's *Snow White* (1937). When he died in 1949 his personal estate was worth less than $500,000, by his own choice.

WORKED EXAMPLES

Example 1. A shop borrows $2,000 at 8% simple annual interest for 18 months. How much interest is owed, and what is the total repaid?

Show solution

1. $I = Prt = 2{,}000 \times 0.08 \times 1.5 = \$240.$
2. Total: $2{,}000 + 240 = \$2{,}240.$

Answer: $240 interest; $2,240 total.

Example 2. A $5,000 equipment loan at 9% annual interest is repaid monthly over 3 years. Find the monthly payment and the total interest.

Show solution

1. Monthly rate: $r = 0.09/12 = 0.0075$; $n = 36$.
2. $(1.0075)^{-36} \approx 0.7641$.
3. $M = 5{,}000 \times \dfrac{0.0075}{1 - 0.7641} = 5{,}000 \times 0.03179 \approx \$159.00$.
4. Total paid: $36 \times 159.00 = \$5{,}724$; interest $\approx \$724$.

Answer: About $159 a month; about $724 in interest over three years. (A spreadsheet's PMT function gives the same result.)

Example 3. The equipment in the last example lets the shop earn an extra $260 a month. Is the loan wise? What if the extra earnings were only $120?

Show solution

1. With $260: $260 - 159 = \$101$ a month left after the payment.
2. With $120: $120 - 159 = -\$39$ a month: the loan costs more than it earns.

Answer: Wise at $260 (if that estimate is solid and the shop could still pay if earnings dipped); unwise at $120.

PRACTICE

1. Easy When and why did Giannini found the Bank of Italy?

   Show answer

   October 1904, to serve working people and immigrants turned away by the big banks.

2. Easy What did Giannini do after the 1906 earthquake?

   Show answer

   Saved the bank's gold and records in produce wagons and lent money from a plank desk on the waterfront to people rebuilding.

3. Easy Name the five C's of credit.

   Show answer

   Character, capacity, capital, collateral, conditions.

4. **Medium** Find the simple interest on \$1,500 at 6% for 2 years.

   Show answer

   $1500 \times 0.06 \times 2 = \$180$

5. **Medium** A \$3,000 loan at 12% annual interest is repaid monthly over 2 years. Find the payment.

   Show answer

   $r = 0.01$, $n = 24$; $M = 3000 \times 0.01/(1 - 1.01^{-24}) \approx \$141.22$.

6. **Medium** In problem 5, find the total interest paid.

   Show answer

   $24 \times 141.22 - 3000 \approx \$389$

7. **Medium** Why did Giannini's judgment of "character" matter so much in 1906?

   Show answer

   Records and property had burned; he could judge borrowers only by their reputation and work. Their honesty in repaying justified his trust.

8. **Hard** A loan payment is \$210 a month. The equipment it buys adds \$180 a month in profit. Should the business borrow? Explain.

   Show answer

   No, unless other benefits exist: it would lose \$30 a month. A loan should pay for itself with a margin of safety.

9. **Hard** Explain "the borrower is servant to the lender" in business terms.

   Show answer

   A borrower must make payments whatever happens to sales, so the lender's claim comes first and limits the borrower's freedom; collateral can be taken if payments stop.

10. **Hard** What should a written family loan include?

    Show answer

    Amount, interest (if any), payment schedule, what happens if a payment is missed or the venture fails, and signatures of everyone involved.

11. **Challenge** Compare a $4,000 loan at 7% for 2 years with the same loan at 7% for 4 years (monthly payments). Find each payment and total interest. Which is better, and when?

    Show answer

    2 years: $M \approx \$179.09$, interest ≈ $298. 4 years: $M \approx \$95.79$, interest ≈ $598. The shorter term costs less overall; the longer term is easier on monthly cash. Choose the shorter if cash flow can carry it.

COMMON MISTAKES

- Using the annual rate in the monthly formula without dividing by 12.
- Borrowing for expenses instead of for something that earns.
- Forgetting to test the payment against a bad month.

> **Make it a game · The Loan Officer.** Your parent plays a loan officer for the Bank of Italy and asks one question for each of the five C's of credit. You request a pretend loan for a made-up venture and answer each question in under thirty seconds. Then calculate the interest on the principal over the term. Say how Giannini kept lending after the 1906 earthquake.

> **Scripture.** “The wicked borroweth, and payeth not again: but the righteous sheweth mercy, and giveth.” (Psalm 37:21, KJV)
>
> Repaying a loan is a matter of righteousness, not only of contract. Giannini’s waterfront loans worked because borrowers kept their word.

5.3 Partners and Equity: The Medici Branches and the Dutch East India Company

OBJECTIVES

- Explain how the Medici Bank used separate partnerships for its branches and how the Dutch East India Company sold transferable shares to the public from 1602.
- Calculate ownership percentages, dilution, and pre- and post-money valuation.
- Weigh the benefits and costs of taking on partners or shareholders, including the moral record of the VOC.

> **Warm-up.** You and two friends put in $50, $30 and $20 to buy supplies for a venture that earns $40. How should the $40 be divided? Write your answer and your reason.

WATCH

How did Medieval Banking Work? (Short Animated Documentary)

History Matters · 3:17

https://www.youtube.com/watch?v=UE7nd36EpRU

> **WHEN TO WATCH**
> After the Medici story, before the VOC.

Note: A short animated history of how medieval and Renaissance banks worked.

BACKUP VIDEO

How the Stock Market Was Born - The Dutch East India Company

Mostly Money · 7:16

https://www.youtube.com/watch?v=4lJibNgTdsw

After the VOC story; how the Dutch East India Company's shares worked.

KEY TERMS

equity

Ownership in a business; equity investors share in profits and losses but are not promised repayment.

share

One unit of ownership in a company.

valuation

What a business is judged to be worth; pre-money before new investment, post-money after.

dilution

The fall in an owner's percentage when new shares are issued to others.

dividend

A share of profits paid out to owners.

CORE IDEAS

The story. Giovanni di Bicci de' Medici founded the Medici Bank in Florence in 1397. Under his son Cosimo it became the greatest bank in Europe, with branches in Rome, Venice, Geneva, Bruges, London and other cities. Each branch was set up as a separate partnership: the Medici supplied most of the capital, and the local branch manager invested some of his own money and received a share of the branch's profits. That arrangement gave managers a strong reason to work well, and it meant that a disaster in one branch did not automatically sink the others.

How they figured it out. The system weakened when later Medici heads paid less attention, managers made large, risky loans to kings and princes who did not repay, and branches were allowed to grow beyond their partners' judgment; by 1494 the bank had collapsed. A century later, in 1602, the Dutch East India Company (in Dutch, the VOC) found a new way to raise money for enormous, risky voyages to Asia: it sold shares to the public, from merchants to servants, and the shares could be bought and sold on the Amsterdam exchange instead of being repaid at the end of each voyage. The company raised about 6.4 million guilders and kept its capital for years. The oldest known share certificate, from 1606, survives in the Netherlands.

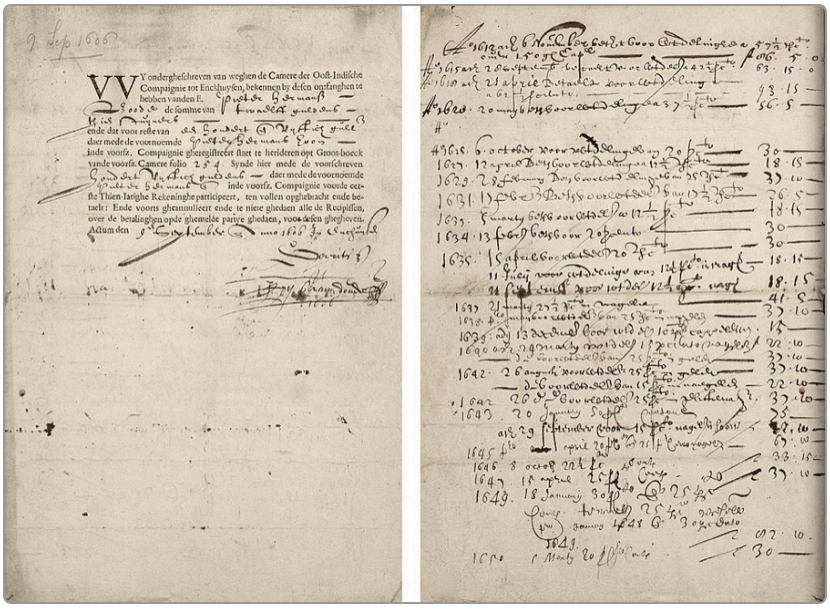
The big idea. Equity is ownership. An equity investor is not promised repayment; he shares in profits (often through **dividends**) and in losses. To sell part of a company you must agree on a **valuation.** If a business is worth $8,000 before an investment (pre-money) and an investor puts in $2,000, it is worth $10,000 after (post-money), and the investor owns 20%. The founders' percentage falls from 100% to 80%; that is **dilution**. Partners bring money, skills and contacts, but they also share control and profits, so choose them as carefully as a spouse chooses a spouse's family.

Who gained, and who suffered? The VOC paid large dividends for decades and showed how shared ownership could fund great ventures. But it was also an armed

company with power to make war: in 1621 its forces conquered the Banda Islands, driving out and destroying much of the population to control the nutmeg trade, and the company bought and sold human beings as forced laborers. People are made in God's image and are never property. The VOC's shareholders gained; many of the people it ruled did not. A company is not great merely because its investors grow rich.

In business today. Partnerships, shareholder agreements and stock markets all descend from these experiments. For a small venture, equity from a partner or family investor should be written down: how much was put in, what percentage it buys, how profits are paid, and what happens if someone leaves.

PICTURE STUDY



A Share in the Dutch East India Company, Vereenigde Oostindische Compagnie, Enkhuizen chamber, 1606 · Handwritten and printed document on paper · Westfries Archief, Hoorn (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This document, dated 1606, records a payment for a share in the Dutch East India Company and is often called the world's oldest surviving share. It is a receipt rather than a fancy certificate: ordinary paper, careful handwriting and signatures that made the promise binding.

Look closely

- Find the date and the signatures. Why do signatures matter on a document like this?
- Look at the handwriting. What information would a share record need to include?
- Compare it with a modern receipt. What is the same?

Talk about it

1. Why would a shareholder want to be able to sell this paper to someone else?
2. What risks did a Dutch shareholder take in 1606?
3. What should a written agreement for an investment in your venture include?

Safety first. Use pretend money. Students do not sell shares or take investments; any real family arrangement must be written and approved by a parent.

PROJECT

Cap Table and Partnership Terms

You will build a capitalization table (cap table) for a pretend investment in your venture, test several valuations and draft fair terms for a partner or family investor.

You will need

- Spreadsheet
- Your financial model and the partnership agreement from Lesson 3.4

Steps

1. Estimate a reasonable pre-money valuation for your venture and explain your reasoning (what it has earned, its equipment, its prospects).
2. Build a cap table: owners, shares, percentages, before and after a pretend $500 investment.
3. Test three valuations (low, middle, high) and show how much of the business the investor would own in each.
4. Add a second pretend round and show dilution.
5. Calculate each owner's share of a sample $1,200 profit.
6. Draft a one-page term sheet: amount, percentage, how profits are shared, who decides what, what happens if the venture closes.
7. Discuss with a parent: would you rather take this investment, borrow or bootstrap? Write your choice and reasons.

Tips

- A high valuation is not automatically good; it must be one an honest investor can accept.
- This is practice with pretend money unless a parent decides otherwise.

Check your work

☐ I can compute ownership, valuation and dilution.

☐ My cap table and term sheet are clear and consistent.

☐ I compared equity with debt and bootstrapping.

LEDGER NOTEBOOK

1. Draw a pie chart of ownership before and after each round.
2. Copy your cap table.
3. Make a timeline: 1397 Medici Bank; 1494 collapse; 1602 VOC; 1606 share; 1621 Banda conquest.

KEY FORMULAS

$$\text{Post-money} = \text{pre-money} + \text{investment}$$

$$\text{Investor's share} = \frac{\text{investment}}{\text{post-money}}$$

From history. The Amsterdam exchange where VOC shares were traded opened its own building in 1611. Traders there soon invented forward contracts and options, and in 1609 Isaac Le Maire, a former VOC director, organized one of the first recorded attempts to profit by driving the share price down.

WORKED EXAMPLES

Example 1. A student's business is valued at $3,000 pre-money. An uncle invests $1,000. What is the post-money valuation and the uncle's share? What share does the student keep?

Show solution

1. Post-money: $3{,}000 + 1{,}000 = \$4{,}000$.
2. Uncle: $1{,}000/4{,}000 = 25\%$. Student: 75%.

Answer: Post-money $4,000; the uncle owns 25%, the student 75%.

Example 2. A Medici-style branch: the bank puts in 10,000 florins and the manager 2,000. Profits are shared in proportion to capital, except that the manager gets an extra 10% of profit for running the branch. A year's profit is 3,000 florins. How is it divided?

Show solution

1. Manager's management share: $0.10 \times 3{,}000 = 300$ florins.
2. Remaining 2,700 split by capital: bank $\frac{10}{12} \times 2{,}700 = 2{,}250$; manager $\frac{2}{12} \times 2{,}700 = 450$.
3. Manager total: $300 + 450 = 750$.

Answer: Bank 2,250 florins; manager 750 (25% of profit on 1/6 of the capital), a strong reason to manage well. (Illustrative terms; actual Medici contracts varied.)

Example 3. A founder owns 100% of 1,000 shares. She sells 250 new shares to an investor, then later 300 new shares to another. What does each own at the end?

Show solution

1. Total shares: $1{,}000 + 250 + 300 = 1{,}550$.
2. Founder: $1{,}000/1{,}550 \approx 64.5\%$; first investor $250/1{,}550 \approx 16.1\%$; second $300/1{,}550 \approx 19.4\%$.

Answer: About 64.5%, 16.1% and 19.4%. Each new issue dilutes earlier owners.

PRACTICE

1. Easy When was the Medici Bank founded, and by whom?

   Show answer

   1397, by Giovanni di Bicci de' Medici.

2. Easy What was new about the VOC's shares in 1602?

   Show answer

   They were sold to the public, the capital was kept for years rather than repaid after each voyage, and shares could be traded on the Amsterdam exchange.

3. Easy Define dilution.

Show answer

The fall in an owner's percentage when new shares are issued to others.

4. Medium Pre-money $6,000; investment $2,000. Find post-money and the investor's share.

Show answer

$8,000; 25%.

5. Medium An investor wants 20% for $1,500. What pre-money valuation does that imply?

Show answer

Post-money $1500/0.20 = \$7{,}500$; pre-money $6,000.

6. Medium Why did the Medici make each branch a separate partnership with its manager?

Show answer

To give managers a stake in profits and to keep losses at one branch from automatically sinking the whole bank.

7. Medium Give two reasons the Medici Bank collapsed.

Show answer

Risky loans to rulers who did not repay; weaker oversight by later Medici and poor branch managers; overexpansion.

8. Hard Compare debt and equity for a small venture: who gets repaid, who shares control, who bears the risk?

Show answer

Debt: lender is repaid with interest regardless of profit, usually has no control, but the owner bears the risk of repayment. Equity: investor is not repaid but shares profits and some control and bears loss with the owner.

9. Hard Explain why the VOC cannot be called a great business in this course's sense, despite its profits.

Show answer

It served its financiers well but used violence and forced labor and treated whole peoples as means to profit, failing workers and communities grievously. Greatness requires serving all six stakeholders.

10. Hard Founders own 1,000 shares. How many new shares must be sold for an investor to own 20%?

Show answer

$x/(1000+x) = 0.20 \Rightarrow x = 250.$

11. Challenge A venture is worth $5,000. You need $2,000. Option A: borrow at 10% for a year. Option B: sell equity at a $5,000 pre-money valuation. If the venture earns $3,000 profit next year, compare what you keep under each.

Show answer

A: keep $3000 - 200 = \$2{,}800$, repay principal. B: investor owns $2/7 \approx 28.6\%$, you keep about $2,143 of profit and 71.4% of the business forever. Debt is cheaper if profits come; equity is safer if they might not.

COMMON MISTAKES

- Confusing pre-money and post-money valuation.
- Forgetting that every new issue of shares dilutes existing owners.
- Taking on partners without a written agreement.

Make it a game · Slicing the Pie. Draw a paper circle and cut it as your cap table: you own all of it. An investor offers money at a pre-money valuation your parent names. Calculate the investor's percentage, cut the pie, and say how much you were diluted. Repeat with a second round. Finish by telling which used separate partnerships, the Medici or the Dutch East India Company.

Scripture. "Be ye not unequally yoked together with unbelievers:" (2 Corinthians 6:14, KJV)

Paul's words concern fellowship and marriage, but Christians have long applied the principle to business partnerships: share ownership only with people whose values and honesty you trust, because partners are bound to each other's decisions.

5.4 Venture Capital: Georges Doriot and Digital Equipment

OBJECTIVES

- Tell how Georges Doriot founded American Research and Development in 1946 and how its 1957 investment in Digital Equipment Corporation shaped venture capital.
- Explain how venture capital funds work and why they seek a few very large successes.
- Calculate a portfolio's return when most investments fail and decide whether a venture fits venture capital.

> **Warm-up.** You invest $100 in each of ten tiny companies. Seven fail, two return your $100, and one returns $1,500. Did you make money overall? How much?

WATCH

Quick Study: How Venture Capitalists Make Decisions

Stanford Graduate School of Business · 6:16

https://www.youtube.com/watch?v=I6iQU4355Ng

> **WHEN TO WATCH**
> After the Doriot story, before the portfolio arithmetic.

Note: From the Stanford Graduate School of Business.

BACKUP VIDEO

How VC works | How VC funds are structured | VC 101

Carta · 6:42

https://www.youtube.com/watch?v=AqM2yAHmpaY

Optional, on how venture funds are structured.

KEY TERMS

venture capital

Equity investment in young, fast-growing, high-risk companies by professional funds, in exchange for ownership and influence.

portfolio

A collection of investments held together; a venture fund holds stakes in many companies.

exit

The event that turns an investor's shares into cash: the company's sale or its listing on a stock exchange.

multiple

How many times the original investment an exit returns (a 10× return turns $1 into $10).

angel investor

A wealthy individual who invests personal money in early-stage companies.

CORE IDEAS

The story. Georges Doriot was born in France in 1899, came to Harvard Business School as a student, and stayed to teach there for decades. During the Second World War he served as a U.S. Army brigadier general in charge of research and development for the Quartermaster Corps, improving soldiers' clothing, boots and equipment. In 1946, with Boston business and university leaders, he founded American Research and Development Corporation (ARD), one of the first firms to raise money from the public to invest in new technology companies, many of them started by engineers from MIT and Harvard.

How they figured it out. Most of ARD's early investments earned little. Then in 1957 two young MIT engineers, Ken Olsen and Harlan Anderson, asked for money to build computers. ARD invested $70,000 for about 70 percent of their new company, Digital Equipment Corporation, and Doriot advised them closely. DEC's small, affordable computers sold widely, and within about a decade ARD's stake was worth hundreds of millions of dollars, more than all its other investments together. Doriot taught that investors should back people of character and ability, help them patiently, and judge success by the companies they built, not only by the money.

The big idea. Venture capital funds raise money from investors and buy equity in young companies that could grow very large very fast. Because most young companies fail or grow slowly, a fund's returns usually come from one or two big successes, as ARD's came from DEC. So venture capitalists look for huge markets, rapid growth and an eventual **exit.** In return they take a large share of ownership, seats on the board and influence over decisions. **Angel investors** do something similar with their own money at an earlier stage.

Is it for you? Very few businesses fit venture capital. A bakery, a repair shop or a family farm may be an excellent business without ever being able to return ten times an investor's money. Taking venture money means aiming for rapid growth, giving up control and accepting pressure to sell the company someday. Many founders wisely choose to bootstrap or borrow instead. Ask: what kind of business am I called to build, and what kind of investor fits it?

In business today. Venture capital has funded many technology and medical companies. It has also funded many failures and some frauds, which is why investors are expected to check facts carefully and founders to report honestly. Doriot's emphasis on character still matters: an investor's money is held in trust.

PICTURE STUDY



Georges F. Doriot, U.S. Army Signal Corps, about 1942 · Photograph · U.S. Army (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This official Army photograph shows Doriot during the Second World War, when he directed military research on clothing and equipment for American soldiers. After the war he applied the same habits of research, testing and patient development to new companies.

Look closely

- Look at the uniform. What responsibilities might Doriot have had?
- Look at his expression. What kind of teacher and investor might he have been?
- Notice that this is a government photograph. Why is it in the public domain?

Talk about it

1. How might wartime work on equipment for soldiers prepare someone to judge new technology companies?
2. Doriot said he backed people more than ideas. Do you agree? Why?
3. What questions would Doriot ask about your venture?

PROJECT

Is This a Venture-Capital Business?

You will analyze three businesses (your own venture, a local business and a well-known growth company) to decide which, if any, could fit venture capital, and recommend the best financing for each.

You will need

- Ledger notebook or spreadsheet
- Public information on the companies (company websites, encyclopedia articles)

Steps

1. Choose the three businesses.
2. For each, estimate market size, possible growth in 5–7 years and whether an exit (sale or stock listing) is plausible.
3. Ask: could an investor reasonably get 10× his money? Show rough arithmetic.
4. List what the owners would give up (control, ownership, freedom to stay small).
5. Recommend bootstrapping, a loan, a partner, angels or venture capital for each, with reasons.
6. Make a small portfolio exercise: ten pretend $1,000 investments with outcomes you assign, and compute the portfolio multiple.
7. Write a paragraph: which financing fits the kind of business you hope to build someday?

Tips

- Be realistic about growth; very few businesses grow tenfold.
- A great business does not need to be a venture-capital business.

Check your work

- ☐ I can explain how venture funds work and why they need big winners.
- ☐ I recommended financing for three businesses with arithmetic and reasons.
- ☐ I computed a portfolio multiple.

LEDGER NOTEBOOK

1. Draw a bar chart of a pretend fund's ten outcomes, showing how one success carries the portfolio.
2. Copy your three-business comparison table.
3. Write a short timeline: 1946 ARD; 1957 DEC investment; DEC's growth; Doriot's teaching.

KEY FORMULAS

$$\text{Multiple} = \frac{\text{value at exit}}{\text{amount invested}}$$

$$\text{Portfolio multiple} = \frac{\sum \text{exit values}}{\sum \text{investments}}$$

From history. Doriot also helped found INSEAD, a business school in Fontainebleau, France, in 1957. His Harvard course on manufacturing was famous for its long field projects; students studied real companies, often with practical advice on dress, manners and character as well as strategy.

WORKED EXAMPLES

Example 1. ARD invested $70,000 in DEC. Suppose the stake was later worth $350 million. What multiple is that?

Show solution

1. $\dfrac{350{,}000{,}000}{70{,}000} = 5{,}000.$

Answer: A 5,000× multiple (using an illustrative round value for the stake). Returns like this are extraordinarily rare.

Example 2. A fund invests $1 million in each of 10 companies. Outcomes: 5 fail ($0), 3 return $1 million each, 1 returns $4 million, 1 returns $25 million. Find the portfolio multiple. What if the best company had failed?

Show solution

1. Total invested: $10 million. Total returned: $0 + 3 + 4 + 25 = \$32$ million.
2. Multiple: $32/10 = 3.2\times$.
3. Without the best company: $7/10 = 0.7\times$, a loss.

Answer: 3.2× overall, but only because of one big success; without it the fund loses 30%. That is why venture funds seek companies that could become very large.

Example 3. A small bakery earns $40,000 a year and could grow to perhaps $80,000. An investor wants a 10× return on $50,000 within 7 years. Can the bakery provide it?

Show solution

1. Required: $10 \times 50{,}000 = \$500{,}000$.
2. Even if the investor owned all the bakery's profits for 7 years at the higher figure: $7 \times 80{,}000 = \$560{,}000$, leaving nothing for the owner.

Answer: Practically no. The bakery may be a fine business, but it is not a venture-capital business; a loan or bootstrapping fits better.

PRACTICE

1. Easy What firm did Doriot found in 1946?

   Show answer

   American Research and Development Corporation (ARD).

2. Easy How much did ARD invest in DEC in 1957, and for about what share?

   Show answer

   $70,000, for about 70 percent.

3. Easy Define exit.

Show answer

The event (a sale or stock listing) that turns an investor's shares into cash.

4. Medium An investment of $200,000 is sold for $3 million. Find the multiple.

Show answer

$3{,}000{,}000/200{,}000 = 15\times$

5. Medium Fund: $8 million in 8 companies of $1 million each; returns $0, $0, $0, $0, $1M, $2M, $2M, $15M. Find the multiple.

Show answer

$20/8 = 2.5\times$

6. Medium Name three things a venture capitalist usually receives besides shares.

Show answer

Board seats, information rights and influence over major decisions (and often protective terms in a sale).

7. Medium Why do venture funds depend on a few big successes?

Show answer

Most young companies fail or grow slowly; only rare huge successes return enough to cover the losses and earn a profit for the fund.

8. Hard Give two reasons a founder might wisely refuse venture capital.

Show answer

Loss of control and ownership; pressure for rapid growth and an exit that may not fit the business or its stakeholders. Also: the business may serve its customers and community best at a modest size.

9. Hard Explain Doriot's emphasis on character in investing.

Show answer

Plans change and products fail, but honest, able founders adapt and keep faith with investors; dishonest founders can destroy any investment. He backed people first.

10. Hard An investor buys 20% of a company for $400,000. Seven years later the company sells for $15 million. What is the investor's payout and multiple (assuming no dilution)?

    Show answer

    $0.20 \times 15{,}000{,}000 = \$3{,}000{,}000$; $3{,}000{,}000 / 400{,}000 = 7.5\times$.

11. Challenge A fund needs a 3× portfolio multiple on 20 investments of $1 million. If 12 return nothing and 6 return their money, what must the remaining 2 return together, and what multiple is that on each (if equal)?

    Show answer

    Needed $60M; the six return $6M, so the two must return $54M: $27M each, a 27× multiple.

COMMON MISTAKES

- Thinking every good business should seek venture capital.
- Ignoring the control and ownership an investor takes.
- Judging a fund by its average company instead of its few large successes.

> **Make it a game · Ten Beans, Few Winners.** Place ten piles of one bean each as ten pretend venture investments. Roll a die for each. On a 1 to 4 the bean is lost, on a 5 it returns one bean, and on a 6 it returns twenty. Count your fund's multiple. Play three rounds, then explain why Doriot's venture funds depended on a few huge winners like Digital Equipment.

5.5 Crowdfunding and Family Investors: The Statue of Liberty's Pedestal

OBJECTIVES

- Tell how Joseph Pulitzer's newspaper raised the money for the Statue of Liberty's pedestal in 1885 from more than 120,000 small donors.
- Distinguish donation, reward, pre-order and equity crowdfunding, and explain why investment offerings are regulated.
- Write an honest family-investment or pre-order agreement and calculate funding goals.

> **Warm-up.** If 200 people each gave $1, and 2 people each gave $100, which raised more? Which group would care more about the result? Why?

WATCH

Raising Dollars - Funding the Statue of Liberty's Pedestal

Statue of Liberty & Ellis Island Foundation · 3:20

https://www.youtube.com/watch?v=DfZ-E2wgkXg

> **WHEN TO WATCH**
> After the story of the pedestal, before the types of crowdfunding.

Note: From the Statue of Liberty–Ellis Island Foundation.

BACKUP VIDEO

Crowd Funding Explained

Syracuse University iSchool · 4:54

https://www.youtube.com/watch?v=4Ca_zyj-tr4

Before the project; a short explanation of crowdfunding today.

KEY TERMS

crowdfunding

Raising money from many people, each giving or investing a small amount.

reward crowdfunding

Backers give money in return for a thank-you gift or an early product, not ownership.

equity crowdfunding

Selling small ownership stakes to many investors, allowed in the United States under federal rules since 2016 with required disclosures.

disclosure

Telling investors or backers the facts they need, including risks, honestly and in writing.

funding goal

The amount a campaign must raise to carry out its plan.

CORE IDEAS

The story. The Statue of Liberty was a gift from the people of France, designed by Frédéric-Auguste Bartholdi and paid for by French donations. Americans were to pay for the granite pedestal, but by 1885 the American committee had run out of money and work had stopped. Pieces of the statue were already crossing the Atlantic in crates. To raise funds, the statue's arm and torch had been displayed in Philadelphia in 1876 and then in New York's Madison Square, where visitors paid to climb up to the balcony.

How they figured it out. In March 1885 Joseph Pulitzer, publisher of the *New York World*, began a campaign in his paper. He scolded the wealthy for giving too little and promised to print the name of every donor, however small the gift. Schoolchildren, workers and families sent nickels, dimes and dollars with letters, and the *World* printed them. In about five months the campaign raised more than $100,000 from more than 120,000 people, most giving less than a dollar. The pedestal was finished, and the statue was dedicated in October 1886. The paper's circulation grew as well.

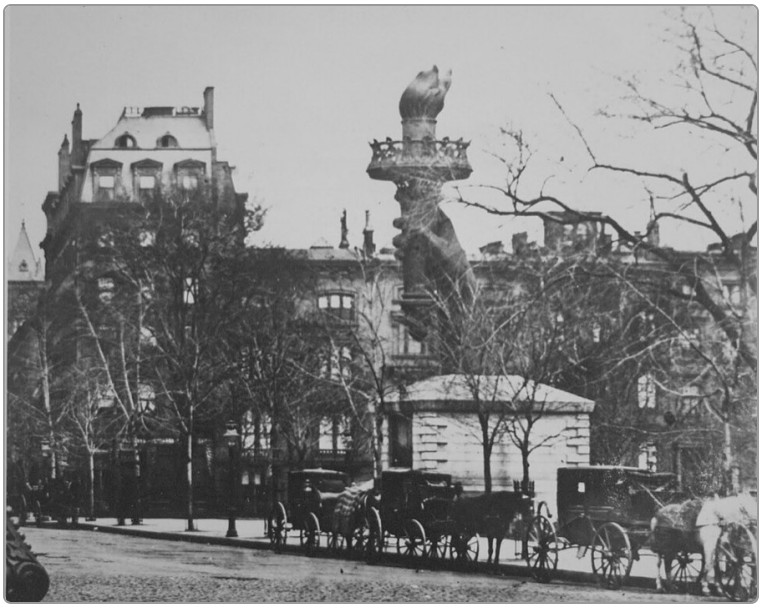
The big idea. Crowdfunding raises money from many people in small amounts. Its forms differ in what backers receive. In donation crowdfunding they receive thanks (as with the pedestal). In **reward** crowdfunding they receive a gift or early product. In pre-order campaigns they pay in advance for a product to be delivered. In **equity crowdfunding** they receive ownership; because ordinary people can be defrauded by investment schemes, federal law requires such offerings to go through registered platforms with written **disclosure** of the business, its finances and its risks.

Family and friends. Many ventures are first funded by family. That money carries special risks: a failed venture can strain relationships. Rules of honesty apply

doubly. Take only money the giver can afford to lose. Say plainly whether it is a gift, a loan or an investment. Write down the amount, the terms and the risks. Report results regularly, good or bad. And if the venture fails, explain what happened and what, if anything, can be repaid.

In business today. Online platforms have made crowdfunding common for products, books, films, charities and churches. Many campaigns succeed; many reward campaigns also deliver late or not at all, which damages trust. A crowdfunding campaign is a set of promises to many people. “Better is it that thou shouldest not vow, than that thou shouldest vow and not pay” (Ecclesiastes 5:5).

PICTURE STUDY



The Arm and Torch of the Statue of Liberty in Madison Square, Unknown photographer, between 1876 and 1882 · Photograph · Wikimedia Commons

Image: Wikimedia Commons, public domain

For several years, before the statue was finished, its arm and torch stood in Madison Square Park in New York. Visitors paid a small fee to climb a ladder inside to the balcony. It was an early fundraising display: show people a piece of the project so they will help finish it.

Look closely

- Find the balcony around the torch. How many people could stand there?
- Compare the size of the arm with the trees and buildings. How big would the whole statue be?
- Look for anything that shows this was meant to attract visitors.

Talk about it

1. Why does showing a real piece of a project help people decide to support it?
2. What is the modern version of displaying the arm in the park?
3. What could you show backers of your own venture before asking for support?

> **Safety first.** Do not launch any public online campaign, create accounts or collect payments online without a parent. Never post personal information. Any money collected is handled by a parent.

PROJECT

An Honest Campaign Plan

You will plan (but not launch publicly) a small pre-order or family-funding campaign for your venture, including the goal, the math, the promises and a written agreement or backer terms.

You will need

- Spreadsheet
- Your financial model
- A parent as adviser and approver

Steps

1. Decide what the money is for and set a funding goal from your Unit 4 numbers.
2. Choose the form: pre-orders among people you know, or a written family investment or loan.
3. Calculate: number of backers or orders needed, fees, product costs and profit.
4. Write the backer terms or agreement: what is promised, by when, the risks, and the refund policy.
5. Write a one-paragraph honest description of the venture, including one thing that could go wrong.
6. Plan regular updates (for example, every two weeks) and what each will report.
7. With a parent's approval, you may run a small private pre-order among family and church friends. Otherwise keep it as a plan.
8. Write a paragraph comparing crowdfunding with the other sources in this unit for your venture.

Tips

- Under-promise and over-deliver: set dates you are sure to meet.
- Keep a list of every backer and what was promised to each.

Check your work

- ☐ I can explain the four types of crowdfunding.
- ☐ My plan has a goal, the math, written terms and a refund policy.
- ☐ I described the risks honestly.

LEDGER NOTEBOOK

1. Draw a thermometer chart of your funding goal with milestones.
2. Copy your campaign math.
3. Write the pedestal timeline: 1876 arm displayed; 1884 statue completed in Paris; March 1885 campaign begins; August 1885 goal met; October 1886 dedication.

KEY FORMULAS

$$\text{Backers needed} = \frac{\text{funding goal} + \text{costs of rewards and fees}}{\text{average pledge}}$$

From history. The French had raised their share for the statue through public subscriptions, banquets and exhibitions. The poem "The New Colossus," by Emma Lazarus, was written in 1883 for an art auction that raised money for the pedestal; it was later placed on a plaque inside it.

WORKED EXAMPLES

Example 1. Pulitzer's campaign raised about $100,000 from about 120,000 donors. What was the average gift?

Show solution

1. $100{,}000 / 120{,}000 \approx \$0.83$.

Answer: About 83 cents per donor (the totals were slightly higher, but the average was under a dollar).

Example 2. A student plans a pre-order campaign for 60 hand-bound journals at $25 each. Materials cost $9 per journal; the payment service a parent uses charges 3% plus $0.30 per order. What is the net amount raised, and the profit?

Show solution

1. Revenue: $60 \times 25 = \$1{,}500$.
2. Fees: $0.03 \times 1{,}500 + 60 \times 0.30 = 45 + 18 = \$63$.
3. Materials: $60 \times 9 = \$540$.
4. Profit: $1{,}500 - 63 - 540 = \$897$.

Answer: Net after fees $1,437; profit $897 before the student's time and shipping.

Example 3. A church youth group needs $2,400 for a building project. If the average gift is $30 and 4% of people asked will give, how many people must be asked?

Show solution

1. Donors needed: $2{,}400 / 30 = 80$.
2. People asked: $80 / 0.04 = 2{,}000$.

Answer: 80 donors, from about 2,000 people asked; or raise the average gift or the response rate.

PRACTICE

1. Easy Who led the 1885 fundraising campaign for the pedestal, and through what?

   Show answer

   Joseph Pulitzer, through his newspaper, the *New York World*.

2. Easy What did Pulitzer promise every donor?

   Show answer

   That his or her name would be printed in the paper, however small the gift.

3. Easy Name four types of crowdfunding.

   Show answer

   Donation, reward, pre-order, equity.

4. Medium Why is equity crowdfunding regulated more strictly than reward crowdfunding?

Show answer

Backers become investors who can lose money to misleading or fraudulent offerings, so the law requires registered platforms and written disclosures.

5. Medium A campaign needs $1,800 with an average pledge of $45. How many backers?

Show answer

$1800/45 = 40$

6. Medium List four things a written family-investment agreement should state.

Show answer

Amount; whether it is a gift, loan or investment; terms (interest or share); risks; how and when results will be reported; what happens if the venture fails.

7. Medium How did displaying the statue's arm help raise money?

Show answer

Visitors paid to climb it, and seeing a piece of the statue built interest and support.

8. Hard A reward campaign promises 100 backers a product by December. In November the student realizes she can make only 60. What should she do?

Show answer

Tell all backers promptly and honestly, give a new date, and offer a full refund to anyone who wants it; deliver in the order of pledges.

9. Hard Why might family money be riskier than a bank loan for a relationship?

Show answer

If the venture fails, losses fall on people you love and see often, and unclear terms breed misunderstanding. A bank relationship is purely financial.

10. Hard Revenue $2,000; fees 5%; product costs 40% of revenue; shipping $300. Find the profit.

Show answer

$$2000 - 100 - 800 - 300 = \$800$$

11. Challenge Explain how the pedestal campaign served several stakeholders at once, and whether Pulitzer's newspaper had a conflict of interest.

Show answer

Donors gained a share in a national monument; France and the U.S. gained the statue; the city gained a landmark; the newspaper gained readers. The paper did benefit from its own campaign, but it disclosed every gift publicly, which made the benefit transparent rather than hidden.

COMMON MISTAKES

- Promising delivery dates you cannot keep.
- Forgetting fees, shipping and the cost of rewards.
- Taking family money without writing down whether it is a gift, a loan or an investment.

Make it a game · Pedestal Fund Drive. Your parent reads four invented campaign offers aloud: a donation drive, a reward for backers, a pre-order and a share of profits. Label each by type and say which one is regulated and why. Then write a one-line honest funding goal for a pretend project. Finish by explaining how Pulitzer's newspaper raised the pedestal money in 1885.

Scripture. "Better is it that thou shouldest not vow, than that thou shouldest vow and not pay." (Ecclesiastes 5:5, KJV)

Every pre-order and every investment is a promise. Do not make a promise to backers unless you are prepared to keep it.

UNIT 5

Financing

Every venture needs money before it earns money, and the way you raise it shapes who owns the business, who bears the risk and who must be repaid. This unit walks through the main sources in roughly the order a small venture meets them: **bootstrapping** from savings and sales, as James L. Kraft did with $65 and a rented horse and wagon in Chicago in 1903; **loans**, with A. P. Giannini, who founded a bank for working people and kept lending from a plank on the waterfront after the 1906 San Francisco earthquake; and **partners and equity**, from the Medici Bank's branch partnerships to the Dutch East India Company's first shares in 1602.

Then you will meet **venture capital** through Georges Doriot, the Harvard professor whose firm invested $70,000 in Digital Equipment Corporation in 1957, and **crowdfunding and family investors**, beginning with the 1885 newspaper campaign that paid for the Statue of Liberty's pedestal with gifts from more than a hundred thousand people. Throughout, the emphasis is on honesty: clear agreements, full disclosure and keeping promises to those who trust you with their money.

PREREQUISITES

- Has start-up costs, projections and a cash forecast from Unit 4
- Knows the legal forms of business (Lesson 3.4)
- Can work with percents, exponents and simple formulas on a calculator

MASTERY CHECKLIST

- ☐ I can explain bootstrapping and estimate how growth can be paid for from profits.
- ☐ I can calculate simple interest and a loan payment, and explain the five C's of credit.
- ☐ I can calculate ownership shares, dilution and pre- and post-money valuation.
- ☐ I can explain how venture capital works and why most small businesses should not seek it.
- ☐ I can distinguish donation, reward, pre-order and equity crowdfunding and write an honest family-investment agreement.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Federal Reserve History: "The Panic of 1907" and other essays on banking**: Free essays from the Federal Reserve on the history of American banks and credit. Good background for Lesson 5.2. Ages 14+.
- **Investor.gov (U.S. Securities and Exchange Commission)**: Free SEC site explaining stocks, crowdfunding and how to recognize investment fraud. Use with Lessons 5.3–5.5. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

5.1 Bootstrapping: J. L. Kraft's Horse and Wagon — 3 sessions of 50 minutes

5.2 Loans and Banks: A. P. Giannini and the Bank of Italy — 3 sessions of 50 minutes

5.3 Partners and Equity: The Medici Branches and the Dutch East India Company
3 sessions of 50 minutes

5.4 Venture Capital: Georges Doriot and Digital Equipment — 3 sessions of 50 minutes

5.5 Crowdfunding and Family Investors: The Statue of Liberty's Pedestal
3 sessions of 50 minutes

Unit 5 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Describe how J. L. Kraft started and grew his business without outside investors.

2. **6 pts**
   Net income $320 a month; owner's draw $120. How long to fund a $1,000 purchase from retained earnings?

3. **5 pts**

   Give two advantages and two disadvantages of bootstrapping.

4. **6 pts**

   Find the simple interest and total repaid on $2,500 at 7% for 2 years.

5. **7 pts**

   Find the monthly payment on a $6,000 loan at 6% annual interest over 4 years.

6. **5 pts**

   Name the five C’s of credit and explain one.

7. **5 pts**

   What did Giannini do after the 1906 earthquake, and what does it show about lending?

8. **6 pts**

   Pre-money $9,000; investment $3,000. Find post-money and the investor’s percentage.

9. **6 pts**

   Founders own 2,000 shares. An investor buys 500 new shares, then another buys 500. Find each owner’s final percentage.

10. **5 pts**

    How did the Medici Bank organize its branches, and why?

11. **5 pts**

    What was new about the VOC’s financing in 1602, and what moral failings must be weighed against its success?

12. **6 pts**

    A fund invests $1 million in each of 10 companies; returns are $0 (6 companies), $1M (2), $3M (1) and $20M (1). Find the portfolio multiple.

13. **5 pts**

    Explain why most small businesses are not suited to venture capital.

14. **6 pts**

    A pre-order campaign sells 80 items at $20; fees are 4%; materials $7 each. Find the profit.

15. **6 pts**

    Describe the 1885 pedestal campaign and one lesson for honest crowdfunding today.

16. **16 pts**

    Essay: Compare bootstrapping, a loan and an equity investment for a venture you might start. Using at least two stories from this unit and one Scripture passage, explain which you would choose and what you would owe to those who funded you.

ANSWER KEY

1. He began in 1903 with $65 and a rented horse and wagon, buying cheese wholesale and selling to grocers; he reinvested earnings, added products customers wanted and later patented a long-keeping process cheese (1916).
2. $1000/200 = 5$ months.
3. Advantages: full control, no debt, discipline. Disadvantages: slower growth, cash strain, owner bears all risk.
4. $2500 \times 0.07 \times 2 = \$350$; $2,850.
5. $r = 0.005$, $n = 48$; $M = 6000 \times 0.005/(1 - 1.005^{-48}) \approx \$140.91$.
6. Character, capacity, capital, collateral, conditions. Example: capacity is the borrower's ability to make payments from expected income.
7. He saved the bank's gold, reopened on a waterfront plank desk and lent to people rebuilding, judging them by character; it shows lending rests on trust and that credit can help a community recover.
8. $12,000; 25%.
9. Total 3,000: founders 66.7%, each investor 16.7%.
10. Each branch was a separate partnership in which the local manager invested and shared profits, giving managers incentive and limiting the damage one branch's losses could do to the rest.
11. Public sale of shares with permanent capital and trading on an exchange. It used violence (the conquest of the Banda Islands) and bought and sold human beings as forced laborers.
12. $25/10 = 2.5\times$
13. Venture funds need a chance of very large, fast growth and an exit to earn big multiples; most good small businesses grow modestly and would lose control and freedom by taking such money.
14. $1600 - 64 - 560 = \$976$
15. Pulitzer's *World* raised over $100,000 from more than 120,000 donors, mostly under $1 each, by printing every donor's name. Lesson: transparency and gratitude to small backers build trust; promises must be kept.
16. Graded on accurate comparison (ownership, repayment, risk, control), correct use of two stories (Kraft, Giannini, the Medici, the VOC, Doriot, the pedestal),

thoughtful use of Scripture (Proverbs 22:7, Psalm 37:21, Ecclesiastes 5:5), and a clear, reasoned choice with specific duties of honesty.

PORTFOLIO PIECE: THE FINANCING PLAN

Assemble your bootstrap schedule, your practice loan request with calculations, your cap table and term sheet, your venture-capital analysis and your campaign plan. Add a one-page financing recommendation for your own venture: how much money it needs, where the money will come from, what each funder is promised in writing, and what you will do if the venture fails.

LOOK FOR	WHAT IT MEANS
Accuracy	Interest, payments, valuations and dilution are calculated correctly.
Fit	The recommended financing fits the size and nature of the venture.
Honesty	Agreements are written, risks are disclosed and promises are realistic.
Clarity	The recommendation is clear enough for a parent or banker to act on.

UNIT 6

Marketing

Marketing is everything a business does to bring the right product to the right customers at a fair price and to tell them about it truthfully. It is not trickery; at its best it is service, helping people find what they need. This unit begins with the **four P's** (product, price, place and promotion), using Procter & Gamble's Ivory soap, which a young Harley Procter named from a Bible verse in 1879. Then it studies **brands and trust** through Josiah Wedgwood's royal "Queen's Ware" and the 1915 Coca-Cola bottle, designed so it could be recognized in the dark.

You will follow the long line from the mail-order **catalog** of Montgomery Ward and Sears, Roebuck to today's websites, learn the history and rules of **truthful advertising** from the 1911 Printers' Ink model statute to the Federal Trade Commission, and finish with **online marketing** done safely, honestly and with respect for customers' privacy. Your venture will end the unit with a one-page marketing plan, an honest ad and a tested message.

PREREQUISITES

- Has a value proposition and business model (Unit 3)
- Has a price and cost model (Unit 4)
- Can compute percents and ratios

MASTERY CHECKLIST

- ☐ I can apply the four P's to a product and explain how they fit together.
- ☐ I can explain what a brand is, why trust makes it valuable, and how trademarks protect it.
- ☐ I can calculate customer acquisition cost, conversion rate, average order and lifetime value for a sales channel.
- ☐ I can tell honest persuasion from deceptive advertising and name the laws and principles behind truth in advertising.
- ☐ I can plan online marketing that is honest, legal, respectful of privacy and safe for a student.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Federal Trade Commission, "Advertising and Marketing Basics"**: Free official guidance on truthful advertising, endorsements, online disclosures and email rules. Use with Lessons 6.4 and 6.5. Ages 14+.
- **Claude C. Hopkins, *Scientific Advertising* (1923)**: A short classic on measuring advertising with coupons and tests, often reprinted. Search Project Gutenberg or your library. Read the chapters on testing with Lesson 6.4. Ages 15+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

6.1 **The Four P's: Harley Procter and Ivory Soap** 3 sessions of 50 minutes

6.2 **Brands and Trust: Wedgwood's Queen's Ware and the Coca-Cola Bottle** 3 sessions of 50 minutes

6.3 **From the Catalog to the Website: Montgomery Ward and Sears, Roebuck** 3 sessions of 50 minutes

6.4 **Advertising Truthfully: The Printers' Ink Statute and the FTC** 3 sessions of 50 minutes

6.5 **Online Marketing with Safety and Privacy** 3 sessions of 50 minutes

Unit 6 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Name the four P's and describe each for Ivory soap in the 1880s.

2. **6 pts**
   A $60 booth must be paid for by sales with a contribution of $2.50 each. How many sales are needed? What is the profit from 50 sales?

3. **5 pts**

   Define brand equity and price premium, with an example.

4. **6 pts**

   How did Wedgwood build trust in his name? Give three methods.

5. **5 pts**

   Why was the 1915 Coca-Cola bottle designed to be recognized in the dark?

6. **6 pts**

   A regular buys $20 a week with a 40% margin for 3 years (50 weeks a year). Find the lifetime value.

7. **6 pts**

   A mailing costs $500 and brings 20 new customers. Each orders $30 with a 35% margin, 4 times a year for 2 years. Find CAC and LTV and their ratio.

8. **6 pts**

   How did Rural Free Delivery and Parcel Post change mail-order business?

9. **5 pts**

   What did the 1911 Printers' Ink model statute propose, and why did advertisers support it?

10. **6 pts**

    Classify: (a) "The friendliest shop in town." (b) "Removes 99% of stains." (c) "Half price!" when the item never sold at full price.

11. **6 pts**

    An $80 ad brings 30 sales at $10 with a variable cost of $4. Find ROAS and ad profit.

12. **5 pts**

    Name four requirements of the CAN-SPAM Act.

13. **6 pts**

    Funnel: 1,500 reached, 6% interested, 40% decide, 50% buy. How many buy? How many if the interest rate rises to 8%?

14. **6 pts**

    State three safety rules and two privacy rules for a student venture's online marketing.

15. **5 pts**

    Why is honest advertising usually more profitable over time than exaggerated advertising?

16. **16 pts**

    Essay: Using Ivory, Wedgwood or Sears, explain how marketing can serve customers rather than manipulate them. Include at least one principle of truthful advertising and one Scripture passage.

ANSWER KEY

1. Product: pure white floating soap; price: modest; place: grocers nationwide; promotion: national magazine ads with “99 44/100% pure” and “It floats.”
2. $60/2.50 = 24$; $50 \times 2.50 - 60 = \$65$.
3. Brand equity: extra value from customers’ trust and preference; price premium: the extra price they will pay. Example: a trusted local honey at $9 vs unbranded at $7.
4. Royal patronage (“Queen’s Ware,” “Potter to Her Majesty”); showrooms and catalogues; free delivery and a satisfaction or refund promise; consistent quality.
5. To distinguish the real product from imitators in similar bottles, protecting customers and the brand.
6. $20 \times 0.40 \times 50 \times 3 = \$1{,}200$
7. CAC $25; LTV $30 \times 0.35 \times 4 \times 2 = \$84$; ratio 3.36.
8. RFD (1896) delivered catalogs and mail to farm homes; Parcel Post (1913) let the post office carry packages cheaply, making mail-order delivery affordable.
9. Making untrue, deceptive or misleading advertising a crime; deception destroyed readers’ trust in all ads, hurting honest advertisers.
10. (a) puffery; (b) factual claim needing substantiation; (c) deceptive.
11. ROAS $300/80 = 3.75$; profit $30 \times 6 - 80 = \$100$.
12. Honest headers and subjects; identify as an ad; include a postal address; honor unsubscribes promptly.
13. $1500 \times 0.06 \times 0.40 \times 0.50 = 18$; at 8%: 24.
14. Safety: no public accounts or posts without a parent; never share address, school or schedule; never meet online contacts. Privacy: collect only what you need; never sell or share customer data; protect and delete it when no longer needed.
15. It builds trust and repeat customers, avoids refunds, complaints and legal trouble, and makes future ads believable.
16. Graded on a clear thesis, accurate history (Ivory’s checkable claims, Wedgwood’s guarantees, Sears’s money-back promise), correct principles (substantiation, disclosure, permission), and fitting use of Scripture (Exodus 20:16, Matthew 5:37, Proverbs 22:1).

PORTFOLIO PIECE: THE MARKETING PLAN

Assemble a marketing plan for your venture: target market and positioning, the four P's, your brand (name, mark, promise and standards), your channel comparison with CAC and LTV, your product page, your two tested ads with their results, and your online plan with its privacy promise and safety rules. Add a one-page summary of what you will do in the next three months and what you will measure.

LOOK FOR	WHAT IT MEANS
Fit	Target market, positioning, four P's and brand tell one consistent story.
Measurement	Channels and ads are measured with real numbers and compared.
Honesty	Every claim is true and supported; conditions and endorsements are disclosed.
Safety and privacy	Online plans protect the student and customers and have a parent's approval.

6.1 The Four P's: Harley Procter and Ivory Soap

OBJECTIVES

- Tell how Procter & Gamble created, named and advertised Ivory soap beginning in 1879.
- Define the four P's of the marketing mix and show how they must fit together.
- Write a four-P marketing mix for your own venture and compute the effect of a change in one P.

> **Warm-up.** Pick a product you love. In one line each, write: what it is, what it costs, where you buy it, and how you first heard of it. You have just described its four P's.

WATCH

The 4 Ps of The Marketing Mix Simplified

College & Career Ready Labs | Paxton Patterson · 2:47

https://www.youtube.com/watch?v=Mco8vBAwOmA

> **WHEN TO WATCH**
> After the story of Ivory, before you write your own marketing mix.

BACKUP VIDEO

The Truth About Floating Soap

Today I Found Out · 5:34

https://www.youtube.com/watch?v=3_n0vHvmFII

Optional, on the history and science of floating soap.

KEY TERMS

marketing
The work of bringing the right product to the right customers at a fair price, and telling them about it truthfully.

marketing mix (four P's)
Product, price, place (distribution) and promotion: the four sets of decisions a marketer makes, named by E. Jerome McCarthy in 1960.

target market

The specific group of customers a product is designed and promoted for.

positioning

The place a product holds in customers' minds compared with competitors (for example, "the pure soap").

promotion

Communication that informs and persuades: advertising, personal selling, demonstrations, publicity and word of mouth.

CORE IDEAS

The story. By 1879 Procter & Gamble made many kinds of candles and soaps, but most soap was yellow or brown and of uneven quality. The company developed a fine white soap meant to compete with costly imported castile soaps. Harley Procter, son of the founder, wanted a better name than "White Soap." According to the company's history, he heard Psalm 45:8 read in church, "out of the ivory palaces," and chose the name Ivory. Customers soon noticed that the soap floated, which made it easy to find in a washtub or a river; company tradition says this came from a batch accidentally mixed too long, so that air was whipped in.

How they figured it out. Harley Procter had the soap tested by chemists and turned the results into a slogan: "99 44/100% pure." In 1882 he persuaded the partners to spend $11,000 on national advertising in magazines, a large sum for a soap maker then. The product (a pure, white, floating soap at a modest price) was sold everywhere groceries were sold (place) and advertised with simple claims customers could see for themselves ("It floats"). Ivory became one of the best-known products in America and was still sold more than a century later.

The big idea. The **four P's** are the main decisions of marketing. **Product**: what you offer, its quality, features, packaging and name. **Price**: what customers pay, including discounts and terms (Unit 4). **Place**: how the product reaches customers: stores, delivery, a booth, a website. **Promotion**: how customers learn about it: advertising, demonstrations, word of mouth. The four must fit a clear **target market** and a clear **positioning**; a premium product at a bargain price in the wrong place with a confusing message will fail even if each piece is good.

Honest marketing. Ivory's claims were concrete and checkable: a customer could see that it floated. The best marketing tells the truth vividly. Marketing goes wrong when it invents needs that do not exist, exaggerates, or hides important facts. Ask of every piece of marketing: would I be comfortable if my customer knew everything I know about this product?

In business today. Some marketers add more P's (people, process, physical evidence), especially for services, but the four remain the core. For a small venture, the four P's fit on one page and should be decided together: who is the customer, what exactly will they get, at what price, where, and how will they hear of it?

PICTURE STUDY



"You Need Only One Soap: Ivory Soap", Strobridge & Co. Lithographers, for Procter & Gamble, 1898 · Color lithograph poster · Library of Congress (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This 1898 poster, printed in bright colors by Strobridge & Co., packs the whole marketing mix into one picture: the product (pure, floating soap), a hint at price ("not expensive"), and promotion through simple claims anyone could check at the nearest stream.

Look closely

- Read every claim on the poster. Which could a customer check for himself?
- Find the bar of soap. Where is it, and why?
- Look at the setting. Whom is the poster speaking to?
- Find the words about price. How is price described?

Talk about it

1. Which of the four P's can you find in this poster?
2. Is any claim exaggerated? How would you test "will wash anything"?
3. How would you show your own product's main benefit in one picture?

PROJECT

The One-Page Marketing Mix

You will write the four P's for your venture, check that they fit one target market and one positioning, and test one change.

You will need

- Ledger notebook or a word processor
- Your Unit 3 and Unit 4 work

Steps

1. Describe your target market in two sentences (who, where, what they need).
2. Write your positioning in one sentence: "For [target], [product] is the [category] that [key difference]."
3. Write the four P's, each in three or four lines.
4. Check fit: for each P, ask whether it supports the positioning. Fix any that conflict.
5. Pick one P to change (for example, a new place such as a church craft fair) and calculate the extra sales needed to pay for it.
6. Show the plan to two people in your target market and ask what is missing or confusing.
7. Revise and file the final one-page mix.

Tips

- Write positioning in customers' words, not yours.
- Small ventures win on fit and focus, not big budgets.

Check your work

- ☐ I can define and apply the four P's.
- ☐ My mix fits one target market and one positioning.
- ☐ I calculated the cost and payoff of a change in one P.

LEDGER NOTEBOOK

1. Draw a four-box chart of your marketing mix with your positioning in the center.

2. Copy Ivory's four P's for comparison.
3. Write the Ivory timeline: 1879 name; 1882 national advertising and "99 44/100% pure"; "It floats."

KEY FORMULAS

$$\text{Profit} = Q \times (P - V) - F$$

$$\text{Extra sales needed to pay for promotion} = \frac{\text{promotion cost}}{P - V}$$

From history. Procter & Gamble later sponsored daytime radio dramas to advertise its soaps, which is why such programs came to be called "soap operas." Harley Procter retired early and spent much of his life in philanthropy.

WORKED EXAMPLES

Example 1. Write the four P's for Ivory soap in the 1880s.

Show solution

1. Product: a pure white soap that floats, in a simple wrapper, named Ivory.
2. Price: modest, within reach of ordinary families, below imported castile soap.
3. Place: sold through grocers and general stores across the country.
4. Promotion: national magazine advertising from 1882 with the slogans "99 44/100% pure" and "It floats."

Answer: Each P supports the same positioning: a pure, dependable soap for every household.

Example 2. A student sells hand-tied fishing flies at $3 each; each costs $0.80 to make. A booth at a fishing-club fair costs $40. How many extra flies must she sell to pay for the booth? If the booth brings 60 sales she would not otherwise make, what is the profit from the fair?

Show solution

1. Contribution per fly: $3.00 - 0.80 = \$2.20$.
2. Extra sales to pay for booth: $40 / 2.20 \approx 18.2$, so 19 flies.
3. Profit from 60 sales: $60 \times 2.20 - 40 = \$92$.

Answer: 19 flies to break even on the booth; $92 profit if it brings 60 sales.

PRACTICE

1. Easy Where did Harley Procter find the name Ivory?

   Show answer

   In Psalm 45:8, “out of the ivory palaces,” according to company history.

2. Easy Name the four P’s.

   Show answer

   Product, price, place, promotion.

3. Easy What did “99 44/100% pure” come from?

   Show answer

   A chemist’s analysis of the soap, which Harley Procter turned into a slogan.

4. Medium Define positioning and give Ivory’s.

   Show answer

   The place a product holds in customers’ minds compared with rivals; Ivory: the pure, dependable, floating soap for every household.

5. Medium A $25 ad brings in sales with a contribution of $1.50 each. How many sales must it bring to pay for itself?

   Show answer

   $25 / 1.50 \approx 16.7$, so 17 sales.

6. Medium Give an example of the four P's not fitting together.

Show answer

Sample: a luxury hand-made candle (product) priced at $3 (price) sold at a gas station (place) with ads about being cheapest (promotion). The pieces send conflicting messages.

7. Medium Why was "It floats" an effective claim?

Show answer

It was simple, memorable, useful (easy to find the soap in water) and customers could check it themselves.

8. Hard A product sells 100 units a month at $10 with V = $6. A price cut to $9 is expected to raise sales to 130. Does it raise contribution?

Show answer

Before: $100 \times 4 = \$400$; after: $130 \times 3 = \$390$. No, slightly lower.

9. Hard Is it honest to promote a product with a slogan like "the best in the world"? Explain the difference between puffery and a factual claim.

Show answer

Vague praise that no one takes literally (puffery) is generally not considered deceptive, but specific factual claims ("lasts twice as long," "99% pure") must be true and supportable. An honest marketer prefers checkable facts.

10. Hard For a lawn-care venture, which P would you change first if no one signs up, and why?

Show answer

Answers vary; strong answers use evidence: if people do not know about it, promotion; if they know but say it costs too much, price; if they want different services, product; if timing or access is the issue, place.

11. Challenge Ivory's partners spent $11,000 on advertising in 1882. If each bar earned 2 cents of contribution, how many extra bars had to be sold to pay for the campaign?

Show answer

$11{,}000 / 0.02 = 550{,}000$ bars.

COMMON MISTAKES

- Thinking marketing means only advertising. Promotion is one P of four.
- Choosing each P separately so they contradict one another.
- Targeting “everyone.”

Make it a game · Ivory in Four Acts. Act out a thirty-second advertisement for an ordinary household item, covering all four P's: product, price, place and promotion. Your parent must name each P they heard and decide whether the four fit together, or whether the message contradicts the price. Then switch. Finish by telling how Procter and Gamble named and advertised Ivory soap.

Scripture. “All thy garments smell of myrrh, and aloes, and cassia, out of the ivory palaces, whereby they have made thee glad.” (Psalm 45:8, KJV)

The verse that named Ivory soap describes the fragrance and splendor of a royal wedding. A good name for a product, like a good name for a person, should promise something true.

6.2 Brands and Trust: Wedgwood's Queen's Ware and the Coca-Cola Bottle

OBJECTIVES

- Tell how Josiah Wedgwood built a trusted brand in the 1760s and 1770s and how Coca-Cola protected its brand with a distinctive bottle in 1915.
- Explain what a brand is, why consistency and trust give it value, and how trademarks protect it.
- Estimate the value of brand loyalty using repeat purchases and price premiums.

> **Warm-up.** Name three brands you would choose even if a cheaper unknown product sat beside them. For each, write why. How many of your reasons are about trust?

WATCH

Birth of the Coca-Cola Contour Bottle - Earl R. Dean Tells His Story

ContourBottle · 12:04

https://www.youtube.com/watch?v=hejoGPRq8EU

> **WHEN TO WATCH**
> After the stories of Wedgwood and Coca-Cola, before the big idea.

Note: Archival interview with Earl R. Dean, who designed the 1915 bottle.

BACKUP VIDEO

How Coca-Cola Got Its Clever Design

Bloomberg Originals · 1:31

https://www.youtube.com/watch?v=VIyK6-DnUrg

Optional, a short summary of the bottle's design.

KEY TERMS

brand

The name, marks and reputation that tell customers who stands behind a product and what to expect from it.

trademark

A word, symbol or design legally registered or used to identify the source of goods; it protects customers and owners from imitators.

brand equity

The extra value a brand adds: customers' willingness to choose it and to pay more for it.

price premium

The extra price customers will pay for a trusted brand over an unknown product.

consistency

Delivering the same quality every time, which is what makes a brand's promise believable.

CORE IDEAS

The story. In 1765 Josiah Wedgwood received an order for a tea service from Queen Charlotte, wife of King George III. He asked permission to call his cream-colored earthenware "Queen's Ware," and he advertised himself as "Potter to Her Majesty." In 1774 he completed a famous service of more than 900 pieces for Catherine the Great of Russia and displayed it in his London showroom, where fashionable crowds came to see it. He printed illustrated catalogues, opened showrooms, offered free delivery in England and promised to replace goods damaged in transit or refund customers who were not satisfied. He made royal orders do his advertising, but he backed the name with quality.

How they figured it out. Coca-Cola was first sold in Atlanta in 1886 and grew under Asa Candler into a national drink, bottled by independent companies under contract. By 1915 dozens of imitators sold drinks with similar names in similar straight-sided bottles, and customers were confused. The company's bottlers held a contest for a bottle so distinctive that a person could recognize it by touch in the dark, or even broken on the ground. Earl R. Dean of the Root Glass Company in Terre Haute, Indiana, designed a bottle with ribs and a bulging middle, inspired by a picture of a cocoa pod he found in an encyclopedia. It was patented in November 1915 and became one of the most recognized shapes in the world.

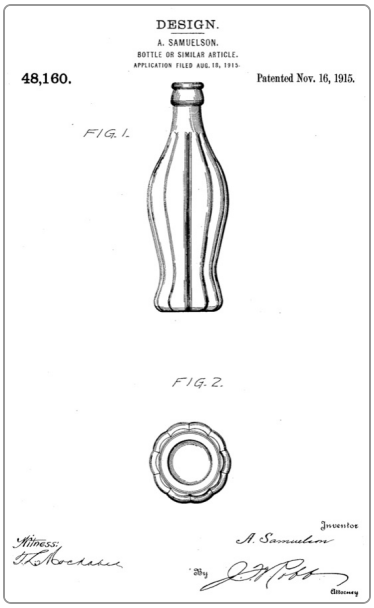
The big idea. A **brand** is a promise: buy this, and you will get what you got last time. That promise is worth money, called **brand equity**, because trust saves customers the trouble and risk of trying unknown products, so they choose the brand again and often pay a **price premium**. A brand is built by **consistency** (the same quality every time), by distinctive marks and by honest dealing; it is protected by **trademarks**,

which stop others from passing off their goods as yours. It is destroyed quickly by one scandal or by quality that slips.

Brands and honesty. Trademarks protect customers as well as owners: they prevent imitators from deceiving buyers. A brand should never promise more than the product delivers, and a business should never use a famous name or look-alike packaging to borrow trust it has not earned. Your own name is your first brand: “A good name is rather to be chosen than great riches” (Proverbs 22:1).

In business today. Small ventures build brands too: a consistent name, a simple mark, a recognizable package and, above all, dependable quality and service. Customers recommend brands they trust to friends, which is the cheapest and most powerful marketing there is.

PICTURE STUDY



Design Patent for the Coca-Cola Bottle, Alexander Samuelson (patentee), Root Glass Company, 1915 · Patent drawing, U.S. Design Patent D48,160 · U.S. Patent and Trademark Office (Wikimedia Commons)
Image: Wikimedia Commons, public domain

This is the drawing from the 1915 design patent for the bottle Earl Dean designed at the Root Glass Company (the patent was filed in the name of the plant's superintendent, Alexander Samuelson). The first design was later slimmed down so it would stand steadily on bottling lines.

Look closely

- Find the ribs. What do they do for a hand holding the bottle?
- Look at the bulge in the middle. Why would it make the bottle easy to recognize?
- Notice there is no name on the drawing. How can a shape alone be a brand?

Talk about it

1. How does this bottle protect customers from imitators?
2. What other products can you recognize by shape alone?
3. What feature could make your own product recognizable without a label?

PROJECT

A Brand Audit and a Simple Brand

You will audit two local brands for consistency and trust, then design a simple brand for your venture with a written promise and quality standards.

You will need

- Ledger notebook
- Products or packaging from two local businesses
- Paper and markers or a simple drawing program

Steps

1. Choose two local businesses your family uses. List their name, mark, colors, packaging and the promise they seem to make.
2. Ask three people you know what they expect from each and whether they have ever been disappointed.
3. Rate each brand on consistency and trust (1–5) with evidence.
4. Design your venture's brand: name, simple mark, colors, one-sentence promise.
5. Write three quality standards that make the promise true every time.
6. Check that your name and mark do not copy an existing business (search with a parent).
7. Calculate what a $1 price premium would be worth to your venture in a year at your projected sales.

Tips

- Simple marks are easier to remember and cheaper to print.
- Your standards matter more than your logo.

Check your work

- ☐ I can explain brand, trademark, brand equity and consistency.
- ☐ My brand has a promise and quality standards that make it true.
- ☐ I checked that my name does not copy another business.

LEDGER NOTEBOOK

1. Sketch your mark in three versions and circle the best.
2. Copy your brand promise and quality standards.
3. Write a timeline: 1765 Queen's Ware; 1774 Russian service; 1886 Coca-Cola; 1915 contour bottle patent.

KEY FORMULAS

$$\text{Yearly value of a premium} = \text{units} \times \text{price premium}$$

From history. Wedgwood's partner Thomas Bentley ran the London showroom and handled much of the marketing while Wedgwood ran the works in Staffordshire. Their letters, thousands of which survive, are one of the best records of eighteenth-century business.

WORKED EXAMPLES

Example 1. A trusted local honey brand sells for $9 a jar while unbranded honey sells for $7. It sells 400 jars a year. What is the yearly value of its price premium?

Show solution

1. Premium per jar: $9 - 7 = \$2$.
2. Yearly: $400 \times 2 = \$800$.

Answer: $800 a year of extra revenue comes from trust in the brand.

Example 2. A bakery has 150 regular customers who each buy $10 a week. One bad batch, sold anyway, drives away 20% of them. What is the yearly revenue lost (50 weeks)?

Show solution

1. Customers lost: $0.20 \times 150 = 30$.
2. Revenue lost: $30 \times 10 \times 50 = \$15{,}000$.

Answer: $15,000 a year. Throwing away the bad batch would have cost far less.

PRACTICE

1. Easy What was Queen's Ware, and how did it get its name?

Show answer

Wedgwood's cream-colored earthenware, named after Queen Charlotte ordered a tea service in 1765.

2. Easy Why did Coca-Cola want a new bottle in 1915?

Show answer

Imitators in similar bottles were confusing customers; a distinctive shape would identify the real product, even by touch.

3. Easy Define trademark.

Show answer

A word, symbol or design that identifies the source of goods and is legally protected from imitation.

4. Medium Name three things Wedgwood did besides making good pottery to build trust in his name.

Show answer

Used royal patronage ("Potter to Her Majesty"); showrooms and catalogues; free delivery and a satisfaction or money-back promise; displays such as the Russian service.

5. Medium A branded product sells 1,200 units a year at a $1.50 premium. Find the yearly value.

Show answer

$1200 \times 1.50 = \$1{,}800$

6. Medium How does a trademark protect customers as well as owners?

Show answer

It lets customers know who made a product and keeps imitators from passing off different goods under the same name or look.

7. Medium Why is consistency the heart of a brand?

Show answer

A brand is a promise of what you will get; only consistent quality makes the promise believable and earns repeat purchases.

8. Hard A company could cut costs by $0.30 a unit with a cheaper ingredient customers will notice. It sells 10,000 units a year to 2,000 regular customers and expects to lose 8% of them, each worth $25 a year in contribution. Is the change worth it for one year?

Show answer

Savings $10{,}000 \times 0.30 = \$3{,}000$; lost contribution $0.08 \times 2{,}000 \times 25 = \$4{,}000$. No: it loses about $1,000 a year (more, since lost customers also buy fewer of the 10,000 units), and it damages the brand's promise.

9. Hard Is it honest for a new soda to use a bottle shaped almost like Coca-Cola's? Explain.

Show answer

No; it borrows trust it has not earned and may deceive customers about who made it. That is the harm trademark and trade-dress law exist to prevent.

10. Hard Explain how royal orders served as Wedgwood's "advertising."

Show answer

They signaled quality and fashion to buyers who admired the court; Wedgwood publicized them and displayed the pieces, so others wanted the same ware.

11. Challenge Design a simple brand for your venture: name, mark, one-sentence promise and two habits of consistency. Explain how each element builds trust.

Show answer

Answers vary; credit for a clear, honest promise backed by specific habits (for example, "every loaf weighed and baked the same day; every order delivered by 10 a.m.").

COMMON MISTAKES

- Thinking a brand is just a logo.
- Letting quality slip once a brand is known.

- Choosing a name that imitates a famous brand.

Make it a game · Trust by Touch. Your parent hides a familiar branded bottle or box in a bag. Identify it by touch alone and explain how its shape works like a trademark, as the Coca-Cola bottle of 1915 did. Then sketch a simple logo for a pretend business, naming three ways you will stay consistent. Finish by telling how Wedgwood's Queen's Ware earned trust.

Scripture. “A good name is rather to be chosen than great riches, and loving favour rather than silver and gold.” (Proverbs 22:1, KJV)

A brand is a business’s name. Like a person’s good name, it is earned slowly through faithful dealing and can be lost quickly.

6.3 From the Catalog to the Website: Montgomery Ward and Sears, Roebuck

OBJECTIVES

- Tell how Montgomery Ward and Sears, Roebuck built mail-order businesses that reached rural America, helped by Rural Free Delivery (1896) and Parcel Post (1913).
- Explain sales channels and how they changed from the catalog to the website.
- Calculate customer acquisition cost, conversion rate, average order value and lifetime value for a channel.

> **Warm-up.** List every way your family bought something this month: in a store, by phone, online, at a market, from a neighbor. Which channel did you use most? Why?

WATCH

The Sears Catalog: A Retail Revolution

Meghan Carter · 6:10

https://www.youtube.com/watch?v=6bUbc32xxIU

> **WHEN TO WATCH**
> After the story of the catalogs, before the channel arithmetic.

KEY TERMS

sales channel

The route by which a product reaches a customer: a store, a catalog, a website, a sales representative, a market stall.

direct-to-customer

Selling straight to the end customer, without wholesalers or retailers in between.

customer acquisition cost (CAC)

Marketing and sales spending divided by the number of new customers gained.

average order value

Total revenue divided by the number of orders.

lifetime value (LTV)

The contribution a customer brings over the whole relationship.

CORE IDEAS

The story. In the 1870s most American families lived on farms and bought from a nearby general store, often at high prices and with little choice. In 1872 Aaron Montgomery Ward, a traveling salesman who had seen farmers' frustration, mailed a single-page price list from Chicago offering goods by mail at low prices. His catalog grew into a thick book. Richard Sears, whose watch business you met in Lesson 2.4, built Sears, Roebuck and Co. on the same idea in the 1890s, with lively descriptions and a promise of satisfaction or money back. By the early 1900s the Sears catalog ran to hundreds of pages and offered almost everything a family might need, even, from 1908, kits for entire houses.

How they figured it out. Mail order needed trust and delivery. Both companies offered money-back guarantees so customers would risk ordering from a stranger far away. The government's Rural Free Delivery, made nationwide from 1896, brought mail to farm families' own mailboxes, and Parcel Post, begun in 1913, let the post office carry packages cheaply. Sears built a huge Chicago plant where orders were filled on a precise schedule. When cars let farmers drive to town, both companies opened retail stores in the 1920s. Sears ended its big general catalog in 1993, just as the web began to make catalog selling cheap again.

The big idea. A **sales channel** is how a product reaches customers. Each channel has different costs and strengths: stores let customers see and touch; catalogs and websites reach far and keep fixed costs low but must earn trust at a distance; markets and personal selling build relationships. To judge a channel, measure **customer acquisition cost** (what it costs to win a new customer), the conversion rate, the **average order value** and the **lifetime value** of a customer. A channel is worth using if lifetime value comfortably exceeds acquisition cost.

Trust at a distance. The catalog's secret was not the paper but the promise: clear descriptions, honest pictures, fair prices and a guarantee. Websites face the same test. Customers who cannot hold the product depend entirely on the seller's truthfulness. Mail-order companies that cheated customers did not last; those that kept their promises built loyalty for generations.

In business today. Most businesses now use several channels at once. A small venture might sell at a church fair, take orders by phone from people it knows, and

later, with a parent, list products on a website. Start with the channel where your customers already are and where you can deliver well.

PICTURE STUDY


SEARS, ROEBUCK & CO., Cheapest Supply House on Earth, Chicago. CATALOGUE No. III. 181

OUR ACME QUEEN PARLOR ORGAN, $27.45.

No. 12R22 ORDER BY NUMBER

WE CHALLENGE any and all competition to produce the equal of this ELEGANT HIGH CLASS ORGAN at anything like our DIRECT FROM FACTORY PRICE.

DESCRIPTION OF OUR ACME QUEEN ORGAN.

DIMENSIONS—The height is 78 inches, the length is 48 inches, the depth is 24 inches. Any one familiar with these dimensions will know it is large, full size and in its proper equal to anything your retail dealer ordinarily charges you $60.00 for.

SHIPPING WEIGHT—The net, not this organ, boxed for shipment, is about 350 pounds. We box and pack the organ with the greatest care, and we have had a test made, so that the instrument may reach you in perfect condition. It cannot in any way, shape or manner, get out of order in transit to you. Little remains to be given in front of book. In most instances, the dealer in your town will charge you from $75.00 to $100.00 for an organ of the same grade as this $27.45.100 organ, $2.00, and so on, and when you compare the $60.00 to $100.00 asked by the retail dealer in your town for his organ with our price, $27.45, the comparison is startling to you.

COMPLETE IN EVERY RESPECT.

ACTION—The action of this high grade Acme Queen Organ consists of three grade instruments. This organ is fitted with Hammond's Octaves and Vox Humana, also the Grand Organ Swell.

NAMES OF THE ELEVEN STOPS—Diapason, Dulciana, Dulcet, Flute, Clarionet, Diapason, Forte, Principal Forte and Vox Humana.

THE CASE—The case is made of the finest quarter sawed oak, and is finished in the highest possible manner. It is especially adapted to the climate of the Southern States, and will not crack, warp or shrink. Special attention has been given to the construction of the case, and we guarantee it to be in every respect perfect. The top is of the piano box style, and has a full length music roll. The lamp stands are of the latest French design, and are very handsome. The case is trimmed with the finest quality of silk plush, and every organ is fitted with a handsome stool to match.

THE BELLOWS—The bellows used in this organ are of the best make, and are of ample capacity to furnish the wind necessary for the proper use of the instrument.

THE TONE—The tone is one of the most pure and sweet ever produced in a reed organ, and is especially adapted to the production of church music. The tone is full and rich, and is not harsh or shrill in any part of the scale. We are willing to stake the reputation of our house that there is no organ made that will excel this organ in tone, and we are willing to allow you to be the judge.

$27.45 BUYS THE ORGAN

ALL YOUR MONEY RETURNED.

25 YEARS' GUARANTEE.

FREE...

Sears, Roebuck & Co. Organ Instructor

A Page from the Sears, Roebuck Catalog, Sears, Roebuck and Co., about 1902 · Printed catalog page · Musical Instrument Museum, Phoenix (Wikimedia Commons)

Image: Wikimedia Commons, public domain

A farm family could order a parlor organ from this catalog page, have it shipped by rail to the nearest station, and send it back if not satisfied. Every detail of the description had to do the work of a salesman in a showroom.

Look closely

- Find the price. How is it displayed?
- Read the description. What facts does it give a buyer who cannot see the organ?
- Look for any guarantee or promise.

Talk about it

1. Why would a farm family trust this page enough to send money?
2. How is a catalog page like a web page selling a product today?
3. What would you include on a page selling your own product?

> **Safety first.** Use only channels a parent approves. Do not post product pages or open selling accounts online without a parent, and never include your address or phone number on public materials.

PROJECT

Channel Test and Product Page

You will compare two sales channels for your venture with real numbers, and write a catalog-style product page that is complete and honest.

You will need

- Spreadsheet
- Paper or a word processor for the product page
- A parent to approve each channel

Steps

1. Choose two channels you can use safely with a parent (for example, a booth at a church or homeschool fair, and order cards given to families you know).
2. Record the cost of each channel (booth fee, printing) and the number of new customers and orders each brings over two or three weeks.
3. Calculate CAC, conversion rate and average order for each.
4. Estimate lifetime value from repeat orders so far.
5. Write a catalog-style product page: a clear picture or drawing, an honest description, the price, delivery terms and a guarantee you will keep.
6. Have two people read the page and tell you what they still want to know; revise.
7. Write a paragraph recommending which channel to emphasize, with your numbers.

Tips

- A good product page answers questions before customers ask them.
- Do not promise a guarantee you cannot afford to honor.

Check your work

- ☐ I can compute CAC, average order, conversion and LTV.
- ☐ I compared two channels with real results.
- ☐ My product page is complete, honest and includes a guarantee I will keep.

LEDGER NOTEBOOK

1. Draw the path of a 1905 mail order: catalog → farm mailbox → order letter → Chicago plant → railroad → Parcel Post → farm.
2. Copy your channel comparison table.
3. Paste or copy your final product page.

KEY FORMULAS

$$\text{CAC} = \frac{\text{marketing spend}}{\text{new customers}}$$

$$\text{LTV} = \text{average order} \times \text{margin} \times \text{orders per year} \times \text{years}$$

From history. Between 1908 and 1940 Sears sold roughly 70,000 to 75,000 mail-order house kits, shipped by rail with numbered lumber and instructions. Many are still lived in today.

WORKED EXAMPLES

Example 1. A catalog mailing costs $0.80 per catalog to 5,000 households. 3% order, with an average order of $40 and a 30% margin. What is the CAC and the profit from the mailing?

Show solution

1. Cost: $5{,}000 \times 0.80 = \$4{,}000$. Orders: $0.03 \times 5{,}000 = 150$.
2. CAC: $4{,}000 / 150 \approx \$26.67$.
3. Contribution: $150 \times 40 \times 0.30 = \$1{,}800$; profit $1{,}800 - 4{,}000 = -\$2{,}200$.

Answer: CAC about $26.67; the first mailing loses $2,200. It pays only if customers keep ordering.

Example 2. In the last example, customers order 3 times a year for 4 years on average. Find the lifetime value and compare it with CAC.

Show solution

1. LTV: $40 \times 0.30 \times 3 \times 4 = \$144$.
2. Ratio: $144 / 26.67 \approx 5.4$.

Answer: LTV $144 against CAC $26.67, more than five times. The channel is very profitable over time, which is how mail-order companies justified expensive catalogs.

PRACTICE

1. Easy When and where did Montgomery Ward start his mail-order business?

Show answer

1872, Chicago.

2. Easy What did Rural Free Delivery (1896) and Parcel Post (1913) do for mail order?

Show answer

RFD delivered mail to farm families' homes; Parcel Post let the post office carry packages cheaply.

3. Easy Define customer acquisition cost.

Show answer

Marketing and sales spending divided by the number of new customers.

4. Medium Spend $300; 40 new customers. Find CAC.

Show answer

$300/40 = \$7.50$

5. Medium Average order $25; margin 40%; 4 orders a year for 2 years. Find LTV.

Show answer

$25 \times 0.40 \times 4 \times 2 = \$80$

6. Medium Why were money-back guarantees essential to mail order?

Show answer

Customers could not see or touch goods before buying from a distant seller; the guarantee removed the risk and built trust.

7. Medium Revenue $2,400 from 80 orders. Find average order value.

Show answer

$30.

8. Hard A booth costs $60 and brings 12 new customers with LTV $20 each. A flyer costs $15 and brings 2 new customers with LTV $20. Which channel is better?

Show answer

Booth: CAC $5, LTV/CAC = 4. Flyer: CAC $7.50, ratio 2.7. The booth is better (and brings more customers).

9. Hard Why did Sears and Ward open retail stores in the 1920s?

Show answer

Automobiles and better roads let farm families drive to town, and cities grew, so stores reached customers the catalog was losing.

10. Hard What does a website seller owe customers that a catalog seller also owed?

Show answer

Accurate descriptions and pictures, honest prices with no hidden fees, reliable delivery, a fair return policy, and protection of personal information.

11. Challenge A channel has CAC $40. Average order $50, margin 35%, 2 orders a year. How many years must a customer stay for LTV to be at least 3 times CAC?

Show answer

Contribution per year $50 \times 0.35 \times 2 = \$35$; need $120, so $120/35 \approx 3.4$, about 3.4 years.

COMMON MISTAKES

- Judging a channel by first sales alone, ignoring repeat customers.
- Writing product descriptions that leave out what customers need to know.
- Using every channel at once instead of doing one or two well.

> **Make it a game · Catalog Customer Math.** Your parent gives you three pretend numbers: what it cost to win a customer, the average order and how many orders a customer places in a lifetime. Calculate average order value, lifetime value and whether the business earns more than it spends. Beat the clock with three rounds. Then explain how Rural Free Delivery helped Ward and Sears reach farms.

> **Scripture.** “But let your communication be, Yea, yea; Nay, nay: for whatsoever is more than these cometh of evil.” (Matthew 5:37, KJV)
>
> A seller far away has only his words. A catalog or website that says exactly what is true, no more and no less, is practicing what Jesus taught about plain, honest speech.

6.4 Advertising Truthfully: The Printers' Ink Statute and the FTC

OBJECTIVES

- Tell how the truth-in-advertising movement, the 1911 Printers' Ink model statute and the Federal Trade Commission (1914) worked against deceptive advertising.
- Distinguish honest persuasion, puffery and deception, and explain substantiation and disclosure.
- Measure an ad's results with tracking and calculate its return.

> **Warm-up.** Find two ads in a flyer, magazine or mailer. For each, underline every claim that could be checked, and circle every claim that could not. Which ad has more of each?

WATCH

A Brief History of the Birth of the Federal Trade Commission

FTCvideos · 3:01

https://www.youtube.com/watch?v=NssfPApe5iQ

> **WHEN TO WATCH**
> After the story, before the rules of truthful advertising.

Note: From the Federal Trade Commission.

KEY TERMS

deceptive advertising

An ad that is likely to mislead a reasonable customer about something important, by a false statement or by leaving out a key fact.

puffery

Vague, exaggerated praise that no reasonable person takes as a factual claim ("the best coffee in town").

substantiation

Having reliable evidence for a factual claim before you make it.

disclosure

Stating clearly the facts customers need, such as fees, conditions or a paid endorsement.

return on ad spend

Revenue (or contribution) brought in by an ad divided by what the ad cost.

CORE IDEAS

The story. Around 1900 American newspapers and magazines were full of advertisements making wild claims, especially for patent medicines that promised to cure nearly anything. Honest advertisers were hurt too: when readers learned not to believe ads, every ad lost value. In 1911 the trade magazine *Printers' Ink* published a model law, drafted at its request by a New York lawyer, Harry Nims, making it a crime to publish advertising that was untrue, deceptive or misleading. Many states adopted versions of it. That same year advertising clubs began a "truth in advertising" movement and set up vigilance committees to investigate false ads; these grew into the Better Business Bureaus.

How they figured it out. In 1914 Congress created the Federal Trade Commission to stop unfair methods of competition, and in 1938 it gave the FTC clear power over deceptive advertising. Over time the rules settled into a few principles: ads must be truthful and not misleading; factual claims must be **substantiated** before they are made; important conditions must be **disclosed** clearly; and endorsements must reflect honest opinions and reveal any payment. Meanwhile, advertisers such as Claude Hopkins, in *Scientific Advertising* (1923), urged that every ad be tested and measured, with coupons and codes, so that money went only to ads that truly worked.

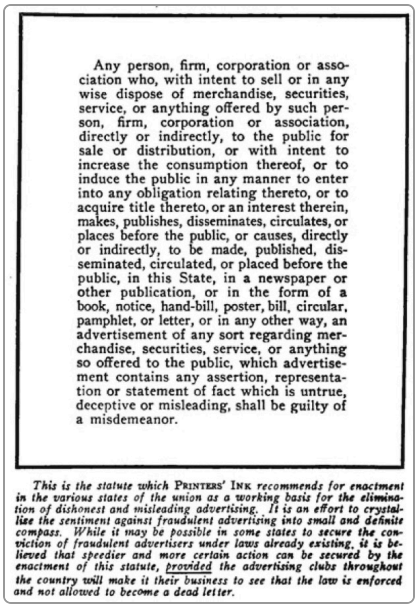
The big idea. Advertising may persuade, but it must not deceive. **Puffery** ("the friendliest store in town") is generally allowed because no one treats it as a fact. A specific factual claim ("lasts twice as long," "all natural," "sale price: 50% off") must be true and supported. **Deceptive advertising** includes false statements, half-truths, hidden fees, fake "sales" from inflated prices, and paid praise disguised as independent opinion. Honest advertising is not weaker; it is more believable, and believability is what makes an ad pay.

Measuring ads. Track every ad: a code on a flyer, a question ("How did you hear of us?"), a separate phone number or coupon. Then compute **return on ad spend** and ad profit. Many small businesses waste money on ads they never measure. An

honest ad that brings back three times its cost is better than a clever one no one can measure.

In business today. The same rules apply to every medium: print, radio, television, websites, email and social media. “Thou shalt not bear false witness against thy neighbour” (Exodus 20:16) covers what a seller says about his own goods and about competitors’ goods.

PICTURE STUDY



Any person, firm, corporation or association who, with intent to sell or in any wise dispose of merchandise, securities, service, or anything offered by such person, firm, corporation or association, directly or indirectly, to the public for sale or distribution, or with intent to increase the consumption thereof, or to induce the public in any manner to enter into any obligation relating thereto, or to acquire title thereto, or an interest therein, makes, publishes, disseminates, circulates, or places before the public, or causes, directly or indirectly, to be made, published, disseminated, circulated, or placed before the public, in this State, in a newspaper or other publication, or in the form of a book, notice, hand-bill, poster, bill, circular, pamphlet, or letter, or in any other way, an advertisement of any sort regarding merchandise, securities, service, or anything so offered to the public, which advertisement contains any assertion, representation or statement of fact which is untrue, deceptive or misleading, shall be guilty of a misdemeanor.

This is the statute which Printers' Ink *recommends for enactment in the various states of the union as a working basis for the elimination of dishonest and misleading advertising. It is an effort to crystallize the sentiment against fraudulent advertising into small and definite compass. While it may be possible in some states to secure the conviction of fraudulent advertisers under laws already existing, it is believed that speedier and more certain action can be secured by the enactment of this statute, provided the advertising clubs throughout the country will make it their business to see that the law is enforced and not allowed to become a dead letter.*

The Printers’ Ink Model Statute, *Printers’ Ink* magazine, 1911 · Printed page · Wikimedia Commons

Image: Wikimedia Commons, public domain

This page printed the proposed law that many states later adopted. It was an advertising-industry magazine, not a government, that proposed it, because honest advertisers saw that deception was ruining trust in all advertising.

Look closely

- Find the key words that describe forbidden advertising.
- Look for who would be held responsible under the law.
- Notice how short the statute is. Why might a short law be effective?

Talk about it

1. Why would advertisers ask for a law against their own industry’s abuses?
2. Which ads you have seen recently might break this rule?
3. How would you make sure your own ads meet this standard?

> **Safety first.** Distribute flyers only to people and places a parent approves. Never put your home address or personal phone number on materials; use a parent's contact.

PROJECT

The Honest Ad and a Measured Test

You will audit real ads for honesty, then write, check and test two versions of an honest ad for your venture with a way to measure results.

You will need

- Five printed ads from flyers or mailers (chosen with a parent)
- Paper, markers or a simple design program
- Ledger notebook or spreadsheet

Steps

1. For each of the five ads, list every claim and label it puffery, factual (and whether it seems substantiated) or possibly deceptive. Note any hidden conditions.
2. Write two versions of an ad for your venture that differ in one element (headline or picture). Each must state the price and any conditions clearly.
3. List every factual claim in your ads and the evidence you have for each. Remove any you cannot support.
4. Add a tracking method (a different code word on each version).
5. With a parent's approval, distribute both versions to similar audiences you know (for example, at two church events or in two neighborhoods of family friends).
6. Count responses and sales from each version; compute ROAS and ad profit.
7. Write a paragraph on which ad worked better and why, and what you will change.

Tips

- Concrete facts and a clear price usually outperform hype.
- Change only one thing at a time so you know what made the difference.

Check your work

☐ I can tell puffery, factual claims and deception apart.

☐ Every factual claim in my ads is supported.

☐ I measured both versions and calculated their return.

LEDGER NOTEBOOK

1. Copy your claim-audit table for the five ads.
2. Paste or copy both ad versions with their results.
3. Write a timeline: 1911 Printers' Ink statute and truth movement; 1912 vigilance committees become Better Business Bureaus; 1914 FTC; 1923 *Scientific Advertising*; 1938 FTC power over deceptive ads.

KEY FORMULAS

$$\text{ROAS} = \frac{\text{revenue from ad}}{\text{ad cost}}$$

$$\text{Ad profit} = \text{sales from ad} \times (P - V) - \text{ad cost}$$

From history. The Pure Food and Drug Act of 1906 had already required truthful labels on food and medicine packages, but it did not reach claims made in newspaper advertisements, which is one reason the truth-in-advertising movement turned to state laws and later to the FTC.

WORKED EXAMPLES

Example 1. Label each claim as puffery, a factual claim needing substantiation, or deceptive: (a) "Grandma's best cookies!" (b) "Made with real butter." (c) "Was $20, now $10!" when the item was never sold at $20. (d) "Loved by our customers" above reviews written by the owner's friends who were paid in cookies, with no disclosure.

Show solution

1. (a) Puffery: vague praise.
2. (b) Factual claim: must be true (no margarine).
3. (c) Deceptive: a fake former price.
4. (d) Deceptive: undisclosed paid endorsements.

Answer: (a) puffery; (b) factual, must be substantiated; (c) and (d) deceptive.

Example 2. A $45 newspaper ad with a coupon code brings 18 sales at $12; variable cost is $5 each. Find ROAS and ad profit.

Show solution

1. Revenue: $18 \times 12 = \$216$; ROAS $216/45 = 4.8$.
2. Ad profit: $18 \times (12 - 5) - 45 = 126 - 45 = \$81$.

Answer: ROAS 4.8; ad profit $81. The coupon code made the result measurable.

PRACTICE

1. Easy What did the 1911 Printers' Ink model statute do?

   Show answer

   It proposed a law, adopted in many states, making untrue, deceptive or misleading advertising a crime.

2. Easy When was the FTC created?

   Show answer

   1914.

3. Easy Define substantiation.

   Show answer

   Having reliable evidence for a factual claim before making it.

4. Medium Why did honest advertisers support truth-in-advertising laws?

   Show answer

   False ads taught readers to distrust all ads, which made honest ads less effective; rules restored trust.

5. Medium A $30 flyer campaign brings 9 sales with $6 contribution each. Find the ad profit.

   Show answer

   $9 \times 6 - 30 = \$24$

6. Medium Give three ways to track which ad brought a customer.

Show answer

Coupon codes; asking “How did you hear of us?”; different phone numbers or web pages for each ad.

7. Medium Is “free gift with purchase” deceptive if the price was raised to cover the gift? Explain.

Show answer

Yes: it misleads customers into thinking they get something extra when they are actually paying for it.

8. Hard A friend writes a glowing review of your product after you gave him one free. What must you do?

Show answer

Make sure the review discloses that he received the product free, and that it reflects his honest opinion.

9. Hard Ad A costs $50 and brings revenue of $150; Ad B costs $20 and brings $80. Compare ROAS. Which is better if contribution margin is 50%?

Show answer

A: 3.0; B: 4.0. Profit A: 75 − 50 = $25; B: 40 − 20 = $20. B is more efficient; A brings slightly more profit. Both are worth repeating.

10. Hard Explain how leaving out a fact can make a true statement deceptive. Give an example.

Show answer

A half-truth creates a false impression. Example: “Only $5 a week!” without saying it is for 52 weeks and requires a $100 sign-up fee.

11. Challenge How many sales at a $4 contribution must a $90 ad bring to have ROAS of at least 3 if the price is $10?

Show answer

ROAS 3 means revenue $270: $270/10 = 27$ sales (profit $27 \times 4 - 90 = \$18$).

COMMON MISTAKES

- Making factual claims you cannot prove.

- Hiding fees or conditions in tiny print.
- Running ads without any way to measure them.

> **Make it a game · Puffery or Deception?.** Your parent reads ten invented advertising claims from slips of paper. Sort each aloud as honest persuasion, puffery or deception, and say what proof or disclosure an honest advertiser would need. Score a point for every correct sort and an extra point for naming the substantiation. Finish by telling why Printers' Ink and the FTC acted.

> **Scripture.** “Thou shalt not bear false witness against thy neighbour.” (Exodus 20:16, KJV)
>
> The ninth commandment forbids lying about others; Christians have long applied it to every false or misleading word that harms a neighbor, including a customer reading an ad.

6.5 Online Marketing with Safety and Privacy

OBJECTIVES

- Tell how the first mass marketing email in 1978 provoked a backlash, and how laws such as COPPA (1998) and CAN-SPAM (2003) set rules for online marketing.
- Explain owned, earned and paid media, permission-based email and the conversion funnel.
- Plan online marketing for a venture that is honest, legal, respectful of privacy and safe for a student under a parent's supervision.

> **Warm-up.** Think of the last unwanted email or message advertisement your family received. What made it annoying? What would have made it welcome?

WATCH

Teen Voices: Oversharing and Your Digital Footprint

Common Sense Education · 3:34

https://www.youtube.com/watch?v=ottnH427Fr8

> **WHEN TO WATCH**
> Before the safety rules for your venture.

Note: Teens discussing what they share online and why it lasts.

KEY TERMS

owned media
Channels a business controls, such as its own website or email list.

earned media
Attention a business earns without paying: reviews, word of mouth, shares, news stories.

paid media
Advertising a business pays for.

permission marketing
Marketing only to people who have asked to hear from you, and stopping when they ask.

conversion funnel

The stages from first awareness to interest, decision and purchase, with fewer people at each stage.

CORE IDEAS

The story. On May 3, 1978, Gary Thuerk, a marketing manager at Digital Equipment Corporation (the company Doriot backed in Lesson 5.4), sent one message advertising new computers to several hundred users of ARPANET, the government-funded network that grew into the internet. It is often called the first spam. A few recipients asked about the computers, but many complained angrily, and the network's managers warned against doing it again. The episode revealed a lasting tension: a new channel made reaching people almost free, and that very cheapness tempted marketers to ignore whether people wanted the message.

How they figured it out. As the web grew, lawmakers set rules. The Children's Online Privacy Protection Act of 1998 (COPPA) requires websites aimed at children under 13 to get verifiable parental consent before collecting their personal information. The CAN-SPAM Act of 2003 requires commercial emails to have honest headers and subject lines, identify themselves as ads, include the sender's postal address and honor requests to unsubscribe promptly. The FTC also requires that online endorsements and influencer posts disclose any payment or free product. Good marketers went further and practiced **permission marketing**: contact only people who asked to hear from you.

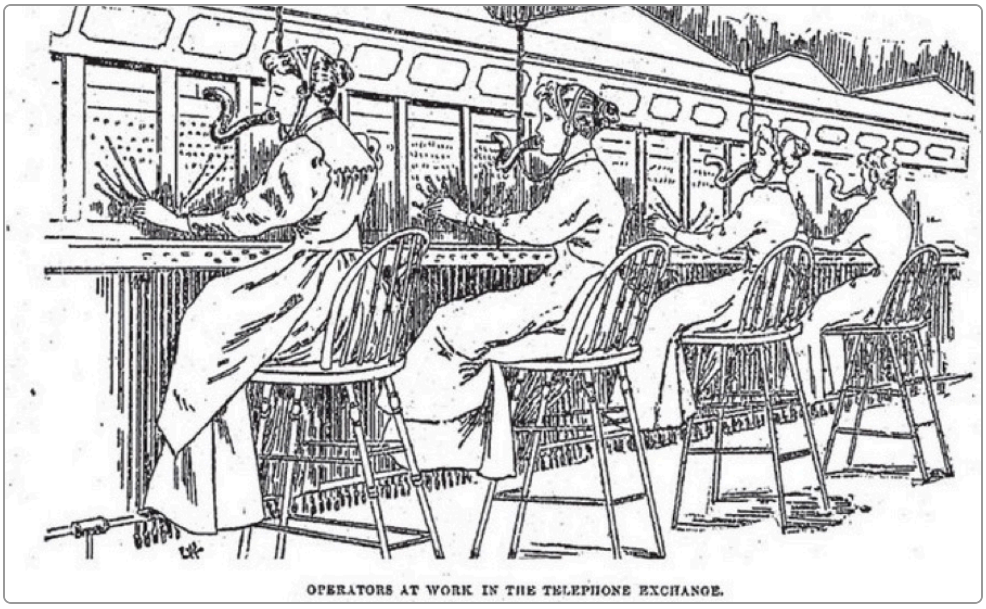
The big idea. Online marketing uses three kinds of media: **owned** (your website and email list), **earned** (reviews, shares and word of mouth) and **paid** (ads). People move through a **conversion funnel**: of all those who see a message, some become interested, some of those decide, and some buy. Because each stage loses people, small improvements at each stage multiply. The most valuable online asset is usually a list of real customers who have asked to hear from you and trust you.

Privacy and safety. Customer information is held in trust. Collect only what you need, keep it secure, never sell or share it without permission, and delete what you no longer need. For a student, safety comes first: no public accounts, online selling or posting without a parent; never share your home address, school, schedule or photos that reveal where you live; never meet an online contact; and let a parent

handle any payment and personal data. The Golden Rule applies online: market to others only as you would want to be marketed to.

In business today. Small businesses use simple websites, email newsletters to customers who signed up, and reviews from real customers. These work best when they are honest, useful and respectful. A business that earns trust online grows by recommendation; one that spams, tracks people without consent or hides payments loses trust and may break the law.

PICTURE STUDY



Telephone Exchange Operators, Unknown photographer, 1893 · Photograph · Wikimedia Commons

Image: Wikimedia Commons, public domain

In the 1890s every telephone call passed through operators like these, who connected callers by hand. The telephone was the new network of its day, and businesses soon used it to reach customers. Operators heard many conversations, so telephone companies had to set rules about privacy.

Look closely

- Count the operators. How many calls might they handle in an hour?
- Look at the switchboard. How does each connection get made?
- Notice how close together the operators sit. What would they overhear?

Talk about it

1. What privacy rules would you want if your calls passed through these operators?
2. How is the internet like a giant switchboard, and who might see your information?
3. What would it mean to use the telephone, or email, “by permission” in business?

> **Safety first.** Students do not create public social-media or selling accounts, post their photos, address or school, or handle customer data online. A parent manages any online presence, payments and contact information. Never meet in person someone known only online.

PROJECT

A Safe, Honest Online Marketing Plan

You will design an online marketing plan for your venture that a parent will run or supervise, with a privacy policy, a permission-based customer list and a funnel forecast. Nothing is posted publicly without a parent.

You will need

- Ledger notebook or word processor
- Spreadsheet for the funnel
- A parent as partner and approver

Steps

1. List the owned, earned and paid media you could use, and mark which a parent would control.
2. Write a one-paragraph privacy promise: what customer information you collect, why, how you protect it, and that you never sell it.
3. Design a sign-up card for customers who want updates (name and a parent-managed contact only), with a clear way to stop.
4. Draft one honest update message that meets CAN-SPAM-style rules: honest subject, clear offer and price, sender identified, easy unsubscribe.
5. Build a funnel forecast for one update: list size, open rate, click or response rate, purchase rate, contribution.
6. Identify the stage you would improve first and how.
7. Review the plan with a parent and write the rules you agree on for any online activity.

Tips

- Start with people who already know and like you.
- Less, better messages beat frequent, pushy ones.

Check your work

☐ I can explain owned, earned and paid media and the funnel.

☐ My plan includes a privacy promise and permission-based contact.

☐ A parent reviewed and approved my safety rules.

LEDGER NOTEBOOK

1. Draw your conversion funnel with numbers at each stage.
2. Copy your privacy promise and safety rules.
3. Write a timeline: 1978 first mass email; 1998 COPPA; 2003 CAN-SPAM; endorsement disclosures.

KEY FORMULAS

$$\text{Buyers} = \text{reached} \times r_{\text{interest}} \times r_{\text{decision}} \times r_{\text{purchase}}$$

From history. The word "spam" for unwanted messages came from users of early online discussion groups in the 1980s and 1990s. The first large commercial spam on the early internet, in 1994, led to such outrage that the senders' internet provider cut off their service.

WORKED EXAMPLES

Example 1. A newsletter goes to 400 subscribers. 45% open it, 10% of openers click the offer, and 25% of clickers buy a $15 item with a $6 contribution. How many buy, and what is the contribution?

Show solution

1. Buyers: $400 \times 0.45 \times 0.10 \times 0.25 = 4.5$, about 4 or 5.
2. Contribution: $4.5 \times 6 = \$27$.

Answer: About 4–5 buyers and $27 of contribution per newsletter.

Example 2. In the last example, which improvement adds more buyers: raising the click rate from 10% to 12%, or growing the list to 450 subscribers?

Show solution

1. Click rate 12%: $400 \times 0.45 \times 0.12 \times 0.25 = 5.4$.
2. List of 450: $450 \times 0.45 \times 0.10 \times 0.25 \approx 5.06$.

Answer: Raising the click rate (5.4 buyers) adds slightly more than growing the list (5.1). Both help; improving each stage multiplies.

PRACTICE

1. Easy Who sent the 1978 message often called the first spam, and to whom?

Show answer

Gary Thuerk of Digital Equipment Corporation, to several hundred ARPANET users.

2. Easy What does COPPA require?

Show answer

Sites aimed at children under 13 must get verifiable parental consent before collecting their personal information.

3. Easy Define owned, earned and paid media.

Show answer

Owned: channels you control (website, email list). Earned: free attention (reviews, word of mouth). Paid: advertising.

4. Medium Name four requirements of CAN-SPAM for commercial email.

Show answer

Honest headers and subject lines; identify the message as an ad; include a postal address; honor unsubscribe requests promptly.

5. Medium 1,000 people see a post; 8% click; 20% of clickers buy. How many buy?

Show answer

$1000 \times 0.08 \times 0.20 = 16$

6. Medium Why is a permission-based email list more valuable than a bought list of addresses?

Show answer

Its members asked to hear from you and trust you, so they open and buy far more often; a bought list annoys people and may break the law.

7. Medium List three safety rules for a student marketing a venture online.

Show answer

No public accounts or posts without a parent; never share address, school, schedule or identifying photos; let a parent handle payments and customer data; never meet online contacts.

8. Hard A business collects customers' birthdays "for marketing" but never uses them. What should it do and why?

Show answer

Stop collecting and delete them: collect only what you need. Unused personal data is a risk to customers if it leaks.

9. Hard An influencer is paid to praise your product. What must the post include?

Show answer

A clear disclosure that it is a paid or sponsored post (or that the product was free), and the praise must be honest.

10. Hard Funnel: 2,000 reached, 5% interested, 30% decide, 50% buy. Which single stage, if improved by 10 percentage points, adds the most buyers?

Show answer

Base: 15. Interest 15%: 45. Decide 40%: 20. Buy 60%: 18. Raising interest from 5% to 15% adds the most (because it is the smallest rate, a 10-point rise triples it).

11. Challenge Apply the Golden Rule to three online marketing practices of your choice, saying which you would use and which you would refuse.

Show answer

Answers vary; credit for clear reasoning, such as using a monthly newsletter to customers who signed up, refusing to add people without consent, and refusing fake reviews.

COMMON MISTAKES

- Adding people to an email list without their permission.
- Collecting more personal information than you need.
- Posting publicly without thinking about safety and privacy.

> **Make it a game · Walk the Funnel.** Lay four pieces of paper in a line for the stages of the conversion funnel. Start with one hundred beans as visitors; your parent decides how many drop out at each stage. Count what is left and compute conversion rates. Next, label cards owned, earned and paid, and answer your parent's channel calls in three seconds. Say what the 1978 email backlash taught.

> **Scripture.** “Withdraw thy foot from thy neighbour's house; lest he be weary of thee, and so hate thee.” (Proverbs 25:17, KJV)
>
> Even a welcome neighbor can visit too often. Marketing that respects people’s time and asks before it comes in follows this proverb.

UNIT 6

Marketing

Marketing is everything a business does to bring the right product to the right customers at a fair price and to tell them about it truthfully. It is not trickery; at its best it is service, helping people find what they need. This unit begins with the **four P's** (product, price, place and promotion), using Procter & Gamble's Ivory soap, which a young Harley Procter named from a Bible verse in 1879. Then it studies **brands and trust** through Josiah Wedgwood's royal "Queen's Ware" and the 1915 Coca-Cola bottle, designed so it could be recognized in the dark.

You will follow the long line from the mail-order **catalog** of Montgomery Ward and Sears, Roebuck to today's websites, learn the history and rules of **truthful advertising** from the 1911 Printers' Ink model statute to the Federal Trade Commission, and finish with **online marketing** done safely, honestly and with respect for customers' privacy. Your venture will end the unit with a one-page marketing plan, an honest ad and a tested message.

PREREQUISITES

- Has a value proposition and business model (Unit 3)
- Has a price and cost model (Unit 4)
- Can compute percents and ratios

MASTERY CHECKLIST

- ☐ I can apply the four P's to a product and explain how they fit together.
- ☐ I can explain what a brand is, why trust makes it valuable, and how trademarks protect it.
- ☐ I can calculate customer acquisition cost, conversion rate, average order and lifetime value for a sales channel.
- ☐ I can tell honest persuasion from deceptive advertising and name the laws and principles behind truth in advertising.
- ☐ I can plan online marketing that is honest, legal, respectful of privacy and safe for a student.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Federal Trade Commission, "Advertising and Marketing Basics"**: Free official guidance on truthful advertising, endorsements, online disclosures and email rules. Use with Lessons 6.4 and 6.5. Ages 14+.
- **Claude C. Hopkins, *Scientific Advertising* (1923)**: A short classic on measuring advertising with coupons and tests, often reprinted. Search Project Gutenberg or your library. Read the chapters on testing with Lesson 6.4. Ages 15+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

6.1 **The Four P's: Harley Procter and Ivory Soap** 3 sessions of 50 minutes

6.2 **Brands and Trust: Wedgwood's Queen's Ware and the Coca-Cola Bottle** 3 sessions of 50 minutes

6.3 **From the Catalog to the Website: Montgomery Ward and Sears, Roebuck** 3 sessions of 50 minutes

6.4 **Advertising Truthfully: The Printers' Ink Statute and the FTC** 3 sessions of 50 minutes

6.5 **Online Marketing with Safety and Privacy** 3 sessions of 50 minutes

Unit 6 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Name the four P's and describe each for Ivory soap in the 1880s.

2. **6 pts**
   A $60 booth must be paid for by sales with a contribution of $2.50 each. How many sales are needed? What is the profit from 50 sales?

3. **5 pts**

   Define brand equity and price premium, with an example.

4. **6 pts**

   How did Wedgwood build trust in his name? Give three methods.

5. **5 pts**

   Why was the 1915 Coca-Cola bottle designed to be recognized in the dark?

6. **6 pts**

   A regular buys $20 a week with a 40% margin for 3 years (50 weeks a year). Find the lifetime value.

7. **6 pts**

   A mailing costs $500 and brings 20 new customers. Each orders $30 with a 35% margin, 4 times a year for 2 years. Find CAC and LTV and their ratio.

8. **6 pts**

   How did Rural Free Delivery and Parcel Post change mail-order business?

9. **5 pts**

   What did the 1911 Printers' Ink model statute propose, and why did advertisers support it?

10. **6 pts**

    Classify: (a) "The friendliest shop in town." (b) "Removes 99% of stains." (c) "Half price!" when the item never sold at full price.

11. **6 pts**

    An $80 ad brings 30 sales at $10 with a variable cost of $4. Find ROAS and ad profit.

12. **5 pts**

    Name four requirements of the CAN-SPAM Act.

13. **6 pts**

    Funnel: 1,500 reached, 6% interested, 40% decide, 50% buy. How many buy? How many if the interest rate rises to 8%?

14. **6 pts**

    State three safety rules and two privacy rules for a student venture’s online marketing.

15. **5 pts**

    Why is honest advertising usually more profitable over time than exaggerated advertising?

16. **16 pts**

    Essay: Using Ivory, Wedgwood or Sears, explain how marketing can serve customers rather than manipulate them. Include at least one principle of truthful advertising and one Scripture passage.

ANSWER KEY

1. Product: pure white floating soap; price: modest; place: grocers nationwide; promotion: national magazine ads with “99 44/100% pure” and “It floats.”
2. $60/2.50 = 24$; $50 \times 2.50 - 60 = \$65$.
3. Brand equity: extra value from customers’ trust and preference; price premium: the extra price they will pay. Example: a trusted local honey at $9 vs unbranded at $7.
4. Royal patronage (“Queen’s Ware,” “Potter to Her Majesty”); showrooms and catalogues; free delivery and a satisfaction or refund promise; consistent quality.
5. To distinguish the real product from imitators in similar bottles, protecting customers and the brand.
6. $20 \times 0.40 \times 50 \times 3 = \$1{,}200$
7. CAC $25; LTV $30 \times 0.35 \times 4 \times 2 = \$84$; ratio 3.36.
8. RFD (1896) delivered catalogs and mail to farm homes; Parcel Post (1913) let the post office carry packages cheaply, making mail-order delivery affordable.
9. Making untrue, deceptive or misleading advertising a crime; deception destroyed readers’ trust in all ads, hurting honest advertisers.
10. (a) puffery; (b) factual claim needing substantiation; (c) deceptive.
11. ROAS $300/80 = 3.75$; profit $30 \times 6 - 80 = \$100$.
12. Honest headers and subjects; identify as an ad; include a postal address; honor unsubscribes promptly.
13. $1500 \times 0.06 \times 0.40 \times 0.50 = 18$; at 8%: 24.
14. Safety: no public accounts or posts without a parent; never share address, school or schedule; never meet online contacts. Privacy: collect only what you need; never sell or share customer data; protect and delete it when no longer needed.
15. It builds trust and repeat customers, avoids refunds, complaints and legal trouble, and makes future ads believable.
16. Graded on a clear thesis, accurate history (Ivory’s checkable claims, Wedgwood’s guarantees, Sears’s money-back promise), correct principles (substantiation, disclosure, permission), and fitting use of Scripture (Exodus 20:16, Matthew 5:37, Proverbs 22:1).

PORTFOLIO PIECE: THE MARKETING PLAN

Assemble a marketing plan for your venture: target market and positioning, the four P's, your brand (name, mark, promise and standards), your channel comparison with CAC and LTV, your product page, your two tested ads with their results, and your online plan with its privacy promise and safety rules. Add a one-page summary of what you will do in the next three months and what you will measure.

LOOK FOR	WHAT IT MEANS
Fit	Target market, positioning, four P's and brand tell one consistent story.
Measurement	Channels and ads are measured with real numbers and compared.
Honesty	Every claim is true and supported; conditions and endorsements are disclosed.
Safety and privacy	Online plans protect the student and customers and have a parent's approval.

UNIT 7

Selling

Nothing happens in a business until someone sells something. Yet selling has a poor reputation, because many people have met salesmen who pushed, flattered or lied. This unit teaches selling as a service: helping a customer find out whether your product meets his need, and telling the truth even when it costs you a sale. It begins with Proverbs 20:14 and John Wanamaker, who put one honest price on every item, and then studies John H. Patterson of the National Cash Register Company, who built the first modern sales school, with lessons both good and bad.

Then you will practice **consultative selling**, asking good questions and listening, as Benjamin Franklin learned to do when he gave up arguing; learn to handle **objections and close** without pressure or manipulation; and learn principled **negotiation**, from Abraham buying a burial field from Ephron the Hittite to the modern ideas of interests, options and a best alternative. You will keep a real sales log for your venture throughout the unit.

PREREQUISITES

- Has a product, price and marketing plan (Units 3–6)
- Can compute percents, averages and simple rates
- A parent available to supervise and role-play

MASTERY CHECKLIST

- ☐ I can explain why honesty is the foundation of selling and describe what an honest salesperson does and refuses to do.
- ☐ I can describe the stages of a sales process and calculate close rates, commissions and quota attainment.
- ☐ I can lead a consultative conversation with open questions and summarize a customer's need accurately.
- ☐ I can respond to common objections honestly, ask for the sale clearly, and recognize manipulative tactics.
- ☐ I can prepare for a negotiation by identifying interests, options, objective criteria, my BATNA and the bargaining range.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- ***The Autobiography of Benjamin Franklin* (Project Gutenberg)**: Free. Read Franklin's account of giving up contradiction for modest questions (in Part One) with Lesson 7.3. Ages 13+.
- **Federal Trade Commission, "Buyer's Remorse: The FTC's Cooling-Off Rule"**: Free official explanation of the three-day right to cancel certain sales, with the reasons the rule exists. Use with Lesson 7.4. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

7.1 The Honest Salesperson: Proverbs 20:14 and John Wanamaker

3 sessions of 50 minutes

7.2 The Sales Process: John H. Patterson’s NCR Sales School 3 sessions of 50 minutes

7.3 Consultative Selling and Listening: Franklin’s Modest Questions

3 sessions of 50 minutes

7.4 Handling Objections and Closing without Manipulation 3 sessions of 50 minutes

7.5 Negotiation: Abraham at Machpelah and Principled Bargaining

3 sessions of 50 minutes

Unit 7 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Explain Proverbs 20:14 and what it teaches about honesty on both sides of a sale.

2. **5 pts**
   Name three practices John Wanamaker made famous and why they built trust.

3. **6 pts**
   800 units sold; 2.5% returned; each return costs $10. Find the cost of the guarantee. If the guarantee raised sales by 100 units with $7 contribution each, is it worth it?

4. **5 pts**
   Name the stages of a sales process.

5. **6 pts**
   Close rate 20%; goal 36 sales. How many conversations? If the close rate rises to 30%?

6. **6 pts**

   Base $250 plus 6% commission; quota $8,000; sales $9,200. Find pay and quota attainment.

7. **6 pts**

   Describe one strength and one serious wrong in John H. Patterson’s NCR.

8. **5 pts**

   What practice did Franklin adopt in speaking with others, and why did it help him persuade?

9. **6 pts**

   Write one situation, problem, implication and need-payoff question for a tutoring service.

10. **5 pts**

    A seller talks 9 minutes of a 12-minute conversation. Find the talk ratio and comment.

11. **6 pts**

    Classify and answer honestly: “I need to think about it.”

12. **5 pts**

    Why did the FTC adopt the Cooling-Off Rule in 1972?

13. **6 pts**

    50 objections; resolution rises from 20% to 40%; 55% of resolved customers buy; contribution $12. Find extra sales and extra contribution.

14. **6 pts**

    Seller’s minimum $240; buyer’s maximum $300. Find the ZOPA and a fair midpoint. Define BATNA.

15. **6 pts**

    Why did Abraham insist on paying for Machpelah, and what principle of good negotiation does it illustrate?

16. **16 pts**

Essay: “Selling is service.” Agree or disagree, using at least two people from this unit and one Scripture passage, and describe two practices you will use and two you will refuse in your own venture.

ANSWER KEY

1. A buyer runs down the goods to get a low price and then boasts; dishonesty in trade can come from buyers as well as sellers, and both are wrong.
2. One fixed price, plain advertising, a money-back guarantee; customers knew they would not be cheated and could return goods, so they came back.
3. Cost $800 \times 0.025 \times 10 = \$200$; gain \$700; net +\$500: yes.
4. Prospecting, approach, needs discovery, presentation or demonstration, handling objections, closing, follow-up.
5. 180; 120.
6. Pay $250 + 552 = \$802$; attainment 115%.
7. Strength: professional sales training, demonstrations and good working conditions (and flood relief in 1913). Wrong: illegal tactics against competitors (knocker machines, intimidation), leading to a 1913 antitrust conviction (overturned in 1915).
8. He stopped contradicting bluntly and used modest phrases and questions; people listened and agreed more readily when not put on the defensive.
9. Sample: S: "How is math going this year?" P: "Which topics are hardest?" I: "How does that affect grades or time at home?" N: "How would weekly help with those topics make a difference?"
10. 75%; far too high for consultative selling; ask more and listen.
11. Usually timing or an unstated concern (need, price or trust). Ask what she would like to think over, answer any question, and agree on a time to follow up; accept a real no.
12. High-pressure sales at homes and temporary locations led many buyers into regretted purchases; the rule gives three days to cancel.
13. $50 \times 0.20 \times 0.55 = 5.5$ extra sales; about \$66.
14. ZOPA \$240–\$300; midpoint \$270. BATNA: your best alternative if no agreement is reached.
15. To secure undisputed title through a public, witnessed purchase at a named price; it shows attention to underlying interests (security, honor) rather than simply getting the lowest price.

16. Graded on a clear thesis, accurate use of two figures (Wanamaker, Patterson, Franklin, Lewis, Abraham, Fisher and Ury), apt Scripture (Proverbs 20:14, James 1:19, 2 Corinthians 4:2, Matthew 7:12), and specific, honest practices.

PORTFOLIO PIECE: THE SALES NOTEBOOK

Assemble your product-knowledge sheet and guarantee, your sales log with close rates and a funnel, your SPIN question guide and conversation table, your objection workbook, and your negotiation preparation sheet with its outcome. Add a one-page reflection on the kind of salesperson you want to be and the evidence from your log that you are becoming one.

LOOK FOR	WHAT IT MEANS
Records	The sales log is complete and the numbers (close rates, funnel, talk ratios) are calculated correctly.
Method	Questions, objection answers and negotiation preparation are thorough and practiced.
Honesty	Every practice respects the customer; no pressure or deception appears in scripts or records.
Reflection	The reflection is specific and supported by the log.

7.1 The Honest Salesperson: Proverbs 20:14 and John Wanamaker

OBJECTIVES

- Explain Proverbs 20:14 and the dishonesty it describes on both sides of a sale.
- Tell how John Wanamaker made one fixed price, plain advertising and a money-back guarantee the rule in his stores.
- Describe what an honest salesperson does and refuses to do, and calculate the cost and value of a guarantee.

> **Warm-up.** Think of a time you felt pushed or tricked by a seller, and a time a seller helped you choose well (perhaps even telling you to buy less). Write one sentence about each. What was the difference?

WATCH

Behind the Price Tag: The Many Mansions of John Wanamaker

This House · 5:15

https://www.youtube.com/watch?v=xRfhDwN5mGo

> **WHEN TO WATCH**
> After the story of Wanamaker, before the big idea.

Note: A short history of Wanamaker's stores and homes from a house-history channel.

BACKUP VIDEO

Steven Conn on John Wanamaker

In Pursuit: Philadelphia and the Making of America · 1:41

https://www.youtube.com/watch?v=d8iBb1vzcfQ

Optional, a historian's brief comment on Wanamaker.

KEY TERMS

selling

Helping a customer decide whether to buy a product that meets his need, and completing the exchange.

one-price system

One marked price for every customer, instead of bargaining over each sale.

guarantee

A promise to repair, replace or refund if the product does not satisfy.

fiduciary attitude

Treating the customer's interest as if it were in your care, as a trustee would.

return rate

The share of items sold that customers bring back.

CORE IDEAS

The story. "It is naught, it is naught, saith the buyer: but when he is gone his way, then he boasteth" (Proverbs 20:14). Solomon describes a buyer who runs down the goods to get a lower price and then brags about his bargain. The verse shows that dishonesty in trade is not only a seller's sin. In nineteenth-century America both sides played that game: prices were not marked, clerks sized up each customer, and buyers pretended not to care. The shrewd paid less and the trusting paid more.

How they figured it out. John Wanamaker, a Philadelphia merchant and Sunday-school superintendent, opened a men's clothing store, Oak Hall, in 1861, and in 1876 a vast store in a former railroad freight depot. He made several practices the rule: one fixed price marked on every item, for every customer; newspaper advertising that described goods plainly; and a guarantee that a customer could return goods for a refund. Other merchants such as A. T. Stewart and some Quaker shopkeepers had used fixed prices before him, but Wanamaker made the system famous. Customers who knew they would not be cheated came back, and his clerks could serve rather than haggle.

The big idea. Selling is helping a customer decide well. An honest salesperson knows the product thoroughly; asks what the customer needs; explains both strengths and limits; tells the price and conditions plainly; recommends a cheaper option or a competitor if that fits the need better; and keeps every promise. An honest salesperson refuses to lie, to hide flaws, to invent urgency, or to sell something he knows the customer does not need. This **fiduciary attitude**, caring for the customer's interest as if it were your own, is both right and wise: it builds the trust that brings repeat sales and referrals.

Guarantees. A **guarantee** costs money when products come back, but it also tells customers you believe in your goods and lowers their risk, so more of them buy.

Measure the **return rate**; if it is high, fix the product rather than drop the guarantee. Wanamaker found that the guarantee helped far more than it cost.

In business today. Customers can compare prices and read reviews instantly, so dishonest selling is exposed quickly. The salespeople who thrive are trusted advisers who know their products and care about their customers. For a Christian, the standard is higher than the market: “Therefore all things whatsoever ye would that men should do to you, do ye even so to them” (Matthew 7:12).

PICTURE STUDY



John Wanamaker at His Desk, Unknown photographer, about 1890 · Photograph · Library of Congress (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This photograph was taken around 1890, when Wanamaker was at the height of his business career. He worked long days at the store and still taught his Sunday school in Philadelphia every week.

Look closely

- Look at the papers on the desk. What might a merchant of a large store be reading?
- Look at his expression and posture. What kind of man does he seem to be?
- Look at the room. Is it showy or businesslike?

Talk about it

1. Why might a man who taught Sunday school insist on one honest price for everyone?
2. What would Wanamaker say to a clerk who hid a flaw to make a sale?
3. What would your own sales desk need to show customers to earn their trust?

Safety first. Sell only to people you know or at events a parent approves, with a parent present. No door-to-door selling and no selling to strangers alone.

PROJECT

The Honest Sales Conversation and Sales Log

You will prepare product knowledge and a guarantee for your venture, role-play honest sales conversations, and begin a sales log you will keep for the rest of the unit.

You will need

- Ledger notebook or spreadsheet for the sales log
- Index cards
- A parent to role-play customers

Steps

1. Write a product-knowledge sheet: what it is, how it is made, its strengths, its limits, its price and terms.
2. Write your guarantee in one or two sentences and estimate its cost with an expected return rate.
3. Role-play three conversations with a parent: a customer who needs your product, one who needs a cheaper version, and one who does not need it at all.
4. After each, write what you said that was honest and helpful, and what you would change.
5. Set up a sales log with columns: date, customer type (no names), need, product discussed, outcome, objections, follow-up.
6. Record every real sales conversation for your venture during this unit.
7. At the end of the week, count conversations and sales and compute your close rate.

Tips

- Saying “I don’t know, but I will find out” is honest and builds trust.
- Listen at least as much as you talk.

Check your work

☐ I can explain Proverbs 20:14 and Wanamaker’s practices.

- ☐ My product sheet states limits as well as strengths.
- ☐ My sales log is set up and in use.

LEDGER NOTEBOOK

1. Copy your product-knowledge sheet.
2. Write your guarantee and the calculation of its cost.
3. Make a two-column chart: “An honest salesperson does…” and “An honest salesperson refuses to…”.

KEY FORMULAS

$$\text{Cost of a guarantee} \approx \text{units sold} \times \text{return rate} \times \text{loss per return}$$

From history. Wanamaker served as Postmaster General of the United States from 1889 to 1893, when he pressed for rural free delivery of mail. His Philadelphia store installed a great pipe organ in 1911, still played today.

WORKED EXAMPLES

Example 1. A student sells 120 birdhouses a year at $25 with a contribution of $14. She offers a money-back guarantee; she expects 4% to come back, and each return costs her the full $25 refund minus $5 she can recover by reselling the birdhouse as a second. If the guarantee raises sales by 15%, does it pay?

Show solution

1. Sales with guarantee: $120 \times 1.15 = 138$. Extra contribution: $18 \times 14 = \$252$.
2. Returns: $138 \times 0.04 \approx 5.5$. Each return costs the $25 refund less $5 recovered by reselling the birdhouse as a second: $\$25 - \$5 = \$20$.
3. Cost of returns: $5.5 \times 20 = \$110$. Net gain: $252 - 110 = \$142$.

Answer: Yes: the guarantee adds about $142 a year, besides the goodwill it earns.

Example 2. Role-play analysis. A customer asks for a $60 deluxe item, but from her questions the salesperson learns that a $35 basic model would do everything she needs. What should the salesperson do, and what might it cost or gain?

Show solution

1. Honest course: explain that the basic model meets her needs and the deluxe adds features she said she does not need.
2. Immediate cost: a smaller sale (contribution perhaps $10 less).
3. Gain: trust; she is likely to return and to recommend the seller, which over time is worth far more than $10.

Answer: Recommend the $35 model. Serving her real need is the honest choice and usually the profitable one over a lifetime of purchases.

PRACTICE

1. Easy In Proverbs 20:14, who is dishonest?

   Show answer

   The buyer, who runs down the goods to pay less and then boasts of his bargain.

2. Easy Name three practices Wanamaker made famous.

   Show answer

   One fixed marked price; plain, truthful advertising; a money-back guarantee.

3. Easy Define return rate.

   Show answer

   The share of items sold that customers bring back.

4. Medium List four things an honest salesperson does and three things he refuses to do.

   Show answer

   Does: knows the product, asks about needs, explains strengths and limits, states price and terms plainly, keeps promises. Refuses: to lie, hide flaws, invent urgency, sell what the customer does not need.

5. **Medium** 500 units sold; 3% returned; each return costs $8. Find the cost of the guarantee.

   Show answer

   $500 \times 0.03 \times 8 = \$120$

6. **Medium** How did the one-price system change the work of a clerk?

   Show answer

   Clerks no longer haggled; they could focus on helping customers find the right goods, and stores could train many clerks quickly.

7. **Medium** Why is recommending a cheaper product sometimes good business?

   Show answer

   It earns trust, repeat purchases and referrals, which are worth more over time than one larger sale.

8. **Hard** A guarantee raises sales from 200 to 230 units with a $9 contribution, and 5% of all units return at a $12 loss each. Is it worth it?

   Show answer

   Extra contribution $30 \times 9 = \$270$; return cost $230 \times 0.05 \times 12 = \$138$. Net +$132: yes.

9. **Hard** Is bargaining itself dishonest? Use Proverbs 20:14 to explain.

   Show answer

   No. Bargaining over a fair price is honest. What the proverb condemns is lying about the goods (“It is naught”) to gain an advantage.

10. **Hard** If a product’s return rate is 20%, what should the seller do about the guarantee?

    Show answer

    Keep the promise and find out why returns are high: fix the product, the description or the customer fit, rather than dropping the guarantee.

11. **Challenge** Write a short “salesperson’s creed” of five lines for your venture, each tied to a Scripture principle or to Wanamaker’s practice.

    Show answer

    Answers vary; credit for specific, checkable commitments (for example, “Every price is marked and the same for all”).

COMMON MISTAKES

- Thinking selling means talking customers into things.
- Hiding limits of the product to win the sale.
- Dropping a guarantee instead of fixing the cause of returns.

Make it a game · The Buyer's Tale. Act out Proverbs 20:14 with your parent. One of you is a buyer who calls an item worthless and then boasts about the bargain afterward; the other is the seller. Replay the scene honestly. Then describe how Wanamaker's fixed price, plain advertising and money-back guarantee would have changed the first version. Your parent judges which scene you would trust.

Scripture. “It is naught, it is naught, saith the buyer: but when he is gone his way, then he boasteth.” (Proverbs 20:14, KJV)

Honesty in trade binds buyer and seller alike. A good salesperson tells the truth about his goods and expects customers to deal honestly too.

7.2 The Sales Process: John H. Patterson's NCR Sales School

OBJECTIVES

- Tell how John H. Patterson built the National Cash Register Company's sales force with a training school, a scripted primer, territories and quotas, and how the company crossed into illegal tactics against competitors.
- Describe the stages of a sales process.
- Calculate close rates, commissions, quota attainment and the number of contacts needed to reach a goal.

> **Warm-up.** List every step between someone first hearing about your product and paying for it. How many steps did you find? Which step do most people drop out at?

WATCH

C-SPAN Cities Tour - Dayton: John H. Patterson

C-SPAN · 8:32

https://www.youtube.com/watch?v=3SCNrXqB17E

> **WHEN TO WATCH**
> After the story of Patterson, before the sales process.

Note: A local-history segment from a public-affairs network's tour of Dayton, Ohio.

BACKUP VIDEO

John Henry Patterson: The Founder of NCR Corporation, Boss of IBM Founder

Business Chronicles · 9:35

https://www.youtube.com/watch?v=DSWaAg4q_3A

Optional, a fuller business history of NCR.

KEY TERMS

sales process

The stages of a sale: prospecting, approach, needs discovery, presentation or demonstration, handling objections, closing and follow-up.

prospect

A person or business that might need your product.

close rate

The share of sales conversations that end in a sale.

commission

Pay to a salesperson equal to a percentage of the sales he makes.

quota

A sales target for a salesperson or territory over a period.

CORE IDEAS

The story. In 1884 John H. Patterson, a Dayton, Ohio, coal and supply merchant, bought control of a small company making cash registers, a machine he had found stopped clerks' theft in his own store. He renamed it the National Cash Register Company. Shopkeepers did not think they needed a costly machine, so Patterson believed it had to be sold, not just offered. He had his best salesmen's arguments written into a booklet, later called the NCR Primer, that new men memorized; he divided the country into exclusive territories; he set quotas and rewarded those who met them with recognition and trips; and in the 1890s he opened what is often called the first formal sales training school, with a model store where salesmen practiced demonstrations.

How they figured it out. Patterson also built a bright factory with large windows, lunchrooms, baths and classes for workers, and when a great flood struck Dayton in 1913 he turned the plant into a relief center. But his company also fought competitors ruthlessly: it sold "knocker" machines below cost to drive rivals out, bought them up and intimidated their customers. In 1913 Patterson and many NCR executives, including a young sales manager named Thomas J. Watson, were convicted under the Sherman Antitrust Act. The convictions were overturned on

appeal in 1915, but the record of the tactics remains. Watson, fired by Patterson in 1914, went on to build IBM using many NCR sales methods.

The big idea. Most sales follow a **process**: find **prospects** who may need the product; approach them respectfully; discover their needs; present or demonstrate how the product meets them; answer objections; ask for the decision; and follow up. Measuring each stage lets you find where sales are lost. The **close rate** tells how many conversations you need: if 1 in 4 conversations ends in a sale and you want 20 sales, you need 80 conversations. **Commissions** and **quotas** reward effort, but if they are set without regard to honesty they tempt salespeople to push customers into bad purchases.

Process and character. Patterson's training made sales more professional; his scripts taught salesmen to understand the customer's problem (theft, errors, lost sales) and demonstrate the machine. The same drive, unchecked, led to attacks on competitors that the law forbade. A good sales process serves customers; a sales culture that rewards results at any cost harms customers, competitors and finally the company.

In business today. Businesses track their sales pipeline from first contact to close. For your venture, a simple log of conversations and outcomes shows your close rate and where you lose people, so you can improve the step that matters most.

PICTURE STUDY



Tool Department, National Cash Register Company, Detroit Publishing Company, 1902 · Photograph · Library of Congress (Wikimedia Commons)

Image: Wikimedia Commons, public domain

Patterson built his Dayton factory with walls of glass so workers had daylight and fresh air, unusual in 1902. Visitors toured it as a model plant. The same company that treated its workers so well was soon convicted for its tactics against competitors.

Look closely

- Find the windows. What did they mean for workers' health and safety?
- Look at the machine tools and belts. What kind of work was done here?
- Count the workers you can see. How large was the operation?

Talk about it

1. Why would a company that cared so much about its workers fight competitors unfairly?
2. How could visitors' tours of this factory help sell cash registers?
3. What does this picture leave out about NCR's business?

Safety first. A parent approves every contact and setting. Do not approach strangers or sell door to door.

PROJECT

Map and Measure Your Sales Process

You will map the sales process for your venture, measure each stage from your sales log and real contacts, and improve the weakest stage.

You will need

- Your sales log from Lesson 7.1
- Spreadsheet
- A parent to supervise contacts

Steps

1. Write each stage of your sales process as it actually happens for your venture.
2. For one or two weeks, record numbers at each stage: people reached, conversations, demonstrations or samples, sales, follow-ups.
3. Compute conversion at each stage and your overall close rate.
4. Set a sales goal for next month and compute how many contacts and conversations you need.
5. Identify the weakest stage and design one honest improvement (a better sample, a clearer price card, a follow-up note).
6. Test the improvement for a week and compare.
7. Write a paragraph on what changed and why.

Tips

- Small samples bounce around; keep counting before drawing conclusions.
- Follow-up is often the most neglected stage.

Check your work

☐ I can name the stages of a sales process.

☐ I measured each stage and computed conversion rates.

☐ I tested an improvement to the weakest stage.

LEDGER NOTEBOOK

1. Draw your sales funnel with numbers at each stage.
2. Copy your goal calculation.
3. Write the NCR timeline: 1884 Patterson buys control; 1887 primer; 1890s sales school; 1913 conviction and flood relief; 1915 reversal; 1914 Watson leaves for IBM.

KEY FORMULAS

$$\text{Close rate} = \frac{\text{sales}}{\text{conversations}}$$

$$\text{Conversations needed} = \frac{\text{sales goal}}{\text{close rate}}$$

From history. Many later business leaders trained at NCR under Patterson, earning it the nickname "the university of salesmanship." Charles Kettering, who invented the electric cash register at NCR, later developed the electric self-starter for automobiles.

WORKED EXAMPLES

Example 1. A student's close rate in conversations at church events is 30%. Each sale brings $8 of contribution. How many conversations are needed to earn $240 of contribution?

Show solution

1. Sales needed: $240/8 = 30$.
2. Conversations: $30/0.30 = 100$.

Answer: 100 conversations. Raising the close rate to 40% would cut that to 75.

Example 2. A salesman earns a $200 monthly base plus 8% commission on sales. His quota is $6,000; he sells $7,500. Find his pay and quota attainment.

Show solution

1. Commission: $0.08 \times 7{,}500 = \$600$; pay $800.
2. Attainment: $7{,}500/6{,}000 = 125\%$.

Answer: $800; 125% of quota.

Example 3. A funnel: 200 prospects contacted, 60 conversations, 25 demonstrations, 10 sales. Find the conversion at each stage and the weakest stage.

Show solution

1. Contact to conversation: $60/200 = 30\%$.
2. Conversation to demo: $25/60 \approx 42\%$.
3. Demo to sale: $10/25 = 40\%$.

Answer: The first stage (30%) is weakest; improving how prospects are approached would add the most.

PRACTICE

1. Easy Why did Patterson believe the cash register had to be actively sold?

   Show answer

   Shopkeepers did not think they needed an expensive machine; salesmen had to show how it stopped theft and errors.

2. Easy Name four tools Patterson used to build his sales force.

   Show answer

   A memorized sales primer; training school with a model store; exclusive territories; quotas and rewards (also demonstrations).

3. Easy Name the stages of a sales process.

   Show answer

   Prospecting, approach, needs discovery, presentation or demonstration, handling objections, closing, follow-up.

4. Medium 18 sales from 60 conversations. Find the close rate.

   Show answer

   30%.

5. Medium Goal: 45 sales. Close rate 25%. How many conversations?

   Show answer

   180.

6. **Medium** Base $150 plus 10% commission; sales $3,200. Find pay.

Show answer

$470.

7. **Medium** What tactics led to NCR's 1913 antitrust conviction?

Show answer

Selling "knocker" machines below cost to drive rivals out, buying out competitors and intimidating their customers.

8. **Hard** How can commissions and quotas tempt salespeople to act badly? Suggest one safeguard.

Show answer

Pay tied only to volume rewards pushing unneeded products or misrepresenting them. Safeguards: count returns and complaints against commissions; reward customer satisfaction; supervise honestly.

9. **Hard** Patterson's company was both generous to workers and ruthless to competitors. How should we judge it with the six stakeholders?

Show answer

High for workers (conditions, flood relief) and customers who gained useful machines; low for the community of competitors and fair markets. A great business serves all stakeholders, including through fair competition.

10. **Hard** Funnel: 150 contacted, 45 talk, 15 buy. If you raise talk rate to 40%, keeping the later rate, how many buy?

Show answer

Later rate $15/45 = 1/3$; 60 talk, 20 buy.

11. **Challenge** A salesperson can make 20 conversations a day with a 15% close rate, or 12 deeper conversations with a 30% close rate. Each sale yields $20 contribution, but deeper conversations produce half as many returns (from a 10% to a 5% return rate, each return costing the full $20). Which approach earns more per day?

    Show answer

    Quick: 3 sales, 0.3 returns: $60 - 6 = \$54$. Deep: 3.6 sales, 0.18 returns: $72 - 3.6 = \$68.40$. The deeper approach earns more and serves customers better.

COMMON MISTAKES

- Counting only sales and not conversations, so you cannot see where people drop out.
- Setting goals without calculating the work needed to reach them.
- Letting the pursuit of quota override honesty.

Make it a game · Five Stages Hallway. Lay five sheets of paper along a hallway, one per stage of a sales process. Walk the stages in order as a salesperson, with your parent as the prospect, and say what you do at each. Then run ten pretend prospects and calculate your close rate. Finish by naming the point where Patterson's company crossed into illegal tactics.

Scripture. “Seest thou a man diligent in his business? he shall stand before kings; he shall not stand before mean men.” (Proverbs 22:29, KJV)

Diligence in learning a trade, including the trade of selling, is honored in Scripture. Diligence never excuses dishonesty, as NCR’s story shows.

7.3 Consultative Selling and Listening: Franklin's Modest Questions

OBJECTIVES

- Tell how Benjamin Franklin gave up blunt contradiction for modest questions and why he found it more persuasive.
- Explain consultative selling and Neil Rackham's research on questions in larger sales.
- Plan and practice a needs-discovery conversation using situation, problem, implication and need-payoff questions.

> **Warm-up.** Have a two-minute conversation with a parent in which you are not allowed to make any statement, only ask questions, to find out what he or she would want in a perfect weekend. What did you learn that you would have missed by talking?

WATCH

Is SPIN® Selling still relevant? Interview with Neil Rackham

Huthwaite International · 5:19

https://www.youtube.com/watch?v=1UlDa-OJYxE

> **WHEN TO WATCH**
> After the story of Franklin, before the SPIN questions.

Note: An interview with Neil Rackham from Huthwaite International, the firm where his research was done.

BACKUP VIDEO

Neil Rackham - How should sellers apply SPIN® Selling questions

Huthwaite International · 1:31

https://www.youtube.com/watch?v=9IXcrP46BDk

Before your practice conversations.

KEY TERMS

consultative selling

Selling by first understanding a customer's situation and needs through questions, then recommending what truly fits.

active listening

Listening closely, then restating what you heard to confirm you understood.

open question

A question that invites explanation rather than yes or no.

SPIN questions

Situation, problem, implication and need-payoff questions, from Neil Rackham's research on successful sales calls.

talk ratio

The share of a conversation in which the salesperson speaks; good consultative sellers keep it low.

CORE IDEAS

The story. As a young printer in Philadelphia, Benjamin Franklin loved to argue and win. In his *Autobiography* he tells how he read of Socrates' method of asking questions and adopted it, drawing people into admitting things they had not foreseen. Later he gave up even that cleverness. He made it a rule never to contradict others bluntly or to assert his own opinions positively, and to say instead, "I conceive," or "it appears to me at present." He found that people received his proposals far more readily, and he credited this habit with much of his success in persuading others in business and public life.

How they figured it out. In the 1970s and 1980s researchers led by Neil Rackham at the British firm Huthwaite observed more than 35,000 sales calls in many countries to find what successful salespeople did differently in large, complex sales. Their answer, published in *SPIN Selling* (1988), was that successful sellers asked more questions and better ones: questions about the customer's **situation**; about **problems** and difficulties; about the **implications** of those problems (what they cost); and **need-payoff** questions that let the customer state the value of a solution. Talking at length about product features, by contrast, did little to win large sales.

The big idea. Consultative selling treats the salesperson as an adviser. It begins by understanding: ask **open questions**, listen actively, restate what you heard, and only then recommend. Its goal is not to win an argument but to help the customer see his own need clearly and decide well, which sometimes means recommending a different product or none. A low **talk ratio** is a good sign: the customer should do most of the talking.

Questions with integrity. Questions can be used to manipulate, by leading a customer step by step into a corner. That is not the purpose here. Ask questions to understand, accept answers that point away from a sale, and never fake interest. Scripture puts it simply: “let every man be swift to hear, slow to speak” (James 1:19).

In business today. Consultative selling is standard wherever purchases are large or complicated: equipment, services, insurance, construction. Even a small venture benefits: a baker who asks what an event is for, how many guests and what they love will sell the right cakes and win a customer for years.

PICTURE STUDY



Benjamin Franklin, Joseph Siffrein Duplessis, about 1785 · Oil on canvas · National Portrait Gallery, Smithsonian Institution

Image: Wikimedia Commons, public domain

Duplessis painted Franklin several times during his years in France, where he served as the American minister and won French help for the young United States largely through patient, modest persuasion. He wears a plain coat, not court finery.

Look closely

- Look at Franklin's expression. Does he look like a man who argues or one who listens?
- Look at his clothing. What impression did plain dress make among French courtiers?
- Notice the lighting on his face. Where does the painter want you to look?

Talk about it

1. How might Franklin's habit of modest questions have helped him as a printer selling to customers?
2. Why can a humble manner persuade better than a forceful one?
3. How would you describe the manner you want to have with customers?

> **Safety first.** Hold conversations only with people a parent approves, with a parent nearby. Do not collect personal information beyond what you need to deliver an order.

PROJECT

Needs-Discovery Conversations

You will write a question guide for your venture, practice it, and hold at least five real consultative conversations with potential customers you know, recording what you learn and your talk ratio.

You will need

- Ledger notebook and your sales log
- A phone timer (to estimate talk time) or a parent to keep time
- A parent to supervise

Steps

1. Write two questions of each SPIN type for your venture.
2. Practice the guide in a role-play with a parent; have the parent time how long you talk.
3. Hold at least five real conversations with potential customers you know, with a parent nearby.
4. In each, ask before you present; restate the customer's need before recommending anything.
5. Record in your log: the need you heard, what you recommended (including "nothing" or "someone else"), the outcome, and your estimated talk ratio.
6. Compare outcomes with talk ratio and with how many problem and implication questions you asked.
7. Write a paragraph on what you learned about listening.

Tips

- Write down the customer's exact words about the problem; use them when you recommend.
- Silence after a question is not a failure; wait.

Check your work

☐ I can write and ask SPIN questions.

☐ I held five consultative conversations and recorded talk ratios.

- [ ] I recommended what fit, even when it was not my product.

LEDGER NOTEBOOK

1. Copy your SPIN question guide.
2. Make a table of your five conversations with talk ratio, questions asked and outcome.
3. Copy one sentence from Franklin's *Autobiography* about modest speech (look it up) and write what it means for selling.

KEY FORMULAS

$$\text{Talk ratio} = \frac{\text{seller's speaking time}}{\text{total conversation time}}$$

From history. Franklin listed humility as the last of his thirteen virtues, with the note "Imitate Jesus and Socrates." He admitted in his *Autobiography* that he could not boast of much success in acquiring the reality of the virtue, but he did acquire a good deal of its appearance in his speech.

WORKED EXAMPLES

Example 1. Write one question of each SPIN type for a student offering weekly yard care to an older neighbor the family knows.

Show solution

1. Situation: "How do you take care of the yard now?"
2. Problem: "Which parts of the yard work are hardest for you?"
3. Implication: "When the mowing gets put off, what happens? Does it affect anything else?"
4. Need-payoff: "If the mowing and edging were done every Saturday, how would that help you?"

Answer: Four questions that help the customer describe her own situation and need, before any offer is made.

Example 2. In a 10-minute conversation the seller spoke for 7 minutes. Find the talk ratio. What should change?

Show solution

1. $7/10 = 70\%$.
2. A consultative target is well under half; ask more questions and listen.

Answer: 70%, too high. Aim for 30–40% by asking questions and summarizing rather than presenting.

PRACTICE

1. Easy What phrases did Franklin use instead of blunt assertions?

   Show answer

   "I conceive," "I apprehend," "it appears to me at present" (or similar modest phrases).

2. Easy What does SPIN stand for?

   Show answer

   Situation, problem, implication, need-payoff.

3. Easy Define active listening.

   Show answer

   Listening closely and restating what you heard to confirm understanding.

4. Medium What did Rackham's research find about successful sellers in large sales?

   Show answer

   They asked more and better questions, especially about problems, implications and the value of solutions, rather than talking about features.

5. Medium Seller spoke 4 of 15 minutes. Find the talk ratio.

   Show answer

   About 27%.

6. Medium Turn “This planter is self-watering and made of cedar” into a needs-discovery question.

Show answer

Sample: “How often are you able to water your plants, and what happens when you travel?”

7. Medium Why might Franklin’s modesty have made him more persuasive?

Show answer

People resist being contradicted; modest phrasing lets them consider an idea without losing face, so they agree more readily.

8. Hard When does questioning become manipulation?

Show answer

When questions are designed to trap or pressure rather than understand, when the seller ignores answers that point away from the sale, or when interest is faked.

9. Hard A customer’s answers show your product will not solve her problem. What should you do?

Show answer

Say so honestly, and suggest what might help (even a competitor or a simpler solution). The trust earned is worth more than the sale.

10. Hard Write an implication question for a family whose old freezer keeps failing.

Show answer

Sample: “When the freezer fails, how much food do you lose, and what does it cost to replace it?”

11. Challenge Explain how James 1:19 and Rackham’s research point to the same practice, and where they differ in purpose.

Show answer

Both commend hearing before speaking. Rackham observed that it wins sales; James commands it as a matter of love and self-control. A Christian seller listens because it honors the customer, and also finds that it works.

COMMON MISTAKES

- Presenting before understanding.
- Asking only situation questions and never reaching the problem.
- Ignoring answers that point away from a sale.

Make it a game · Franklin's Modest Questions. Your parent plays a customer with a made-up need. For two minutes you may only ask open questions, and you may not pitch. Afterward, estimate who talked more and aim for your parent talking at least two thirds of the time. Name one situation question and one problem question. Then tell how Franklin gave up blunt contradiction.

Scripture. “Wherefore, my beloved brethren, let every man be swift to hear, slow to speak, slow to wrath:” (James 1:19, KJV)

Swift to hear and slow to speak is the whole method of consultative selling in seven words, and it is commanded for every conversation, not only sales.

7.4 Handling Objections and Closing without Manipulation

OBJECTIVES

- Explain the AIDA model (E. St. Elmo Lewis, 1898) and why the FTC adopted its Cooling-Off Rule in 1972 after high-pressure selling.
- Respond honestly to common objections about price, need, trust and timing.
- Ask for the sale clearly, recognize manipulative tactics, and calculate how better objection handling changes results.

> **Warm-up.** List three reasons people give for not buying something. For each, write whether it is a real reason, a polite excuse or a request for more information.

WATCH

Biz Kid$: Sell, Sell (The Science Of Sales) (Accessible Preview)

Described and Captioned Media Program · 4:08

https://www.youtube.com/watch?v=MkGhiGsSL_o

> **WHEN TO WATCH**
> After the story, before the practice on objections.

Note: A preview of a Biz Kid$ public-television episode on the science of selling.

KEY TERMS

objection

A customer’s concern or reason for not buying yet; often a request for information.

closing

Asking the customer for a decision.

AIDA

Attention, interest, desire, action: the stages of persuasion described by the advertiser E. St. Elmo Lewis in 1898.

high-pressure tactics

Methods that push a customer to decide before he is ready: false urgency, refusing to leave, guilt, confusion.

cooling-off period

A time after a sale during which the buyer may cancel, such as the FTC's three-day rule for many sales made at a buyer's home.

CORE IDEAS

The story. In 1898 the advertising man E. St. Elmo Lewis described persuasion as a series of steps: attract **attention**, maintain **interest**, create **desire**, then get **action**. Salesmen adopted the idea, and through the twentieth century many sales courses taught closing techniques to push customers through the steps. Some sellers, especially door to door, used them harshly: staying in the home for hours, inventing deadlines, confusing buyers with contracts. So many people signed purchases they regretted that in 1972 the Federal Trade Commission adopted the Cooling-Off Rule, giving buyers three days to cancel many sales made at their homes or at temporary locations.

How they figured it out. Honest salespeople learned that an **objection** is usually not a wall but a question. "It's too expensive" may mean "I don't yet see enough value," "I can't pay it all now," or "I can get it cheaper elsewhere." The honest response is to ask what lies behind the objection, answer it with facts, and accept a "no" that is a real no. Common objections fall into four groups: price, need, trust and timing. Each has an honest answer: show value or a smaller option; confirm the need or agree it is not there; offer proof, references and a guarantee; respect timing and follow up.

The big idea. Closing is simply asking for a decision, and it is respectful to ask clearly once the customer has what he needs: "Would you like to order the dozen for Saturday?" What is wrong is manipulation: **high-pressure tactics** such as false scarcity ("only two left" when there are fifty), false deadlines, refusing to take no, guilt, flattery, or burying terms in fine print. A good test: would I be comfortable if the customer later learned everything I said and why I said it?

Measuring. In your sales log, record every objection and its outcome. You will find that a few objections come up again and again. Preparing an honest answer to each one, perhaps a sample, a guarantee, a smaller size or a clear explanation, raises your close rate without any pressure at all.

In business today. Laws such as the Cooling-Off Rule exist because some sellers refused to restrain themselves. The Christian standard is higher: “But have renounced the hidden things of dishonesty, not walking in craftiness” (2 Corinthians 4:2).

PICTURE STUDY



The Moneylender and His Wife, Quentin Matsys, 1514 · Oil on panel · Louvre, Paris

Image: Wikimedia Commons, public domain

Quentin Matsys painted this moneylender in Antwerp, the busiest trading city in northern Europe. The old frame is said to have carried a verse from Leviticus about just weights. The wife is distracted from her prayer book by the money, a quiet question about where a trader's heart lies.

Look closely

- Find the balance. What is being weighed, and why must it be honest?
- Look at the wife's eyes and hands. Where is her attention?
- Find the round mirror on the table. What does it show outside the room?
- Look at the shelf behind them. What objects tell you about their business?

Talk about it

1. How is weighing coins honestly like answering a customer's objection honestly?
2. What does the painting suggest about the danger of loving money?
3. Who might be the person reflected in the mirror, and what might he be waiting for?

Safety first. Practice and sell only with people and at places a parent approves. Never pressure anyone, and never sell door to door.

PROJECT

The Objection Workbook

You will collect the real objections from your sales log, prepare honest answers, role-play them, and measure the effect on your close rate.

You will need

- Your sales log
- Index cards
- A parent to role-play

Steps

1. List every objection recorded in your sales log; group them into price, need, trust and timing; count each.
2. For the three most common, write an honest answer on an index card, with any proof (sample, reference, guarantee) you can offer.
3. Write a clear, low-pressure closing question for your venture.
4. Role-play each objection with a parent until your answer sounds natural and respectful.
5. Use the cards in real conversations for a week and record outcomes.
6. Compare your resolution and close rates before and after.
7. Write a paragraph: which objection was really a “no,” and how did you accept it gracefully?

Tips

- Ask “Can you tell me more?” before answering an objection.
- Accepting a no gracefully often earns a yes later.

Check your work

- ☐ I can classify objections and answer them honestly.
- ☐ I can ask for the sale clearly without pressure.
- ☐ I measured the change in my results.

LEDGER NOTEBOOK

1. Copy your objection tally and your three answer cards.
2. Draw the AIDA steps with an honest action at each.
3. Write a list of five tactics you will never use, and why.

KEY FORMULAS

$$\text{Extra sales} = \text{objections raised} \times \Delta(\text{share resolved}) \times \text{close rate after resolution}$$

From history. E. St. Elmo Lewis also wrote in 1908 that a business's best advertisement is a satisfied customer. The phrase "caveat emptor" ("let the buyer beware") was once a principle of trade; modern consumer law and honest business both lean instead toward "let the seller be honest."

WORKED EXAMPLES

Example 1. Classify each objection and give an honest response: (a) "That's more than I wanted to spend." (b) "I'm not sure I'll use it." (c) "I've never bought from you before." (d) "Not this week."

Show solution

1. (a) Price: ask what she hoped to spend; explain what the price includes; offer a smaller size if one fits.
2. (b) Need: ask how she would use it; if she truly would not, agree and do not press.
3. (c) Trust: offer a sample, references from people she knows, and your guarantee.
4. (d) Timing: ask when would suit, note it in your log and follow up then.

Answer: Price, need, trust, timing, each answered with facts and respect rather than pressure.

Example 2. In a month, 40 customers raise objections. Before preparation you resolved 25% of them, and 60% of those then bought. After preparing honest answers you resolve 50%. With the same 60% buying, how many extra sales? At $9 contribution, what is the gain?

Show solution

1. Before: $40 \times 0.25 \times 0.60 = 6$ sales.
2. After: $40 \times 0.50 \times 0.60 = 12$ sales.
3. Extra: 6 sales; $6 \times 9 = \$54$.

Answer: Six extra sales and $54 a month, won by better answers, not pressure.

PRACTICE

1. Easy What does AIDA stand for, and who described it?

   Show answer

   Attention, interest, desire, action; E. St. Elmo Lewis, 1898.

2. Easy What does the FTC Cooling-Off Rule do?

   Show answer

   Gives buyers three days to cancel many sales made at their homes or at temporary locations.

3. Easy Name the four common groups of objections.

   Show answer

   Price, need, trust, timing.

4. Medium Give an honest response to “I can get it cheaper at the store.”

   Show answer

   Sample: “That may be true. Mine is made fresh the same day and delivered; if price is most important, the store may be the better choice for you.”

5. Medium Name three high-pressure tactics.

   Show answer

   False scarcity, false deadlines, refusing to take no, guilt, burying terms in fine print.

6. Medium Why is asking for the sale not manipulative?

Show answer

Asking clearly for a decision respects the customer's freedom to say yes or no; manipulation is pressure or deceit that undermines that freedom.

7. Medium 30 objections; resolution rate rises from 30% to 45%; 50% of resolved customers buy. Find extra sales.

Show answer

$30 \times 0.15 \times 0.50 = 2.25$, about 2 extra sales.

8. Hard Why did the FTC create the Cooling-Off Rule in 1972?

Show answer

High-pressure door-to-door and temporary-location sellers were pushing people into purchases they regretted, so buyers needed time to reconsider without pressure.

9. Hard Write a closing question for your venture that is clear but not pushy.

Show answer

Sample: "Would you like me to bring two loaves on Saturday, or would you rather try one first?"

10. Hard Apply the test "Would I be comfortable if the customer knew everything I said and why?" to the tactic "Only three left at this price!" when the seller has plenty.

Show answer

Fails: the customer would rightly feel deceived. It is false scarcity and dishonest.

11. Challenge From your sales log, list your three most common objections with counts, write an honest prepared answer for each, and estimate how many extra sales a month resolving half of them would bring.

Show answer

Answers vary; credit for real counts, honest answers and a correct estimate using resolution and close rates.

COMMON MISTAKES

- Arguing with an objection instead of understanding it.
- Treating every no as a challenge to overcome.
- Using false urgency or scarcity to force a decision.

Make it a game · Objection Cards. Make four cards labeled price, need, trust and timing. Your parent draws one and plays a customer raising it. You answer honestly in thirty seconds, with no pressure. Your parent rules whether you informed or pushed. After four rounds, write the four AIDA stages from memory and explain why the 1972 Cooling-Off Rule exists.

Scripture. "But have renounced the hidden things of dishonesty, not walking in craftiness," (2 Corinthians 4:2, KJV)

Paul describes his own preaching, but the standard applies to every kind of persuasion: no hidden dishonesty and no craftiness, only the truth plainly set before the other person's conscience.

7.5 Negotiation: Abraham at Machpelah and Principled Bargaining

OBJECTIVES

- Tell how Abraham negotiated for the cave of Machpelah in Genesis 23 and what it shows about honest bargaining.
- Explain interests versus positions, options for mutual gain, objective criteria, BATNA and the zone of possible agreement.
- Prepare for and conduct a practice negotiation, calculating each side's bargaining range.

> **Warm-up.** Two sisters both want the last orange. One wants the juice; the other wants the peel for baking. What is the best solution, and what does it teach about asking why someone wants something?

WATCH

Interests Behind Negotiating Positions

William Ury · 3:01

https://www.youtube.com/watch?v=vdA2wecb4k0

> **WHEN TO WATCH**
> After the story of Abraham, before the big idea.

Note: William Ury, co-author of Getting to Yes, explains interests behind positions.

BACKUP VIDEO

Alternatives and BATNA in Interest Based Negotiation - Noam Ebner

Noam Ebner: Negotiation, Conflict Resolution & ADR · 5:46

https://www.youtube.com/watch?v=FSyABLfStXE

Before the practice negotiation, on alternatives and BATNA.

KEY TERMS

position

What a party says it wants ("I want $500").

interest

Why a party wants it: the need, worry or goal behind a position.

BATNA

Best alternative to a negotiated agreement: what you will do if this negotiation fails.

reservation price

The worst price at which a party will still agree (the most a buyer will pay, the least a seller will accept).

ZOPA

Zone of possible agreement: the range between the seller's and the buyer's reservation prices.

CORE IDEAS

The story. When Sarah died in Hebron, Abraham, a stranger in the land, needed a burial place. In Genesis 23 he asked the sons of Heth to approach Ephron the Hittite about his cave of Machpelah. Ephron publicly offered to give it, with the field, for nothing. Abraham insisted on paying. Ephron then named a value, "four hundred shekels of silver; what is that betwixt me and thee?" Abraham did not haggle. He weighed out the full amount "current money with the merchant," before witnesses at the city gate, and the field, the cave and the trees were made sure to him.

How they figured it out. Abraham's interest was not a low price but a secure, undisputed title to a family burial place in a land where he was a sojourner. A gift could be disputed later; a public purchase at a named price, witnessed at the gate, could not. Ephron's interest included honor and a fair return. By paying openly, Abraham gave Ephron both, and secured what he most needed. Centuries later, the Harvard Negotiation Project's Roger Fisher and William Ury, in *Getting to Yes* (1981), described the same principles: separate the people from the problem; focus on **interests**, not **positions**; invent options for mutual gain; and insist on objective criteria.

The big idea. Before negotiating, know your **BATNA**: what you will do if there is no deal. It sets your **reservation price**, the point beyond which you walk away. The other side has one too. If the buyer's highest acceptable price is above the seller's lowest, a **ZOPA** exists and a deal is possible; where in the zone it lands depends on information, fairness and skill. Principled negotiators look for options that make both sides better off (delivery dates, quantities, terms) and use fair standards such as market prices to settle the rest.

Honesty in negotiation. You need not reveal your reservation price, but you must not lie: about facts, about other offers you do not have, or about your intentions. Do not take advantage of someone's ignorance or distress to drive an unjust bargain (Leviticus 25:14, "ye shall not oppress one another"). A deal both sides are glad of builds a relationship that lasts.

In business today. Entrepreneurs negotiate with suppliers, landlords, partners, customers and employees. Preparation (interests, options, criteria, BATNA, ZOPA) matters more than cleverness. A good negotiator is firm on interests, flexible on means, and honest throughout.

PICTURE STUDY



Woman Holding a Balance, Johannes Vermeer, about 1662–1663 · Oil on canvas · National Gallery of Art, Washington, D.C.

Image: Wikimedia Commons, public domain

Abraham weighed out silver "current money with the merchant." In Vermeer's quiet painting a woman holds a small balance, perfectly level, over a table with pearls and gold. Behind her hangs a painting of the Last Judgment, a reminder that every bargain is weighed by a higher Judge.

Look closely

- Look closely at the balance. Is anything in its pans?
- Find the painting on the back wall. What subject does it show?
- Find the mirror and the window. Where does the light fall?
- Look at the woman's face. Is she eager or calm?

Talk about it

1. Why might a level, empty balance be a picture of fairness?
2. How does the painting of judgment behind her change the meaning of weighing gold?
3. How would you show fairness in your own negotiations?

PROJECT

A Prepared Negotiation

You will prepare and conduct a practice negotiation over a real purchase or arrangement for your venture (a supply order, a booth fee, a used tool, a partner's profit split), with a parent playing the other side.

You will need

- A negotiation preparation sheet (below)
- Real prices for comparison
- A parent to play the other side

Steps

1. Choose a real issue for your venture.
2. Prepare: your interests and theirs (guess); your BATNA and reservation price; their likely BATNA; the ZOPA if any; at least three options for mutual gain; one or two objective criteria with real data.
3. Write what you will not do (lie, pressure, exploit).
4. Conduct the negotiation with a parent in role for 15 minutes.
5. Record the outcome, where it fell in the ZOPA and how options were used.
6. Switch roles and negotiate again.
7. Write a paragraph on what preparation helped most and how you kept the negotiation honest.

Tips

- Ask "What matters most to you about this?" early.
- Use silence and summaries rather than pressure.

Check your work

☐ I can explain interests, positions, BATNA and ZOPA.

☐ My preparation sheet is complete with real data.

☐ I negotiated honestly and recorded the result.

LEDGER NOTEBOOK

1. Draw a number line with both reservation prices and the ZOPA, and mark the agreed price.
2. Copy your preparation sheet.
3. Write out Genesis 23:16 and note what made Abraham's purchase secure.

KEY FORMULAS

$$\text{ZOPA} = [\,\text{seller's reservation},\ \text{buyer's reservation}\,] \text{ if seller's} \le \text{buyer's}$$

From history. Roger Fisher, a Harvard law professor, served in the Second World War and later worked on international negotiations. *Getting to Yes*, written with William Ury (and later Bruce Patton), has been translated into dozens of languages and is still used to teach negotiation.

WORKED EXAMPLES

Example 1. A student wants to buy a used table saw for her woodworking venture. A new one costs $320; a similar used saw elsewhere is listed at $180 (her BATNA). She will pay at most $190. The seller, who is moving, has a dealer offer of $120 and will accept no less than $130. Find the ZOPA and a fair settlement using an objective criterion.

Show solution

1. Buyer's reservation: $190. Seller's reservation: $130.
2. ZOPA: $[\$130,\ \$190]$.
3. Objective criterion: recent prices of similar used saws, say $150–$170.
4. A price of $160 is within the ZOPA and near market value.

Answer: ZOPA $130 to $190; a fair settlement near $160, supported by comparable prices. Options such as the seller including blades, or the buyer picking it up on moving day, can add value for both.

Example 2. Genesis 23: Abraham paid 400 shekels of silver. If a shekel weighed about 11.4 grams, how much silver is that in kilograms?

Show solution

1. $400 \times 11.4 = 4{,}560$ g ≈ 4.56 kg.

Answer: About 4.6 kg of silver (shekel weights varied by time and place, so this is approximate).

Example 3. A supplier quotes $2.00 a unit for 500 units. You need 500 but care most about delivery before a fair; the supplier cares most about filling a slow week. Suggest a mutual-gain option.

Show solution

1. Your interest: on-time delivery. Supplier's interest: work during a slow week.
2. Option: order now for production during the slow week, guaranteeing early delivery, at $1.85 because it fills the supplier's idle time.

Answer: Both gain: you get early delivery at a lower price; the supplier keeps workers busy. Interests, not positions, produced the deal.

PRACTICE

1. Easy What did Abraham buy in Genesis 23, from whom, and for how much?

   Show answer

   The cave and field of Machpelah, from Ephron the Hittite, for 400 shekels of silver.

2. Easy Define BATNA.

   Show answer

   Best alternative to a negotiated agreement: what you will do if the negotiation fails.

3. Easy Name the four principles of *Getting to Yes*.

   Show answer

   Separate people from the problem; focus on interests, not positions; invent options for mutual gain; insist on objective criteria.

4. Medium Seller will accept no less than $70; buyer will pay at most $95. Find the ZOPA.

Show answer

$70 to $95.

5. Medium Seller's minimum $120; buyer's maximum $100. Is a deal possible on price alone? What might help?

Show answer

No ZOPA on price. Adding value (extras, delivery, payment terms) or changing what is traded might create one.

6. Medium Why did Abraham insist on paying rather than accept the field as a gift?

Show answer

A public purchase at a named price before witnesses gave him a secure, undisputed title; a gift could be challenged later.

7. Medium Distinguish position and interest in this case: a landlord says, "Rent is $800, no less."

Show answer

Position: $800. Possible interests: steady income, a reliable tenant, low vacancy, covering costs. A long lease or good care might meet them at a different price.

8. Hard Is it honest to say "I have another offer for $150" when you do not? Explain.

Show answer

No. It is a lie about a material fact. You may decline to reveal your limits, but you may not invent facts.

9. Hard How does a strong BATNA improve your negotiating position?

Show answer

You can walk away if terms are poor, so you need not accept a bad deal, and the other side knows it.

10. Hard Two partners argue over a $600 profit split. Suggest an objective criterion.

Show answer

Split in proportion to agreed contributions (money and hours), as written in their agreement, or by a standard wage for hours plus a return on money.

11. Challenge A buyer's BATNA is a $260 item elsewhere plus $20 delivery; a seller's BATNA is selling to a dealer for $200. The seller's item saves the buyer the delivery. Find each side's reservation price, the ZOPA, and the midpoint.

Show answer

Buyer will pay up to $280; seller accepts at least $200. ZOPA $200–$280; midpoint $240.

COMMON MISTAKES

- Arguing over positions without asking about interests.
- Entering a negotiation without knowing your BATNA.
- Lying about other offers or facts.

Make it a game · Machpelah Bargain. Each of you secretly writes a lowest or highest acceptable price on a slip for a pretend used bicycle, along with a better alternative, your BATNA. Then negotiate openly. After the deal, reveal the slips and see whether a zone of agreement existed. Retell how Abraham bargained for the cave of Machpelah, and what honest bargaining looked like.

Scripture. "And Abraham hearkened unto Ephron; and Abraham weighed to Ephron the silver, which he had named in the audience of the sons of Heth, four hundred shekels of silver, current money with the merchant." (Genesis 23:16, KJV)

Abraham paid the named price openly, in full, in good money and before witnesses. Fair dealing made his title secure and honored the seller.

UNIT 7

Selling

Nothing happens in a business until someone sells something. Yet selling has a poor reputation, because many people have met salesmen who pushed, flattered or lied. This unit teaches selling as a service: helping a customer find out whether your product meets his need, and telling the truth even when it costs you a sale. It begins with Proverbs 20:14 and John Wanamaker, who put one honest price on every item, and then studies John H. Patterson of the National Cash Register Company, who built the first modern sales school, with lessons both good and bad.

Then you will practice **consultative selling**, asking good questions and listening, as Benjamin Franklin learned to do when he gave up arguing; learn to handle **objections and close** without pressure or manipulation; and learn principled **negotiation**, from Abraham buying a burial field from Ephron the Hittite to the modern ideas of interests, options and a best alternative. You will keep a real sales log for your venture throughout the unit.

PREREQUISITES

- Has a product, price and marketing plan (Units 3–6)
- Can compute percents, averages and simple rates
- A parent available to supervise and role-play

MASTERY CHECKLIST

- ☐ I can explain why honesty is the foundation of selling and describe what an honest salesperson does and refuses to do.
- ☐ I can describe the stages of a sales process and calculate close rates, commissions and quota attainment.
- ☐ I can lead a consultative conversation with open questions and summarize a customer's need accurately.
- ☐ I can respond to common objections honestly, ask for the sale clearly, and recognize manipulative tactics.
- ☐ I can prepare for a negotiation by identifying interests, options, objective criteria, my BATNA and the bargaining range.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- ***The Autobiography of Benjamin Franklin*** **(Project Gutenberg)**: Free. Read Franklin's account of giving up contradiction for modest questions (in Part One) with Lesson 7.3. Ages 13+.
- **Federal Trade Commission, "Buyer's Remorse: The FTC's Cooling-Off Rule"**: Free official explanation of the three-day right to cancel certain sales, with the reasons the rule exists. Use with Lesson 7.4. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

7.1 The Honest Salesperson: Proverbs 20:14 and John Wanamaker

3 sessions of 50 minutes

7.2 The Sales Process: John H. Patterson’s NCR Sales School 3 sessions of 50 minutes

7.3 Consultative Selling and Listening: Franklin’s Modest Questions

3 sessions of 50 minutes

7.4 Handling Objections and Closing without Manipulation 3 sessions of 50 minutes

7.5 Negotiation: Abraham at Machpelah and Principled Bargaining

3 sessions of 50 minutes

Unit 7 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Explain Proverbs 20:14 and what it teaches about honesty on both sides of a sale.

2. **5 pts**
   Name three practices John Wanamaker made famous and why they built trust.

3. **6 pts**
   800 units sold; 2.5% returned; each return costs $10. Find the cost of the guarantee. If the guarantee raised sales by 100 units with $7 contribution each, is it worth it?

4. **5 pts**
   Name the stages of a sales process.

5. **6 pts**
   Close rate 20%; goal 36 sales. How many conversations? If the close rate rises to 30%?

6. **6 pts**

   Base $250 plus 6% commission; quota $8,000; sales $9,200. Find pay and quota attainment.

7. **6 pts**

   Describe one strength and one serious wrong in John H. Patterson’s NCR.

8. **5 pts**

   What practice did Franklin adopt in speaking with others, and why did it help him persuade?

9. **6 pts**

   Write one situation, problem, implication and need-payoff question for a tutoring service.

10. **5 pts**

    A seller talks 9 minutes of a 12-minute conversation. Find the talk ratio and comment.

11. **6 pts**

    Classify and answer honestly: “I need to think about it.”

12. **5 pts**

    Why did the FTC adopt the Cooling-Off Rule in 1972?

13. **6 pts**

    50 objections; resolution rises from 20% to 40%; 55% of resolved customers buy; contribution $12. Find extra sales and extra contribution.

14. **6 pts**

    Seller’s minimum $240; buyer’s maximum $300. Find the ZOPA and a fair midpoint. Define BATNA.

15. **6 pts**

    Why did Abraham insist on paying for Machpelah, and what principle of good negotiation does it illustrate?

16. **16 pts**

Essay: “Selling is service.” Agree or disagree, using at least two people from this unit and one Scripture passage, and describe two practices you will use and two you will refuse in your own venture.

ANSWER KEY

1. A buyer runs down the goods to get a low price and then boasts; dishonesty in trade can come from buyers as well as sellers, and both are wrong.
2. One fixed price, plain advertising, a money-back guarantee; customers knew they would not be cheated and could return goods, so they came back.
3. Cost $800 \times 0.025 \times 10 = \$200$; gain \$700; net +\$500: yes.
4. Prospecting, approach, needs discovery, presentation or demonstration, handling objections, closing, follow-up.
5. 180; 120.
6. Pay $250 + 552 = \$802$; attainment 115%.
7. Strength: professional sales training, demonstrations and good working conditions (and flood relief in 1913). Wrong: illegal tactics against competitors (knocker machines, intimidation), leading to a 1913 antitrust conviction (overturned in 1915).
8. He stopped contradicting bluntly and used modest phrases and questions; people listened and agreed more readily when not put on the defensive.
9. Sample: S: "How is math going this year?" P: "Which topics are hardest?" I: "How does that affect grades or time at home?" N: "How would weekly help with those topics make a difference?"
10. 75%; far too high for consultative selling; ask more and listen.
11. Usually timing or an unstated concern (need, price or trust). Ask what she would like to think over, answer any question, and agree on a time to follow up; accept a real no.
12. High-pressure sales at homes and temporary locations led many buyers into regretted purchases; the rule gives three days to cancel.
13. $50 \times 0.20 \times 0.55 = 5.5$ extra sales; about \$66.
14. ZOPA \$240–\$300; midpoint \$270. BATNA: your best alternative if no agreement is reached.
15. To secure undisputed title through a public, witnessed purchase at a named price; it shows attention to underlying interests (security, honor) rather than simply getting the lowest price.

16. Graded on a clear thesis, accurate use of two figures (Wanamaker, Patterson, Franklin, Lewis, Abraham, Fisher and Ury), apt Scripture (Proverbs 20:14, James 1:19, 2 Corinthians 4:2, Matthew 7:12), and specific, honest practices.

PORTFOLIO PIECE: THE SALES NOTEBOOK

Assemble your product-knowledge sheet and guarantee, your sales log with close rates and a funnel, your SPIN question guide and conversation table, your objection workbook, and your negotiation preparation sheet with its outcome. Add a one-page reflection on the kind of salesperson you want to be and the evidence from your log that you are becoming one.

LOOK FOR	WHAT IT MEANS
Records	The sales log is complete and the numbers (close rates, funnel, talk ratios) are calculated correctly.
Method	Questions, objection answers and negotiation preparation are thorough and practiced.
Honesty	Every practice respects the customer; no pressure or deception appears in scripts or records.
Reflection	The reflection is specific and supported by the log.

UNIT 8

Operations

Operations is how a business actually makes and delivers what it sells: the steps, the materials, the people, the time and the quality. Great ideas fail when operations are sloppy, and ordinary products succeed when operations are excellent. This unit follows the great turning points. Henry Ford's moving assembly line of 1913 cut the time to build a Model T chassis from more than twelve hours to about an hour and a half. Toyota's production system, rooted in Sakichi Toyoda's self-stopping loom, taught the world to cut waste and stop to fix problems. W. Edwards Deming taught Japanese managers in 1950 that quality comes from improving the system, not from blaming workers.

Then you will follow goods from factory to customer through the **supply chain**, with Malcolm McLean, whose shipping container sailed on the *Ideal X* in 1956, and learn **customer service and scaling up** from Marshall Field's Chicago store and the McDonald brothers' Speedee Service System of 1948. Throughout, you will map, time and improve your own venture's process.

PREREQUISITES

- Has a product and a sales process (Units 3–7)
- Can compute rates, percents and averages
- A stopwatch (a phone timer is fine)

MASTERY CHECKLIST

- ☐ I can map a process, time each step, find the bottleneck and compute throughput and cycle time.
- ☐ I can identify the seven wastes, explain just-in-time and jidoka, and use the five whys.
- ☐ I can explain common-cause and special-cause variation, compute defect rates and the cost of poor quality, and apply plan-do-study-act.
- ☐ I can trace a supply chain, compute lead times and reorder points, and weigh its risks.
- ☐ I can design service standards, measure customer satisfaction and explain what must be standardized before a business can grow.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **The Henry Ford museum: digital collections**: Free photographs and documents of Ford's Highland Park plant and the moving assembly line. Use with Lesson 8.1. Ages 12+.
- **The W. Edwards Deming Institute**: Free articles explaining Deming's 14 points, the red bead experiment and plan-do-study-act. Use with Lesson 8.3. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

8.1 The Moving Assembly Line: Ford at Highland Park, 1913 3 sessions of 50 minutes

8.2 Lean Production: Sakichi Toyoda's Loom and the Toyota Production System

3 sessions of 50 minutes

8.3 Quality: W. Edwards Deming and the Red Beads 3 sessions of 50 minutes

8.4 The Supply Chain: Malcolm McLean and the Shipping Container

3 sessions of 50 minutes

8.5 Customer Service and Scaling Up: Marshall Field and the Speedee System

3 sessions of 50 minutes

Unit 8 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Describe what Ford's engineers did in 1913 and the effect on chassis assembly time.

2. **6 pts**
   Steps take 35, 60, 45 and 25 seconds. Find the bottleneck, cycle time, throughput per hour and labor time per unit.

3. **5 pts**
   Name two gains and two costs of the moving assembly line for its stakeholders.

4. **6 pts**
   Define jidoka and just-in-time and give the origin of each at Toyota.

5. **6 pts**
   Throughput 12 units a day; WIP 48. Find lead time. What WIP gives a 2-day lead time?

6. **5 pts**
   Name the seven wastes.

7. **6 pts**

   800 units, 48 defective. Find defect rate and yield. If each defect costs $3, what is the scrap cost?

8. **6 pts**

   Explain the red bead experiment and its lesson.

9. **5 pts**

   Distinguish common-cause and special-cause variation with examples.

10. **6 pts**

    Daily use 5; lead time 8 days; safety stock 10. Find the reorder point.

11. **6 pts**

    Describe McLean’s innovation and one group that gained and one that lost.

12. **6 pts**

    Loading 5,000 tons at $5.86 a ton versus $0.16 a ton. Find the saving.

13. **5 pts**

    What did the McDonald brothers change in 1948, and why did it make franchising possible?

14. **6 pts**

    60 customers; 75% retention; 20 new a year. Find customers after 2 years.

15. **5 pts**

    Write two measurable service standards for a venture of your choice.

16. **16 pts**

    Essay: Choose Ford, Toyota or Deming. Explain the operations idea, how it served customers, and how it affected workers. Then explain how you will apply the idea to your own venture without harming anyone who works with you.

ANSWER KEY

1. They moved the work past stationary workers who each did one task, timed and balanced the steps, and brought parts to the workers; chassis time fell from about 12.5 hours to about 1.5 hours.
2. 60 s step; 60 s; 60 per hour; 165 s.
3. Gains: cheap cars for customers; large profits; high wages after 1914. Costs: monotonous, tightly controlled work; intrusive inspections of workers' homes; pressure on competitors.
4. Jidoka: stop at once to fix problems (from Sakichi Toyoda's self-stopping loom). Just-in-time: make only what the next step needs when it needs it (from American supermarket restocking, developed by Taiichi Ohno).
5. 4 days; 24 units.
6. Overproduction, waiting, transport, overprocessing, inventory, motion, defects.
7. 6%; 94%; $144.
8. Workers scoop beads from a box with a fixed share of red "defects"; their results vary by chance, yet managers praise and punish them. Most variation comes from the system, which only management can change.
9. Common: built into the system (every batch has a few bubbles from the mixing method). Special: unusual event (one batch ruined by a dropped mold).
10. 50.
11. Standard steel containers moved by crane between trucks, trains and ships (Ideal X, 1956). Gained: customers and shippers through far cheaper transport. Lost: many longshoremen.
12. $5000 \times 5.70 = \$28{,}500$
13. A short menu, low prices, rehearsed kitchen layout and custom equipment; the standardized system could be taught and copied in other locations.
14. Year 1: 65; year 2: $65(0.75) + 20 = 68.75$, about 69.
15. Sample: orders confirmed within 24 hours; deliveries on the promised day 95% of the time.
16. Graded on accurate explanation of the idea, balanced stakeholder analysis (customers and workers), and a specific, humane application to the student's venture.

PORTFOLIO PIECE: THE OPERATIONS MANUAL

Assemble a short operations manual for your venture: the process map with timings and the bottleneck, your waste walk and five-whys fix, your quality standard with run chart and PDSA results, your supply-chain map with reorder points and contingencies, and your service standards with satisfaction and retention data. End with the one-page checklist someone else has successfully followed.

LOOK FOR	WHAT IT MEANS
Measurement	Times, defects, lead times and service data are recorded and calculated correctly.
Improvement	At least two changes are tested and their results reported honestly.
Clarity	The manual and checklist are clear enough for another person to follow.
Stewardship	Safety, care for helpers and respect for customers are built into the processes.

8.1 The Moving Assembly Line: Ford at Highland Park, 1913

OBJECTIVES

- Tell how Ford's engineers developed the moving assembly line at Highland Park in 1913 and what it did to cost, price, work and wages.
- Map a process, time each step, find the bottleneck and compute throughput and cycle time.
- Weigh the line's gains for customers against its costs for workers.

> **Warm-up.** Time yourself making three peanut-butter sandwiches one at a time. Then time yourself making three at once, doing each step for all three before the next step. Which was faster? Why?

WATCH

History of the Model T | The Henry Ford's Innovation Nation

The Henry Ford · 3:16

https://www.youtube.com/watch?v=gglrbduPbQ0

> **WHEN TO WATCH**
> After the story, before the process arithmetic.

Note: From The Henry Ford museum.

BACKUP VIDEO

7th October 1913: Ford Motor Company introduces the world's first moving assembly line

HistoryPod · 2:25

https://www.youtube.com/watch?v=NmaTLq-FBO8

Optional, a short summary of the 1913 line.

KEY TERMS

process map
A diagram of every step in making or delivering a product, in order.

cycle time
The time between finished units coming off a process; set by the slowest step.

bottleneck

The slowest step, which limits the output of the whole process.

throughput

Units completed per hour (or day).

line balancing

Dividing work so every station takes about the same time.

CORE IDEAS

The story. The Model T went on sale in 1908 at $850. Demand far exceeded what Ford's Highland Park plant in Detroit could build, because cars were assembled at fixed stations where teams of men brought parts to a stationary chassis. In the spring of 1913 Ford's engineers tried something new on a small part, the flywheel magneto. Instead of one man assembling a whole magneto, they set the parts on a waist-high line and had each worker do one small task and slide the piece along. Assembly time fell from about twenty minutes per magneto to thirteen, then to about five.

How they figured it out. They applied the idea to engines, transmissions and finally, in the fall of 1913, the whole chassis, pulled along by a rope and winch and later by a powered chain. They timed every motion, moved parts to the worker rather than the worker to the parts, set the line at a comfortable height, and balanced the stations. Chassis assembly time fell from about twelve and a half hours to about an hour and a half by early 1914. The price of the Model T fell year after year, to about $260 by the mid-1920s, and millions of families bought their first car. But the work was fast, repetitive and tightly controlled, and in 1913 many workers quit within weeks. In January 1914 Ford announced the $5 day, roughly double the usual wage, which cut turnover sharply.

The big idea. Every product is made by a **process**. Map it, time each step, and you will find a **bottleneck**, the slowest step, which sets the **cycle time** and therefore the **throughput** of the whole line. Speeding up any other step does nothing for output. Improvement comes from breaking work into steps, bringing materials to the worker, removing wasted motion and **balancing** the line so each step takes about the same time.

Who gained, and who paid? Customers gained cheap, reliable cars. Ford and his shareholders gained enormous profits. Workers gained high wages after 1914 but lost the variety and skill of craft work and endured strict discipline; Ford's Sociological Department even inspected workers' homes to decide who qualified for the full $5. Competitors had to adopt the line or fail. Judge the line with all six stakeholders in view.

In business today. The same thinking applies to a bakery, a car wash or a bookkeeping service: map the steps, time them, find the bottleneck, and fix that first. Good process design also considers the people doing the work, their safety, their dignity and their ideas.

PICTURE STUDY



Ford Assembly Line, 1913, Unknown photographer (Ford Motor Company), 1913 · Photograph · Wikimedia Commons

Image: Wikimedia Commons, public domain

This photograph from 1913 shows the new line at Highland Park. Each man stays in place and does one task as the work comes to him.

Look closely

- Find how the work moves. Do the workers move, or the cars?
- Count the workers along the line. How much of the car does each one build?
- Look at the height of the work. Why does that matter for speed and for workers' backs?
- Look at the workers' faces and posture. What might the day have felt like?

Talk about it

1. Which step on this line might be the bottleneck, and how would you find out?
2. What did customers gain from this picture? What did workers give up?
3. How could you use the same idea in your own venture?

Safety first. Use kitchen, shop or garden tools only with a parent's permission and supervision. Speed must never come at the cost of safety.

PROJECT

Map, Time and Balance Your Process

You will map your venture's production or service process, time each step over several runs, find the bottleneck and test an improvement.

You will need

- Stopwatch or phone timer
- Ledger notebook or spreadsheet
- Your venture's materials for a small batch

Steps

1. List every step in making one unit (or delivering one service) in order. Draw the process map.
2. Make a small batch and time each step for at least five units. Record the times and compute averages.
3. Compute labor time per unit, the bottleneck, cycle time and throughput.
4. Look for waste: walking, searching, waiting, rework. Note each one.
5. Redesign: move materials closer, batch a step, split the bottleneck, or recruit a helper (a sibling) for one station.
6. Run the new process for five units and time it again.
7. Compare before and after in a table and a bar chart, and write what changed.

Tips

- Time the real process, not the ideal one; include the hunting for tools.
- Safety first: never rush steps with heat, knives or tools.

Check your work

- ☐ I can map a process and find its bottleneck.
- ☐ I timed at least five units before and after.
- ☐ My improvement is measured and explained.

LEDGER NOTEBOOK

1. Draw your process map with step times and circle the bottleneck.

2. Copy your before-and-after table.
3. Write the Ford timeline: 1908 Model T; 1910 Highland Park; 1913 magneto and chassis lines; January 1914 $5 day; mid-1920s about $260.

KEY FORMULAS

$$\text{Throughput} = \frac{1}{\text{cycle time}} = \frac{1}{\max(\text{step times})}$$

$$\text{Labor time per unit} = \sum \text{step times}$$

From history. Ford's engineers borrowed ideas from many places: the "disassembly" lines of Chicago meatpackers, conveyor systems in flour mills and grain elevators, interchangeable parts from arms makers and bicycle factories, and Frederick Taylor's time studies. The moving line was a team's achievement, not one man's.

WORKED EXAMPLES

Example 1. A student's greeting-card process has four steps: fold (20 s), stamp design (45 s), color (90 s), pack (25 s). One person does all steps for each card in turn. What is the labor time per card and the output per hour? If three people work as a line with one person on coloring, another on stamping and folding, and a third packing, what is the throughput?

Show solution

1. Labor time per card: $20 + 45 + 90 + 25 = 180$ s. One person: $3{,}600/180 = 20$ cards an hour.
2. Line stations: coloring 90 s; stamping and folding 65 s; packing 25 s. Bottleneck: coloring, 90 s.
3. Throughput: $3{,}600/90 = 40$ cards an hour.

Answer: 20 cards an hour alone; 40 with the three-person line (two per hour per person, slightly less than 20 each because stations are unbalanced). Splitting coloring between two people would raise it further.

Example 2. In the line above, a fourth helper joins and coloring is split between two people (45 s each, working in parallel so the coloring station handles a card every 45 s). What is the new bottleneck and throughput?

Show solution

1. Station times: coloring 45 s (effective), stamping and folding 65 s, packing 25 s.
2. New bottleneck: stamping and folding at 65 s.
3. Throughput: $3{,}600/65 \approx 55$ cards an hour.

Answer: About 55 cards an hour; the bottleneck moves to stamping and folding. Improvement is a chase after the bottleneck.

PRACTICE

1. Easy What part did Ford's engineers first assemble on a moving line in 1913?

   Show answer

   The flywheel magneto.

2. Easy Define bottleneck.

   Show answer

   The slowest step in a process, which limits the output of the whole.

3. Easy How did the Model T's price change from 1908 to the mid-1920s?

   Show answer

   From $850 to about $260.

4. Medium Steps take 30, 50, 40 and 20 seconds on a line. Find the cycle time and hourly throughput.

   Show answer

   50 s; $3600/50 = 72$ per hour.

5. Medium In problem 4, what is the labor time per unit?

   Show answer

   140 s.

6. Medium Chassis time fell from 12.5 hours to 1.5 hours. By what percent?

Show answer

$(12.5 - 1.5)/12.5 = 88\%$

7. Medium Why did Ford announce the $5 day in 1914?

Show answer

Turnover was very high because the line work was hard and monotonous; higher pay kept workers, cut hiring and training costs, and improved discipline.

8. Hard Speeding up a non-bottleneck step from 40 s to 20 s in problem 4: what happens to throughput? Why?

Show answer

Nothing: throughput stays 72 an hour because the 50 s step still limits output.

9. Hard Score the moving assembly line for workers and customers on the stakeholder scale (1–5) with reasons.

Show answer

Sample: customers 5 (cheap, reliable cars); workers 3 (high pay after 1914 but monotonous, tightly disciplined work and intrusive inspections).

10. Hard A 4-step process takes 25, 25, 60 and 30 s. You can add one helper to any one step (halving its time). Where, and what is the new throughput?

Show answer

At the 60 s step: becomes 30 s; new bottleneck 30 s; throughput 120 per hour.

11. Challenge A line must produce 90 units an hour. Total labor time per unit is 240 s. What is the maximum cycle time, and what is the minimum number of perfectly balanced stations?

Show answer

Cycle time $3600/90 = 40$ s; stations $240/40 = 6$.

COMMON MISTAKES

- Speeding up steps that are not the bottleneck.
- Timing only once; times vary, so average several runs.
- Forgetting the people who do the work when redesigning it.

Make it a game · Paper Plane Assembly Line. Fold five identical paper planes alone, timing yourself. Then set up a line with your parent: one folds, one creases, one adds wings or marks. Time each step, find the bottleneck and calculate cycle time and throughput. Rebalance the steps and run again. Finish by explaining what the 1913 moving assembly line did to Ford's cost and wages.

8.2 Lean Production: Sakichi Toyoda's Loom and the Toyota Production System

OBJECTIVES

- Tell how Sakichi Toyoda's self-stopping loom and Taiichi Ohno's work at Toyota produced just-in-time and jidoka.
- Identify the seven wastes and use the five whys to find root causes.
- Calculate work-in-process, lead time and the cash freed by reducing inventory.

> **Warm-up.** Look at a pantry or a craft drawer at home. How much is there that has not been used in a month? What did it cost? What would happen if you kept only what you need for the next week?

WATCH

How Toyota Changed The Way We Make Things

Bloomberg Originals · 4:52

https://www.youtube.com/watch?v=F5vtCRFRAK0

> **WHEN TO WATCH**
> After the story, before the seven wastes.

BACKUP VIDEO

The Toyota Production System as Taught by Toyota - Episode 01

Toyota Motor Corporation · 1:43

https://www.youtube.com/watch?v=TUKpxjAftnk

Optional, Toyota's own short introduction to its production system.

KEY TERMS

lean production

Making what customers want with the least waste of time, materials, motion and effort.

just-in-time

Making or delivering what is needed, when it is needed, in the amount needed, instead of building large inventories.

jidoka

Building quality in by stopping the process the moment a problem appears, so it can be fixed at its cause.

kanban

A card or signal that tells an earlier step to make or send more only when the later step has used some up.

five whys

Asking "why?" repeatedly (about five times) to find the root cause of a problem.

CORE IDEAS

The story. Sakichi Toyoda, a carpenter's son in Japan, spent his life improving looms. His Type G automatic loom of 1924 stopped by itself the moment a thread broke, so one weaver could watch many looms and no cloth was wasted with a flaw running through it. In 1929 he sold the patent rights to an English loom maker, Platt Brothers, and the money helped his son Kiichiro start making automobiles. The Toyota Motor Corporation was founded in 1937.

How they figured it out. After the Second World War, Toyota was small and short of money. It could not afford the huge inventories and long runs of American factories. Taiichi Ohno, a Toyota engineer, spent years building another way. From Sakichi's loom he took **jidoka**: any worker could stop the line when he saw a problem, and the team fixed the cause. From American supermarkets, which restocked shelves only as customers took goods, he took the idea of **just-in-time**: each step made only what the next step had used, signaled by cards called **kanban**. Ohno also taught workers to ask "why?" five times to find the root of a problem. By the 1970s and 1980s Toyota's cars were known for reliability, and factories around the world studied its system.

The big idea. Lean production means removing waste. Ohno named seven wastes: overproduction, waiting, unnecessary transport, overprocessing, excess inventory, unnecessary motion and defects. Inventory is especially costly because it ties up cash and hides problems; Little's Law says that work-in-process equals throughput times lead time, so cutting inventory shortens the time from order to delivery. Jidoka means stopping to fix a problem at once rather than passing defects on.

Respect for people. Toyota's system depended on workers who were trusted to stop the line and expected to suggest improvements (kaizen). Lean done badly becomes

mere cost-cutting that strains workers and suppliers and leaves no buffer for emergencies. Lean done well treats every worker as a source of ideas.

In business today. Hospitals, restaurants, software teams and small workshops all use lean ideas. For your venture: make in small batches close to when you sell, keep only the materials you need, fix mistakes at their cause, and ask “why?” until you find it.

PICTURE STUDY



Sakichi Toyoda, Unknown photographer, before 1930 · Photograph · Wikimedia Commons

Image: Wikimedia Commons, public domain

Sakichi Toyoda was a self-taught inventor who held many patents on looms. The idea he built into his loom, stop at once when something goes wrong, became one of the two pillars of the Toyota Production System.

Look closely

- Look at his expression. What qualities might an inventor of patient improvements need?
- Look at his formal clothing. What does it suggest about how he wished to be seen?
- Notice what the picture does not show: no looms, no factory. Why might a portrait leave them out?

Talk about it

1. Why would a loom that stops itself save more than it costs?
2. How did selling a patent help start an automobile company?
3. Where in your own venture should you “stop the line” to fix a problem?

PROJECT

A Waste Walk and Five Whys

You will walk through your venture's process looking for the seven wastes, measure your inventory and lead time, and solve one recurring problem with the five whys.

You will need

- Your process map from Lesson 8.1
- Ledger notebook or spreadsheet

Steps

1. Walk through your process and list every example of the seven wastes you see.
2. Count your inventory (materials and finished goods) and value it at cost.
3. Estimate your throughput and work-in-process; compute lead time with Little's Law.
4. Choose a recurring problem (a defect, a delay, a shortage) and ask "why?" five times. Record each answer.
5. Design a fix for the root cause and a jidoka rule (when will you stop and fix?).
6. Set a simple kanban: a card or mark that tells you when to reorder each key material.
7. After one week, record what changed in inventory, lead time and defects.

Tips

- The first "why" usually blames a person; keep going until you reach a process.
- Do not cut safety stock of critical items to zero.

Check your work

- ☐ I can name the seven wastes and use the five whys.
- ☐ I computed lead time with Little's Law.
- ☐ I fixed a root cause and set a reorder signal.

LEDGER NOTEBOOK

1. Draw your waste list as a table with a fix beside each.
2. Write your five-whys chain.
3. Draw a kanban card for one of your materials.

KEY FORMULAS

$$\text{WIP} = \text{throughput} \times \text{lead time}$$

From history. Taiichi Ohno described the system in *Toyota Production System: Beyond Large-Scale Production* (1978). In the 1980s Toyota and General Motors ran a joint plant in Fremont, California, where Toyota's methods turned one of GM's worst factories into one of its best.

WORKED EXAMPLES

Example 1. A bakery venture finishes 20 loaves a day and keeps about 60 loaves' worth of work in process (dough rising, cooling, packaged waiting). What is the average lead time? If it cuts work-in-process to 20 loaves, what is the new lead time?

Show solution

1. Little's Law: lead time $= \text{WIP}/\text{throughput} = 60/20 = 3$ days.
2. After: $20/20 = 1$ day.

Answer: From 3 days to 1 day: fresher bread and less cash tied up.

Example 2. Use the five whys on this problem: several candles in a batch burned unevenly.

Show solution

1. Why did they burn unevenly? The wicks leaned to one side.
2. Why did the wicks lean? They moved while the wax cooled.
3. Why did they move? The wick holders slipped.
4. Why did the holders slip? They were too short for the wider jars bought this month.
5. Why were the wrong holders used? No one checked supplies against the new jar size.

Answer: Root cause: no check of supplies when a material changed. Fix: buy longer holders and add a supply check whenever a material changes. (Jidoka: stop pouring as soon as a leaning wick is seen.)

Example 3. A venture holds \$600 of materials but uses only \$150 a week. If it switches to buying weekly, keeping a one-week supply plus a \$50 buffer, how much cash is freed?

Show solution

1. New inventory: $150 + 50 = \$200$.
2. Cash freed: $600 - 200 = \$400$.

Answer: \$400, which can pay bills or be kept as a reserve.

PRACTICE

1. Easy What did Sakichi Toyoda's Type G loom do when a thread broke?

   Show answer

   It stopped automatically.

2. Easy Name the seven wastes.

   Show answer

   Overproduction, waiting, transport, overprocessing, inventory, motion, defects.

3. Easy Where did Ohno get the idea for just-in-time restocking?

Show answer

From American supermarkets, which restocked shelves as customers took goods.

4. Medium Throughput 15 units a day; lead time 4 days. Find WIP.

Show answer

60 units.

5. Medium WIP 90 units; throughput 30 a day. Find lead time.

Show answer

3 days.

6. Medium Give an example of each of three wastes in a home kitchen.

Show answer

Sample: overproduction (cooking more than will be eaten); motion (walking across the kitchen for each ingredient); defects (a burned batch thrown out).

7. Medium Explain jidoka in your own words.

Show answer

Stop the work as soon as a problem appears and fix its cause, instead of passing defects along.

8. Hard Why does excess inventory hide problems?

Show answer

With plenty of spare parts or products, defects and delays can be covered up instead of fixed; low inventory makes problems visible quickly.

9. Hard What is a danger of cutting inventory too far? Give an example.

Show answer

No buffer for disruptions: a late shipment or a sick worker stops sales. Example: a bakery with no spare flour when the store is out.

10. Hard Materials $900 on hand; weekly use $200. Keeping one week plus $100 buffer, how much cash is freed?

    Show answer

    $$900 - 300 = \$600$$

11. Challenge A shop has a lead time of 10 days and wants 4 days. Throughput is 25 orders a day. By how much must WIP fall? If each order in process ties up $12 of materials, how much cash is freed?

    Show answer

    WIP from 250 to 100, a drop of 150 orders; cash freed $150 \times 12 = \$1{,}800$.

COMMON MISTAKES

- Blaming people instead of fixing the process.
- Treating lean as cutting everything, including safety stock and care for workers.
- Making large batches just because the equipment is set up.

Make it a game · Seven Wastes Hunt. Hunt through the kitchen for signs of the seven wastes: extra steps, waiting, overstock, wasted motion and more. Find at least four in five minutes. Choose one and ask why five times, writing each answer down until you reach a root cause. Then tell how Sakichi Toyoda's self-stopping loom led to jidoka.

Scripture. “When they were filled, he said unto his disciples, Gather up the fragments that remain, that nothing be lost.” (John 6:12, KJV)

After feeding the five thousand, Jesus told the disciples to gather what was left so that nothing would be wasted. Careful stewardship of materials honors the Giver of them.

8.3 Quality: W. Edwards Deming and the Red Beads

OBJECTIVES

- Tell how W. Edwards Deming taught statistical quality control to Japanese leaders from 1950 and why he became famous in America after 1980.
- Distinguish common-cause and special-cause variation and explain why blaming workers for system problems fails.
- Compute defect rates, yield and the cost of poor quality, and plan an improvement with plan-do-study-act.

> **Warm-up.** Cut five strips of paper "exactly" 10 cm long without a ruler, then measure them. How much do they vary? Now use a ruler. What changed: you, or the system?

WATCH

Red Bead Experiment with Dr. W. Edwards Deming

The Deming Institute · 9:01

https://www.youtube.com/watch?v=ckBfbvOXDvU

> **WHEN TO WATCH**
> After the story of Deming, before common and special causes.

Note: From The W. Edwards Deming Institute: Deming himself conducting the red bead experiment.

KEY TERMS

variation

The natural differences among outputs of any process.

common-cause variation

Variation built into the system itself; only changing the system reduces it.

special-cause variation

Variation from a specific, unusual event (a broken tool, a bad batch) that can be found and removed.

defect rate

The share of units that fail to meet the standard.

PDSA

Plan, do, study, act: Deming's cycle for testing and adopting improvements.

CORE IDEAS

The story. W. Edwards Deming was an American statistician who worked for the U.S. Department of Agriculture and the Census Bureau and helped wartime factories use statistics to control quality. In 1950 the Union of Japanese Scientists and Engineers invited him to lecture in Japan, where industry was rebuilding after the war and "made in Japan" meant cheap and shoddy. Deming told engineers and company presidents that if they studied their processes with statistics and improved them continually, Japan could win world markets within a few years. Many listened. In 1951 the Japanese union created the Deming Prize for quality.

How they figured it out. Deming taught that most quality problems come from the system, which managers control, not from careless workers. In his famous red bead experiment, "workers" scoop beads from a box containing white and red beads, with red counting as defects. Their scores vary, and the manager praises and punishes them, but every result comes from the mix of beads in the box: the system. No exhortation can change it; only changing the system can. Deming summarized his philosophy in 14 points, including "cease dependence on inspection to achieve quality" and "drive out fear." He was little known in his own country until a 1980 NBC documentary, *If Japan Can… Why Can't We?*, made him sought after by American companies in his eighties.

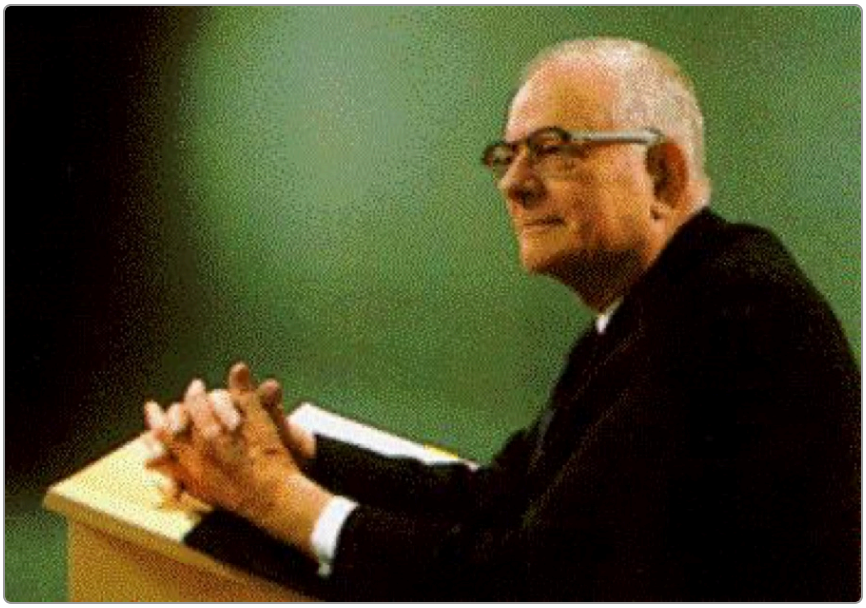
The big idea. All processes show **variation**. **Common-cause variation** comes from the system itself (materials, methods, machines, training); **special-cause variation** comes from unusual events. Treating common causes as if they were someone's fault leads to blame without improvement; ignoring special causes lets them recur. Measure the **defect rate** and the **cost of poor quality**, then improve the system with the **PDSA** cycle: plan a change, do it on a small scale, study the results, act to adopt or adjust it.

Quality and character. Deming, a lifelong Episcopalian who also composed church music, believed that people want to find joy in their work and that management's job is to remove the barriers that rob them of it. Quality is a form of honesty: the product is what it claims to be, every time. "Whatsoever ye do, do it heartily, as to the Lord" (Colossians 3:23).

In business today. Quality methods are used in manufacturing, medicine, software and services. For a small venture, the lessons are simple: measure defects, find

causes in the process, change one thing at a time and keep what works, and never ship what you know is defective.

PICTURE STUDY



W. Edwards Deming, Unknown photographer, 20th century · Photograph · Wikimedia Commons
Image: Wikimedia Commons, public domain

Deming taught into his nineties, giving four-day seminars to managers across America. He was famously blunt with executives and gentle with workers, because he believed the system, not the worker, caused most problems.

Look closely

- Look at his expression. What kind of teacher does he seem?
- Notice his age. What does it suggest about lifelong work?
- Imagine him beside a chart of defects. What question would he ask?

Talk about it

1. Why might Japanese managers in 1950 have been more willing to listen to Deming than Americans were?
2. What does it mean to blame the system rather than the worker? Is that always right?
3. Which of Deming's 14 points would most improve your venture?

PROJECT

A Quality Study and PDSA Cycle

You will define a quality standard for your product, measure defects over several batches, separate common and special causes, and run one PDSA cycle.

You will need

- Ledger notebook or spreadsheet
- Graph paper or a spreadsheet chart
- Your venture's materials

Steps

1. Write a clear, checkable quality standard for your product (size, weight, appearance, taste, time).
2. Make at least five batches and record the number of units and defects in each.
3. Compute the defect rate for each batch and plot them on a run chart.
4. Mark any batch with an unusual cause (special cause) and note what happened.
5. Estimate your cost of poor quality.
6. Plan one change to the system to reduce common-cause defects; run it for at least two batches (do); compare results (study); adopt or adjust (act).
7. Write a paragraph on what you learned about systems versus effort.

Tips

- Change one thing at a time so you know what made the difference.
- Record everything, including the batches that went well.

Check your work

- ☐ I can compute defect rates and the cost of poor quality.
- ☐ My run chart shows at least five batches with special causes marked.
- ☐ I completed a PDSA cycle and reported the result honestly.

LEDGER NOTEBOOK

1. Copy your run chart.
2. Draw the PDSA wheel with your experiment written in each quarter.
3. Write three of Deming's 14 points in your own words.

KEY FORMULAS

$$\text{Defect rate} = \frac{\text{defective units}}{\text{units made}}, \qquad \text{Yield} = 1 - \text{defect rate}$$

$$\text{Cost of poor quality} = \text{scrap} + \text{rework} + \text{returns} + \text{lost customers}$$

From history. Deming's most famous books are *Out of the Crisis* (1982 in its first edition) and *The New Economics* (1993). He received Japan's Order of the Sacred Treasure in 1960 and the U.S. National Medal of Technology in 1987, and worked until shortly before his death in 1993.

WORKED EXAMPLES

Example 1. A student makes 200 cookies; 14 are burned or broken. Find the defect rate and yield. If each defective cookie costs \$0.30 in materials, and selling two broken cookies once cost her a customer worth \$40 a year, what was the cost of poor quality that month?

Show solution

1. Defect rate: $14/200 = 7\%$; yield 93%.
2. Scrap: $14 \times 0.30 = \$4.20$.
3. Lost customer: \$40 a year.
4. Cost of poor quality: about \$44.20, almost all from the lost customer.

Answer: 7% defects, 93% yield, about \$44 in cost of poor quality. Never shipping defects is cheaper than losing customers.

Example 2. Deming's red beads: a box holds 3,200 white and 800 red beads. A paddle scoops 50 beads. What is the expected number of red beads per scoop? If a worker scores 14 one day and 7 the next, what should the manager conclude?

Show solution

1. Share red: $800/4{,}000 = 20\%$.
2. Expected per scoop: $0.20 \times 50 = 10$.
3. Results of 7 and 14 are well within normal chance variation around 10.

Answer: Expect about 10. The difference between 7 and 14 is common-cause variation from the system, not the worker's skill; praising or punishing it is pointless. Change the box (the system) to reduce defects.

Example 3. Plan a PDSA cycle for the cookie problem in the first example.

Show solution

1. Plan: hypothesis that uneven oven heat burns the back row; change: rotate the tray halfway through baking.
2. Do: bake three trays with rotation, three without.
3. Study: compare defect rates.
4. Act: if defects fall, adopt rotation as standard; if not, test another cause.

Answer: A small, measured test of one change, adopted only if the data show improvement.

PRACTICE

1. Easy Who invited Deming to Japan in 1950?

   Show answer

   The Union of Japanese Scientists and Engineers (JUSE).

2. Easy What does PDSA stand for?

   Show answer

   Plan, do, study, act.

3. Easy Define special-cause variation.

Show answer

Variation from a specific, unusual event that can be found and removed.

4. Medium 500 units, 35 defective. Find defect rate and yield.

Show answer

7%; 93%.

5. Medium What lesson does the red bead experiment teach managers?

Show answer

Most variation comes from the system; blaming or rewarding workers for it is unfair and useless; managers must improve the system.

6. Medium A box has 20% red beads; scoops of 40. Expected red per scoop?

Show answer

8.

7. Medium Classify: (a) one batch of soap cracked because the mold was dropped; (b) every batch has a few bubbles because of the mixing method.

Show answer

(a) special cause; (b) common cause.

8. Hard Why did Deming say to “cease dependence on inspection”?

Show answer

Inspection finds defects after they are made but does not prevent them; quality must be built into the process.

9. Hard Defects fall from 8% to 3% on 1,000 units a month; each defect costs $2. Find the monthly saving.

Show answer

$1000 \times 0.05 \times 2 = \$100$

10. Hard How does “drive out fear” improve quality?

Show answer

Workers who are not afraid report problems and suggest improvements, so causes are found and fixed instead of hidden.

11. **Challenge** A process has a 10% defect rate; a defect found by the customer costs $25 (refund and lost goodwill) while one caught before shipping costs $2. Inspection catches 80% of defects. For 1,000 units, compare total costs with and without inspection (inspection costs $0.10 a unit).

    Show answer

    Without: $100 \times 25 = \$2{,}500$. With: caught 80 × $2 = $160; escaped 20 × $25 = $500; inspection $100; total $760. Inspection pays, but fixing the process to cut defects pays more.

COMMON MISTAKES

- Blaming yourself or a helper for defects caused by the method or materials.
- Changing several things at once.
- Shipping defects to save time.

Make it a game · Red Beads Draw. Mix about eighty white beans and twenty red ones in a bowl. Scoop twenty times with the same spoon and record the red beans in each scoop, then chart the defect rate. Next your parent secretly adds extra red beans for a few scoops. Can you spot the special cause? Explain what Deming taught about blaming workers.

Scripture. “And whatsoever ye do, do it heartily, as to the Lord, and not unto men;” (Colossians 3:23, KJV)

Quality work is a way of serving the Lord in ordinary things. Deming’s conviction that people want to find joy in their work fits this verse well.

8.4 The Supply Chain: Malcolm McLean and the Shipping Container

OBJECTIVES

- Tell how Malcolm McLean's container shipping, begun with the *Ideal X* in 1956, cut the cost of moving goods.
- Trace a supply chain and explain lead time, safety stock and reorder points.
- Weigh the gains and costs of supply-chain changes for different stakeholders, including dockworkers.

> **Warm-up.** Pick one ingredient or material your venture uses. Write every step it took to reach you, as far back as you can guess: grown or mined where, processed where, shipped how, sold by whom.

WATCH

Malcom McLean and Containerisation | Maersk

Maersk · 4:33

https://www.youtube.com/watch?v=gAs01Xr1U8w

> **WHEN TO WATCH**
> After the story of McLean, before the reorder arithmetic.

Note: From Maersk, a shipping company.

BACKUP VIDEO

How containerization shaped the modern world

TED-Ed · 4:46

https://www.youtube.com/watch?v=Gn7IoT_WSRA

Optional, an animated overview of how containers changed trade.

KEY TERMS

supply chain

The whole series of suppliers, makers, carriers and sellers that bring a product to the customer.

lead time

The time from placing an order with a supplier to receiving it.

safety stock

Extra inventory kept to protect against late deliveries or surprise demand.

reorder point

The inventory level at which you place a new order.

intermodal

Using several kinds of transport (ship, rail, truck) without unloading the goods between them.

CORE IDEAS

The story. Malcolm McLean grew up in North Carolina and built a large trucking company from a single used truck bought in the 1930s. He spent hours waiting at docks while longshoremen unloaded trucks crate by crate and carried each item into a ship's hold, a slow, costly and dangerous process; ships could spend as much time in port as at sea. He wondered why the truck body itself could not simply be lifted onto the ship.

How they figured it out. McLean sold his trucking company to raise money, bought a shipping line, and worked with engineer Keith Tantlinger to design strong steel boxes that could be stacked, locked together and lifted by crane from truck chassis to ship and back. On April 26, 1956, a converted tanker, the *Ideal X*, sailed from Newark, New Jersey, to Houston with 58 containers on deck. By one widely quoted calculation, loading cost fell from about $5.86 a ton for loose cargo to about 16 cents a ton. Ports, railroads and shipping lines slowly adopted standard container sizes in the 1960s, and the cost of moving goods across the world fell dramatically.

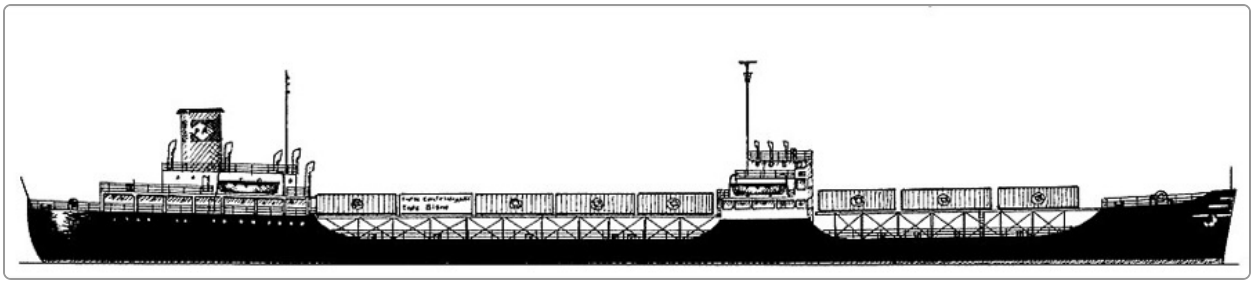
The big idea. A **supply chain** is every step from raw material to customer. Each link adds time and cost and can fail. Two numbers matter for a small business: **lead time** (how long a supplier takes to deliver) and daily use. Together with **safety stock** they set the **reorder point**: reorder when inventory falls to daily use times lead time plus safety stock. Too little stock means lost sales; too much ties up cash (Lesson 8.2).

Who gained, and who paid? Customers around the world gained cheaper goods and wider choice. Exporters, importers and port cities that adopted containers grew. But tens of thousands of longshoremen lost work as ports needed far fewer hands, and old harbor districts declined. Unions negotiated compensation and job guarantees

for some. Supply chains that stretch around the world can also be fragile when a link breaks. Weigh every change with all six stakeholders.

In business today. Even a small venture has a supply chain: a store or mill, a delivery, your kitchen or workshop, your customer. Know your lead times, keep a modest safety stock of critical items, have a second supplier for anything essential, and plan for the week when something goes wrong.

PICTURE STUDY



The Ideal X, Unknown photographer, 1956 · Ship drawing · Wikimedia Commons

Image: Wikimedia Commons, public domain

This drawing shows the *Ideal X*, a Second World War tanker that McLean's company converted. Workers built a deck platform to hold 58 containers, while the ship still carried petroleum below.

Look closely

- Find the long, flat deck. Where would the containers have been stacked?
- Find the bridge and the funnel. Why is there so much open deck between them?
- Compare this ship with the steamboats on the Ohio River in the 1800s. What changed?

Talk about it

1. What would a longshoreman watching this ship in 1956 have thought?
2. Why did it take years for ports and railroads to adopt containers?
3. Where in your own supply chain could a "container" (a standard, ready-to-move unit) save time?

PROJECT

Map Your Supply Chain and Set Reorder Points

You will map the supply chain for your venture's key materials, measure lead times, set reorder points and plan for a broken link.

You will need

- Ledger notebook or spreadsheet
- Your inventory list from Lesson 8.2

Steps

1. List your five most important materials or supplies.
2. For each, trace the chain as far back as you can learn (store, distributor, maker, origin).
3. Record the lead time to get each one (how long from deciding to buy until you have it), and your average daily or weekly use.
4. Set safety stock and a reorder point for each.
5. Name a second source for each critical item.
6. Write a contingency plan for one broken link (supplier out of stock, a late delivery).
7. Draw a supply-chain map and score each link's risk 1–5.

Tips

- The riskiest link is often the one you have never thought about.
- Local suppliers often have shorter lead times even if prices are a little higher.

Check your work

- ☐ I can compute reorder points with safety stock.
- ☐ My supply-chain map shows each link and its risk.
- ☐ I have a second source and a contingency plan for critical items.

LEDGER NOTEBOOK

1. Draw your supply-chain map with lead times on each arrow.
2. Make a reorder-point table.

3. Write the container timeline: 1937 McLean waits at the docks (as he later told it); 1956 *Ideal X*; 1960s standard sizes; worldwide adoption.

KEY FORMULAS

$$\text{Reorder point} = \text{daily use} \times \text{lead time (days)} + \text{safety stock}$$

From history. Container ships began crossing the Atlantic regularly in 1966. During the Vietnam War, McLean's company carried military supplies to the Pacific in containers, which helped persuade shippers of their value. Today the largest container ships carry more than 20,000 standard twenty-foot containers.

WORKED EXAMPLES

Example 1. A student uses 3 pounds of flour a day. Her supplier delivers in 4 days. She keeps 5 pounds of safety stock. What is her reorder point?

Show solution

1. $3 \times 4 + 5 = 17$ pounds.

Answer: Reorder when 17 pounds remain.

Example 2. A ship carries 10,000 tons of cargo. Compare loading costs at $5.86 a ton (loose) and $0.16 a ton (containers). How much is saved?

Show solution

1. Loose: $10{,}000 \times 5.86 = \$58{,}600$.
2. Containers: $10{,}000 \times 0.16 = \$1{,}600$.
3. Saved: $\$57{,}000$, about 97%.

Answer: $57,000 per ship load, a 97% cut in loading cost (using the widely cited 1956 figures).

Example 3. A supplier's lead time varies from 3 to 7 days. Daily use is 10 units. If you set safety stock to cover the worst case beyond the average lead time of 5 days, what are the safety stock and reorder point?

Show solution

1. Average-lead-time need: $10 \times 5 = 50$.
2. Worst case: $10 \times 7 = 70$; safety stock 20.
3. Reorder point: 70 units.

Answer: Safety stock 20 units; reorder at 70.

PRACTICE

1. Easy When and between which ports did the *Ideal X* sail?

   Show answer

   April 26, 1956, from Newark, New Jersey, to Houston, Texas.

2. Easy Define lead time.

   Show answer

   The time from ordering from a supplier to receiving the order.

3. Easy Write the reorder-point formula.

   Show answer

   Daily use × lead time + safety stock.

4. Medium Daily use 8; lead time 6 days; safety stock 12. Find the reorder point.

   Show answer

   60.

5. Medium Why were ships delayed in port before containers?

   Show answer

   Cargo was loaded and unloaded piece by piece by longshoremen, which took days.

6. Medium By what percent did loading cost fall from $5.86 to $0.16 a ton?

   Show answer

   About 97%.

7. Medium Which stakeholders gained and which lost from containerization?

Show answer

Gained: customers, exporters and importers, shippers, many port cities. Lost: many longshoremen and old harbor districts.

8. Hard Why is having a second supplier wise even if it costs a little more?

Show answer

If the main supplier fails, you can still serve customers; the extra cost is insurance against a broken link.

9. Hard Lead time varies from 2 to 5 days; daily use 6. Set safety stock to cover the worst case beyond a 3-day average. Find the reorder point.

Show answer

Average need 18, worst 30; safety stock 12; reorder at 30.

10. Hard Explain “intermodal” and why standard container sizes mattered.

Show answer

Moving goods by ship, rail and truck without unloading them between modes. Standard sizes let any crane, ship, train or truck handle any container, so the system worked across companies and countries.

11. Challenge Holding inventory costs 2% of its value per month. You use $300 of materials a month. Ordering monthly costs $10 in delivery each time; ordering every two months saves one delivery but doubles average inventory from $150 to $300. Which is cheaper over two months?

Show answer

Monthly: deliveries $20; holding $150 \times 0.02 \times 2 = \$6$; total $26. Bimonthly: delivery $10; holding $300 \times 0.02 \times 2 = \$12$; total $22. Bimonthly is slightly cheaper, if you have the cash and space.

COMMON MISTAKES

- Ignoring lead time until you run out.
- Keeping no safety stock of critical items.
- Relying on a single supplier for something essential.

Make it a game · Reorder Point Days. Start with ten cards as stock. Each day roll a die for demand and remove that many cards; a new order of ten arrives after a lead time of three days. Choose your reorder point and safety stock before you start, then play fifteen days. A day with empty stock costs a point. Then explain how containers cut shipping costs.

Scripture. “A prudent man foreseeth the evil, and hideth himself; but the simple pass on, and are punished.” (Proverbs 27:12, KJV)

Safety stock, a second supplier and a contingency plan are ways of foreseeing trouble. The prudent business prepares; the simple one is surprised.

8.5 Customer Service and Scaling Up: Marshall Field and the Speedee System

OBJECTIVES

- Tell how Marshall Field's Chicago store made service a hallmark and how the McDonald brothers redesigned their restaurant in 1948 into a system that could be copied.
- Write service standards and measure customer satisfaction and retention.
- Explain what must be standardized before a business can grow, and calculate the effect of retention on growth.

> **Warm-up.** Describe the best service you have ever received in a store or restaurant. What exactly did the person do? Could a new employee be taught to do it?

WATCH

Marshall Field's Department Store - Life in America

Recollection Road · 8:09

https://www.youtube.com/watch?v=SJa_GuC_DdQ

> **WHEN TO WATCH**
> After the story of Marshall Field, before the McDonald brothers.

Note: Skip the closing promotion.

KEY TERMS

customer service

Everything a business does to help customers before, during and after a purchase.

service standard

A specific, measurable promise about service (orders ready in 10 minutes, calls returned the same day).

retention rate

The share of customers who buy again in the next period.

standardization

Doing a task the same proven way every time, written down so others can learn it.

franchise

An arrangement in which an owner pays to use a company's name, system and support to run his own location.

CORE IDEAS

The story. Marshall Field came to Chicago in 1856 as a store clerk and became the city's leading merchant. His department store on State Street was famous for service: generous returns, clerks trained to be courteous, goods delivered to homes, a tearoom (one of the first in a department store) and rooms where shoppers could rest. A phrase often attributed to Field, "Give the lady what she wants," summed up his policy of putting customers first. The store rebuilt after the Great Chicago Fire of 1871 and became a Chicago landmark.

How they figured it out. Ninety years later, in San Bernardino, California, two brothers, Richard and Maurice McDonald, ran a busy drive-in restaurant with carhops and a long menu. Costs were high and service slow. In 1948 they closed for three months and redesigned everything. They cut the menu to a few items, mostly 15-cent hamburgers, fries and drinks; they laid out the new kitchen in chalk on a tennis court and rehearsed the motions; they had custom equipment made; and they replaced carhops with a walk-up window. They called it the Speedee Service System. Food came in seconds, at low prices, the same way every time. A milkshake-machine salesman, Ray Kroc, saw it in 1954 and began franchising the system across the country; later he bought out the brothers, and their agreement over royalties became a matter of dispute.

The big idea. Service is part of the product. Write **service standards** that are specific and measurable, train them, and measure satisfaction and **retention**. Keeping customers is cheaper than finding new ones, and retention compounds: a business that keeps 80% of its customers grows far faster than one that keeps 50%. To **scale up**, a business must be **standardized**: the best way of doing each task written down and taught so that new workers or new locations can deliver the same quality. Field standardized service; the McDonalds standardized an entire kitchen.

Growing well. Growth brings new stakeholders and new risks: workers to train and treat fairly, suppliers to rely on, quality to keep, and partners whose agreements must be written and kept. Many businesses have been ruined by growing faster

than their systems, their cash or their character. Grow only as fast as you can keep your promises.

In business today. Every successful chain, from restaurants to hardware stores, runs on written standards. Your venture can too: a one-page checklist for making and delivering your product, a service promise, and a simple way to ask customers how you did.

PICTURE STUDY



The Marshall Field Building, Unknown photographer, about 1905 · Photograph · Wikimedia Commons

Image: Wikimedia Commons, public domain

Marshall Field and Company's store on State Street was rebuilt and enlarged several times. By 1905 it was one of the largest stores in the world, and its clocks on the corners became Chicago meeting places.

Look closely

- Find the entrances and windows. How does the building invite shoppers in?
- Look at the people and streetcars. How did customers get to the store?
- Look for the store's clock. Why might a clock be good for business?

Talk about it

1. What would it take to give the same good service in every department of a store this large?
2. How is a written service standard like the stone and steel of this building?
3. What would your "store front" promise customers?

Safety first. Anyone following your checklist must be supervised by a parent if it involves heat, sharp tools or food handling.

PROJECT

Service Standards and a Scale-Up Checklist

You will write service standards for your venture, survey customers, compute satisfaction and retention, and write a one-page operations checklist that someone else could follow.

You will need

- Ledger notebook or spreadsheet
- A short customer survey (paper cards)
- Your process map and quality standard from Lessons 8.1–8.3

Steps

1. Write three service standards for your venture that are specific and measurable.
2. Track whether you meet them for two weeks.
3. Give a three-question survey to customers (satisfied? would buy again? one improvement?) and compute the satisfaction score.
4. From your sales log, compute your retention so far (customers who bought more than once).
5. Write a one-page checklist for making and delivering your product, clear enough that a sibling or friend could follow it.
6. Have someone else follow your checklist once while you watch; note where they got stuck and revise.
7. Write a paragraph: what would have to be true before your venture could double in size?

Tips

- Write checklists with verbs: “Weigh 500 g of flour,” not “Flour.”
- Thank every customer who answers your survey.

Check your work

☐ I can write measurable service standards.

☐ I computed satisfaction and retention from real data.

- [ ] Someone else completed my checklist successfully after revision.

LEDGER NOTEBOOK

1. Copy your service standards and two weeks of results.
2. Draw a retention chart comparing 50% and 80% retention over three years.
3. Paste your final checklist.

KEY FORMULAS

$$\text{Customers next year} = \text{customers now} \times \text{retention} + \text{new customers}$$

$$\text{Satisfaction score} = \frac{\text{satisfied responses}}{\text{all responses}}$$

From history. Harry Gordon Selfridge, a manager at Marshall Field's, later founded Selfridges department store in London in 1909. The first McDonald's franchised by Ray Kroc opened in Des Plaines, Illinois, in 1955.

WORKED EXAMPLES

Example 1. A venture has 40 customers. Each year it gains 30 new customers. Compare customer counts after 3 years with 50% retention and with 80% retention.

Show solution

1. 50%: year 1 $40(0.5) + 30 = 50$; year 2 $50(0.5) + 30 = 55$; year 3 $55(0.5) + 30 = 57.5$.
2. 80%: year 1 $40(0.8) + 30 = 62$; year 2 $62(0.8) + 30 = 79.6$; year 3 $79.6(0.8) + 30 \approx 93.7$.

Answer: About 58 customers with 50% retention and about 94 with 80%: good service nearly doubles the business in three years with the same marketing.

Example 2. The McDonald brothers cut their menu from about 25 items to 9 and sold hamburgers at 15 cents instead of about 30. If a hamburger's variable cost fell from 18 cents to 9 cents through standardization and volume rose from 400 to 1,500 a day, compare daily contribution from hamburgers. (Illustrative numbers.)

Show solution

1. Before: $400 \times (0.30 - 0.18) = \$48$.
2. After: $1{,}500 \times (0.15 - 0.09) = \$90$.

Answer: \$48 rises to \$90 a day: lower prices, lower costs and much higher volume together. Standardization made the low price possible.

PRACTICE

1. Easy Name three services Marshall Field's store offered customers.

   Show answer

   Generous returns, courteous trained clerks, home delivery, a tearoom, rest rooms for shoppers.

2. Easy What did the McDonald brothers do in 1948?

   Show answer

   Closed for three months and redesigned their restaurant as the Speedee Service System: short menu, low prices, a rehearsed kitchen layout, custom equipment and a walk-up window.

3. Easy Define retention rate.

   Show answer

   The share of customers who buy again in the next period.

4. Medium 50 customers, 70% retention, 20 new a year. Find next year's customers.

   Show answer

   $50(0.7) + 20 = 55$

5. Medium Write two measurable service standards for a bread-delivery venture.

Show answer

Sample: every order delivered by 10 a.m. Saturday; any problem refunded or replaced within 24 hours.

6. Medium Of 25 survey responses, 21 are satisfied. Find the satisfaction score.

Show answer

84%.

7. Medium Why must a business standardize before it can grow?

Show answer

So new workers or locations can deliver the same quality; otherwise quality depends on the founder and falls as the business grows.

8. Hard Explain how Ray Kroc's treatment of the McDonald brothers raises a stakeholder question.

Show answer

Kroc scaled their system enormously, but the brothers, as original builders and partners, believed a promised royalty was not honored after the buyout. Growth must keep faith with the people whose work made it possible.

9. Hard A business spends \$20 to win a customer worth \$15 a year in contribution. Compare 3-year value at 50% and 90% retention (count contribution only for years the customer stays, starting year 1 with certainty).

Show answer

50%: $15(1 + 0.5 + 0.25) = \$26.25$, net \$6.25. 90%: $15(1 + 0.9 + 0.81) = \$40.65$, net \$20.65.

10. Hard Why can growing too fast ruin a good business? Give two reasons.

Show answer

Cash runs short (Lesson 4.5); quality falls because systems and training lag; promises to customers, workers and partners are broken.

11. **Challenge** Starting with 30 customers, gaining 25 a year, what retention is needed to reach at least 80 customers after 2 years?

    Show answer

    $(30r + 25)r + 25 \geq 80 \Rightarrow 30r^2 + 25r - 55 \geq 0; r \geq \dfrac{-25 + \sqrt{625 + 6600}}{60} \approx 1.0.$ About 100% retention would be needed, so the venture must also add more new customers.

COMMON MISTAKES

- Vague service promises (“great service”) that cannot be measured.
- Trying to grow before the process is written down and repeatable.
- Chasing new customers while neglecting the ones you have.

Make it a game · Service Standards Scene. Act out two versions of a customer walking into a store, one poor and one following written service standards that you wrote in sixty seconds. Your parent scores each scene against your three standards. Then calculate retention: if forty of fifty customers return, what is the rate? Finish by telling what the McDonald brothers copied into a system in 1948.

Scripture. “But it shall not be so among you: but whosoever will be great among you, let him be your minister;” (Matthew 20:26, KJV)

Jesus defines greatness as service. In business too, the firms remembered as great are those that served their customers best.

UNIT 8

Operations

Operations is how a business actually makes and delivers what it sells: the steps, the materials, the people, the time and the quality. Great ideas fail when operations are sloppy, and ordinary products succeed when operations are excellent. This unit follows the great turning points. Henry Ford's moving assembly line of 1913 cut the time to build a Model T chassis from more than twelve hours to about an hour and a half. Toyota's production system, rooted in Sakichi Toyoda's self-stopping loom, taught the world to cut waste and stop to fix problems. W. Edwards Deming taught Japanese managers in 1950 that quality comes from improving the system, not from blaming workers.

Then you will follow goods from factory to customer through the **supply chain**, with Malcolm McLean, whose shipping container sailed on the *Ideal X* in 1956, and learn **customer service and scaling up** from Marshall Field's Chicago store and the McDonald brothers' Speedee Service System of 1948. Throughout, you will map, time and improve your own venture's process.

PREREQUISITES

- Has a product and a sales process (Units 3–7)
- Can compute rates, percents and averages
- A stopwatch (a phone timer is fine)

MASTERY CHECKLIST

- ☐ I can map a process, time each step, find the bottleneck and compute throughput and cycle time.
- ☐ I can identify the seven wastes, explain just-in-time and jidoka, and use the five whys.
- ☐ I can explain common-cause and special-cause variation, compute defect rates and the cost of poor quality, and apply plan-do-study-act.
- ☐ I can trace a supply chain, compute lead times and reorder points, and weigh its risks.
- ☐ I can design service standards, measure customer satisfaction and explain what must be standardized before a business can grow.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **The Henry Ford museum: digital collections**: Free photographs and documents of Ford's Highland Park plant and the moving assembly line. Use with Lesson 8.1. Ages 12+.
- **The W. Edwards Deming Institute**: Free articles explaining Deming's 14 points, the red bead experiment and plan-do-study-act. Use with Lesson 8.3. Ages 14+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

8.1 The Moving Assembly Line: Ford at Highland Park, 1913 3 sessions of 50 minutes

8.2 Lean Production: Sakichi Toyoda's Loom and the Toyota Production System

3 sessions of 50 minutes

8.3 Quality: W. Edwards Deming and the Red Beads

3 sessions of 50 minutes

8.4 The Supply Chain: Malcolm McLean and the Shipping Container

3 sessions of 50 minutes

8.5 Customer Service and Scaling Up: Marshall Field and the Speedee System

3 sessions of 50 minutes

Unit 8 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Describe what Ford's engineers did in 1913 and the effect on chassis assembly time.

2. **6 pts**
   Steps take 35, 60, 45 and 25 seconds. Find the bottleneck, cycle time, throughput per hour and labor time per unit.

3. **5 pts**
   Name two gains and two costs of the moving assembly line for its stakeholders.

4. **6 pts**
   Define jidoka and just-in-time and give the origin of each at Toyota.

5. **6 pts**
   Throughput 12 units a day; WIP 48. Find lead time. What WIP gives a 2-day lead time?

6. **5 pts**
   Name the seven wastes.

7. **6 pts**

   800 units, 48 defective. Find defect rate and yield. If each defect costs $3, what is the scrap cost?

8. **6 pts**

   Explain the red bead experiment and its lesson.

9. **5 pts**

   Distinguish common-cause and special-cause variation with examples.

10. **6 pts**

    Daily use 5; lead time 8 days; safety stock 10. Find the reorder point.

11. **6 pts**

    Describe McLean’s innovation and one group that gained and one that lost.

12. **6 pts**

    Loading 5,000 tons at $5.86 a ton versus $0.16 a ton. Find the saving.

13. **5 pts**

    What did the McDonald brothers change in 1948, and why did it make franchising possible?

14. **6 pts**

    60 customers; 75% retention; 20 new a year. Find customers after 2 years.

15. **5 pts**

    Write two measurable service standards for a venture of your choice.

16. **16 pts**

    Essay: Choose Ford, Toyota or Deming. Explain the operations idea, how it served customers, and how it affected workers. Then explain how you will apply the idea to your own venture without harming anyone who works with you.

ANSWER KEY

1. They moved the work past stationary workers who each did one task, timed and balanced the steps, and brought parts to the workers; chassis time fell from about 12.5 hours to about 1.5 hours.
2. 60 s step; 60 s; 60 per hour; 165 s.
3. Gains: cheap cars for customers; large profits; high wages after 1914. Costs: monotonous, tightly controlled work; intrusive inspections of workers' homes; pressure on competitors.
4. Jidoka: stop at once to fix problems (from Sakichi Toyoda's self-stopping loom). Just-in-time: make only what the next step needs when it needs it (from American supermarket restocking, developed by Taiichi Ohno).
5. 4 days; 24 units.
6. Overproduction, waiting, transport, overprocessing, inventory, motion, defects.
7. 6%; 94%; $144.
8. Workers scoop beads from a box with a fixed share of red "defects"; their results vary by chance, yet managers praise and punish them. Most variation comes from the system, which only management can change.
9. Common: built into the system (every batch has a few bubbles from the mixing method). Special: unusual event (one batch ruined by a dropped mold).
10. 50.
11. Standard steel containers moved by crane between trucks, trains and ships (Ideal X, 1956). Gained: customers and shippers through far cheaper transport. Lost: many longshoremen.
12. $5000 \times 5.70 = \$28{,}500$
13. A short menu, low prices, rehearsed kitchen layout and custom equipment; the standardized system could be taught and copied in other locations.
14. Year 1: 65; year 2: $65(0.75) + 20 = 68.75$, about 69.
15. Sample: orders confirmed within 24 hours; deliveries on the promised day 95% of the time.
16. Graded on accurate explanation of the idea, balanced stakeholder analysis (customers and workers), and a specific, humane application to the student's venture.

PORTFOLIO PIECE: THE OPERATIONS MANUAL

Assemble a short operations manual for your venture: the process map with timings and the bottleneck, your waste walk and five-whys fix, your quality standard with run chart and PDSA results, your supply-chain map with reorder points and contingencies, and your service standards with satisfaction and retention data. End with the one-page checklist someone else has successfully followed.

LOOK FOR	WHAT IT MEANS
Measurement	Times, defects, lead times and service data are recorded and calculated correctly.
Improvement	At least two changes are tested and their results reported honestly.
Clarity	The manual and checklist are clear enough for another person to follow.
Stewardship	Safety, care for helpers and respect for customers are built into the processes.

UNIT 9

Law, Ethics and Stakeholders

A business lives inside a web of promises and rules: contracts with customers, suppliers and landlords; rights to inventions, names and creative work; duties to employees; taxes and licenses; and, when things go wrong, the law of debt and bankruptcy. This unit teaches these as practical steps for an honest entrepreneur, not as debates. You will learn contracts from Sam Walton, who lost his first thriving store in 1950 because his lease had no renewal clause; intellectual property from Abraham Lincoln, the only president to hold a patent; and employees, wages and safety from the factory reforms that followed the Triangle Shirtwaist fire of 1911.

Then you will learn the practical steps of taxes and licenses, grounded in Jesus' answer about the tribute money, and close with failure, bankruptcy and starting again, through the story of H. J. Heinz, who went bankrupt in 1875 and then quietly repaid every creditor he legally no longer owed. Throughout, the six stakeholders remind you that the law sets a floor, and character must build above it.

PREREQUISITES

- Has a venture plan, financial model and operations manual (Units 3–8)
- Knows the legal forms of business (Lesson 3.4)
- Can compute percents

MASTERY CHECKLIST

- ☐ I can name the elements of a valid contract, read a simple agreement for key terms, and explain why minors need a parent to sign.
- ☐ I can distinguish patents, trademarks, copyrights and trade secrets, and avoid infringing others' rights.
- ☐ I can explain an employer's basic duties on wages, hours, safety and youth employment, and design a safe workplace for a small venture.
- ☐ I can list the licenses, permits and taxes a small venture may need and estimate self-employment tax.
- ☐ I can explain bankruptcy and its moral dimensions and describe how an honest entrepreneur fails and starts again.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **U.S. Patent and Trademark Office: "Inventors and Entrepreneurs" resources**: Free official explanations of patents and trademarks, with a searchable database. Use with Lesson 9.2. Ages 14+.
- **IRS: Small Business and Self-Employed Tax Center**: Free official information on business taxes, record keeping and self-employment tax. Use with Lesson 9.4 with a parent. Ages 15+.
- **U.S. Department of Labor: YouthRules!**: Free official guide to the hours and jobs teens may work. Use with Lesson 9.3. Ages 13+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

9.1	**Contracts: Sam Walton's Lost Lease**	3 sessions of 50 minutes

9.2 **Intellectual Property: Lincoln's Patent and the "Fuel of Interest"**

3 sessions of 50 minutes

9.3 **Employees, Wages and Safety: After the Triangle Fire** 3 sessions of 50 minutes

9.4 **Taxes and Licenses: Rendering unto Caesar as a Practical Step**

3 sessions of 50 minutes

9.5 **Failure, Bankruptcy and Starting Again: H. J. Heinz** 3 sessions of 50 minutes

Unit 9 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Why did Sam Walton lose his Newport store in 1950, and what did he learn?

2. **6 pts**
   Name the elements of a valid contract and identify each in: "Mow my lawn Saturdays in July for $25 each." "Agreed."

3. **6 pts**
   A renewal right costs $8 a month more on a 12-month lease. The location brings $250 a month in contribution. Explain whether the right is worth it.

4. **6 pts**
   Match each to its protection: (a) a new mechanism; (b) a bakery logo; (c) a written cookbook; (d) a confidential spice blend. Give how long each generally lasts.

5. **5 pts**
   What did Lincoln say the patent system added, and what was his own patent?

6. **5 pts**

   Why is printing a famous team's logo on shirts you sell wrong?

7. **6 pts**

   $13 an hour, 47 hours, overtime at 1.5× over 40. Find gross pay.

8. **6 pts**

   Name three reforms that followed the Triangle fire and two later federal laws on work.

9. **5 pts**

   State two Scripture passages about paying workers and what they require.

10. **6 pts**

    Estimate self-employment tax on $3,200 of net earnings.

11. **5 pts**

    Sales of $180 at 7.5% sales tax. Find the tax, and explain who owns it.

12. **5 pts**

    Name four licenses or permits a small venture may need.

13. **6 pts**

    Creditors are owed $50,000; assets bring $16,000 after costs. Find the recovery rate. Define discharge.

14. **6 pts**

    Tell how Heinz handled his debts after his 1875 bankruptcy and why it matters.

15. **6 pts**

    A closing venture has $90 and owes a helper $25, customer deposits $40 and a supplier $50. Give the payment order and amounts.

16. **16 pts**

    Essay: "The law sets a floor; character builds above it." Using two stories from this unit and one Scripture passage, explain what this means for an entrepreneur.

ANSWER KEY

1. His lease lacked a renewal clause, and the landlord refused to renew; he learned to read every contract carefully.
2. Offer (mowing for $25 each Saturday), acceptance (“Agreed”), consideration (mowing for money), capacity (adults or a parent), lawful purpose.
3. It costs $96 a year and protects up to $3,000 of next year’s contribution; even a small chance of losing the site makes it worthwhile.
4. (a) patent, about 20 years from filing; (b) trademark, as long as used; (c) copyright, life plus 70 years; (d) trade secret, as long as kept secret.
5. “The fuel of interest to the fire of genius”; a device for buoying vessels over shoals (Patent 6,469, 1849).
6. It infringes their trademark and deceives buyers about the source; it takes value that belongs to another.
7. $520 + 7 \times 19.50 = \$656.50$
8. Fire exits, sprinklers, fire drills, factory inspections, workers’ compensation; the Fair Labor Standards Act (1938) and OSHA (1970).
9. Deuteronomy 24:14-15 (pay promptly, do not oppress); Luke 10:7 (the laborer is worthy of his hire); Colossians 4:1 (just and equal).
10. $0.153 \times 0.9235 \times 3200 \approx \$452.15$
11. $13.50; it belongs to the state, held in trust by the seller.
12. Business license, cottage-food or health permit, sales-tax permit, employer identification number (as applicable).
13. 32%. Discharge: a court order releasing the debtor from legal obligation to pay certain debts.
14. He listed them as “moral obligations” and repaid creditors in full though legally released; it shows integrity beyond the law and rebuilt trust.
15. Helper $25, deposits $40, supplier $25 of $50 now with a plan to pay the remaining $25.
16. Graded on a clear thesis, accurate use of two stories (Walton’s landlord, Lincoln and IP, the Triangle fire, taxes and Zacchaeus, Heinz’s M.O. list), apt Scripture, and specific application.

PORTFOLIO PIECE: THE COMPLIANCE AND ETHICS FILE

Assemble your customer terms and any supply or space agreement (signed by a parent), your IP check and source list, your safety plan and any fair-pay agreements with pay records, your compliance checklist and tax set-aside records, and your honest closing plan. Add a one-page statement of the ethical rules you will follow in your venture, each linked to a law, a story or a Scripture passage from this unit.

LOOK FOR	WHAT IT MEANS
Completeness	Every required agreement, checklist and plan is present and reviewed by a parent.
Accuracy	Calculations (pay, taxes, recovery) are correct and rules are drawn from official sources.
Stakeholders	Workers, customers, suppliers and the community are each considered.
Character	The ethics statement goes beyond legal minimums with specific commitments.

9.1 Contracts: Sam Walton's Lost Lease

OBJECTIVES

- Tell how Sam Walton built a successful variety store in Newport, Arkansas, from 1945 and lost it in 1950 because his lease lacked a renewal clause.
- Name the elements of a valid contract and the key terms to read in any agreement.
- Read and draft a simple agreement for a venture, and explain why minors need a parent to sign.

> **Warm-up.** Write down three promises you have made this month. For each: Was it written? What did each side give? What would happen if one side did not keep it?

WATCH

Elements of a Contract

David Jaroszewski · 9:34

https://www.youtube.com/watch?v=6QWZXl-qWos

> **WHEN TO WATCH**
> After the story of Walton's lease, before you read an agreement.

BACKUP VIDEO

How Walmart Began | The Sam Walton Story | Walmart's Origins

Northwest Arkansas Alive · 5:06

https://www.youtube.com/watch?v=k-IHuRUGwfk

Optional, a short history of how Walton began.

KEY TERMS

contract

An agreement the law will enforce: an exchange of promises or performance between parties able to agree, for a lawful purpose.

offer and acceptance

One party proposes definite terms; the other agrees to them.

consideration

Something of value each side gives or promises in the exchange.

capacity

The legal ability to make a contract; minors and some others have limited capacity.

renewal clause

A term giving a party the right to extend an agreement, such as a lease, for another period.

CORE IDEAS

The story. In 1945, after the Second World War, Sam Walton bought a Ben Franklin variety-store franchise in Newport, Arkansas, for $25,000, putting in $5,000 of his own and borrowing $20,000 from his father-in-law. The store had been struggling. Walton bought goods wherever he could find them cheapest, cut prices, kept long hours and tried every promotion he could think of. By his own account, sales rose from about $72,000 a year to about $250,000 in five years, and it became the top Ben Franklin store in its region.

How they figured it out. Walton had signed a five-year lease without a clause giving him the right to renew it. When the lease ran out in 1950, the landlord, seeing how well the store was doing, refused to renew; he wanted the business for his own son. Walton had to sell his fixtures and inventory to the landlord and leave the town he had built his business in. He later wrote that it was the low point of his business life, and that he learned to read every contract carefully. He started over in Bentonville, Arkansas, with Walton's Five and Dime, the beginning of the company that became Walmart.

The big idea. A **contract** needs an **offer and acceptance**, **consideration** on both sides, parties with **capacity**, and a lawful purpose; many important contracts (leases, sales of land, agreements longer than a year) must be in writing. Before signing, read for the key terms: who, what, how much, when, how long, what happens if either side fails, how the agreement ends or renews, and who bears which risks. Minors generally may cancel most contracts they make, which is why adults are reluctant to contract with them; a student venture's agreements should be made and signed by a parent.

Contracts and character. Scripture honors the one who "sweareth to his own hurt, and changeth not" (Psalm 15:4): a Christian keeps his word even when it costs him. Contracts write promises down so that both sides remember them the same way. But a written contract is not a license to exploit the other party's mistake. Walton's landlord was within his legal rights; whether he dealt generously is another question.

In business today. Small businesses sign leases, supply agreements, customer orders, service terms and partnership agreements. Read every one; ask questions; get advice from an attorney for anything significant. Your own customer terms (price, delivery, refunds) are a contract too, so make them clear and keep them.

PICTURE STUDY



The Merchant Georg Gisze, Hans Holbein the Younger, 1532 · Oil on oak panel · Gemäldegalerie, Berlin

Image: Wikimedia Commons, public domain

Georg Gisze was a merchant of the Hanseatic League working in London. Holbein painted him surrounded by the tools of agreement: letters from partners, a signet seal to make documents binding, scales, pens and a box for coins. A merchant's word, written and sealed, was his business.

Look closely

- Find the letters on the wall and in his hand. What might they contain?
- Find the seal. What did a seal do to a written agreement?
- Find the scales and the coin box. What do they say about his trade?
- Look at the fragile glass vase. What might it suggest about fortune?

Talk about it

1. Why would a merchant far from home depend so much on written agreements?
2. What is the modern version of Gisze's seal?
3. Which agreement in your venture most needs to be written down?

Safety first. Students do not sign contracts alone. A parent reads, approves and signs every agreement, and should consult an attorney for anything significant.

PROJECT

Read an Agreement and Write Your Customer Terms

You will read a real agreement with a parent, mark its key terms, and write clear customer terms for your venture.

You will need

- A real agreement your family has (a rental, service or warranty agreement), chosen by a parent
- Highlighters
- Ledger notebook or word processor

Steps

1. With a parent, read a real agreement and highlight: parties, what is provided, price and payment, length, renewal, failure and remedies, ending.
2. List three questions you would want answered before signing it.
3. Write customer terms for your venture: what you provide, price, payment, delivery, cancellation, refunds or guarantee.
4. Check them against the elements of a contract.
5. Write a supplier or space agreement you might need (for example, a booth at a fair), including a renewal or repeat term.
6. Have a parent review both and sign as the responsible party.
7. Write a paragraph on what Walton's lease teaches about your own plans.

Tips

- Plain words are better than legal-sounding ones you do not understand.
- If a term confuses you, ask before you sign; never after.

Check your work

- ☐ I can name the elements of a contract and the key terms to read.
- ☐ My customer terms are clear and complete.
- ☐ A parent reviewed and signed my agreements.

LEDGER NOTEBOOK

1. Draw a checklist card of contract elements and key terms to keep in your wallet.
2. Copy your customer terms.
3. Write the Walton timeline: 1945 Newport store; sales grow to about $250,000; 1950 lease not renewed; Bentonville five-and-dime.

KEY FORMULAS

$$\text{Total lease cost} = \text{monthly rent} \times \text{months} + \text{fees}$$

From history. Walton's autobiography, *Sam Walton: Made in America*, was published in 1992, the year he died. He described learning from competitors, visiting their stores constantly, and trying to keep costs and prices low.

WORKED EXAMPLES

Example 1. Identify the elements of a contract in this exchange: A neighbor emails a parent, "Would your daughter mow our lawn every Saturday in June for $20 a week?" The parent replies, "Yes, she will start June 1."

Show solution

1. Offer: mowing every Saturday in June for $20 a week.
2. Acceptance: the parent's "yes."
3. Consideration: mowing in exchange for $20 a week.
4. Capacity: made through the parent, an adult.
5. Lawful purpose: lawn mowing.

Answer: A valid, simple contract. It would be wise to confirm in writing what happens if it rains or if the mower breaks.

Example 2. A booth lease offers two options: $45 a month for 12 months with no renewal right, or $50 a month for 12 months with the right to renew for another year at the same rent. If your business at that booth earns $300 a month in contribution, what is the renewal right worth to you?

Show solution

1. Extra cost of option 2: $12 \times 5 = \$60$.
2. If you lose the booth after a year, you could lose up to $12 \times 300 = \$3{,}600$ of contribution in year two (or more while finding a new site).
3. Even a modest chance of losing the location makes the renewal right worth far more than $60.

Answer: The renewal right costs $60 and protects up to $3,600: Walton's lesson in numbers.

PRACTICE

1. Easy What did Sam Walton buy in 1945, and for how much?

   Show answer

   A Ben Franklin variety-store franchise in Newport, Arkansas, for $25,000.

2. Easy Why did Walton lose the Newport store in 1950?

   Show answer

   His lease had no renewal clause, and the landlord refused to renew.

3. Easy Name the elements of a valid contract.

   Show answer

   Offer and acceptance, consideration, capacity, lawful purpose (and writing where required).

4. Medium Why should a student's venture agreements be signed by a parent?

   Show answer

   Minors generally have limited capacity and may cancel most contracts, so adults are reluctant to rely on them; a parent signing makes the agreement dependable and protects everyone.

5. **Medium** List six key terms to read in any agreement.

Show answer

Parties; what is provided; price and payment; dates and length; what happens on failure; how it ends or renews (also risks and responsibilities).

6. **Medium** A 2-year lease at $60 a month plus a $100 fee. Find total cost.

Show answer

$60 \times 24 + 100 = \$1{,}540$

7. **Medium** Walton's sales rose from about $72,000 to $250,000. Find the percent increase.

Show answer

About 247%.

8. **Hard** Is a verbal agreement a contract? What are its weaknesses?

Show answer

Often yes, if the elements are present (though some contracts must be written). Weaknesses: people remember terms differently, and it is hard to prove.

9. **Hard** Explain Psalm 15:4 in a business setting.

Show answer

A person of integrity keeps his word even when a contract turns out to cost him, such as a fixed-price job whose materials rose in price.

10. **Hard** The landlord was legally right. Was he right in every sense? Use the six stakeholders.

Show answer

He kept the law but took the value Walton's work had built; as a member of the community he might have dealt more generously. Law sets a floor; character asks more.

11. **Challenge** Draft five clauses for a summer pet-sitting agreement (signed by a parent) that protect both the family and the customer.

    Show answer

    Sample: services and schedule; price and payment date; emergency contact and vet authorization; what happens if the sitter is sick; cancellation and refund terms.

COMMON MISTAKES

- Signing without reading.
- Assuming a successful arrangement will continue without a written right to renew.
- Leaving out what happens if something goes wrong.

Make it a game · Catch the Missing Clause. Your parent reads a short invented shop lease aloud, leaving out an important protection. Listen for the missing renewal clause and any vague terms. Say each problem and how you would rewrite it. Score a point for each issue spotted. Then name the elements of a valid contract and tell what happened to Sam Walton's store in 1950.

Scripture. “He that sweareth to his own hurt, and changeth not.” (Psalm 15:4, KJV)

The man who may dwell in God’s holy hill keeps his word even when keeping it costs him. That is the heart of honest contracting.

9.2 Intellectual Property: Lincoln's Patent and the "Fuel of Interest"

OBJECTIVES

- Tell the story of Abraham Lincoln's 1849 patent and his view that patents add "the fuel of interest to the fire of genius."
- Distinguish patents, trademarks, copyrights and trade secrets, and their terms.
- Protect your venture's name and work and avoid infringing others' intellectual property.

> **Warm-up.** Look around your room for five things that have a brand name, a patent number or a copyright notice. Write what each one protects.

WATCH

What is a Patent? A Cartoon Introduction

World Intellectual Property Organization – WIPO · 6:00

https://www.youtube.com/watch?v=Bb9EBtlGx7w

> **WHEN TO WATCH**
> After the story of Lincoln's patent, before the four kinds of intellectual property.

Note: From the World Intellectual Property Organization.

KEY TERMS

patent

A government grant giving an inventor the exclusive right to make, use and sell an invention for a limited time (20 years from filing for most U.S. utility patents), in exchange for publicly disclosing it.

trademark

A word, symbol or design identifying the source of goods or services; protected as long as it is used.

copyright

The right of an author or artist to control copying of an original creative work; in the U.S. generally the author's life plus 70 years.

infringement

Using someone else's protected invention, mark or work without permission.

trade secret

Valuable business information kept confidential, such as a recipe or process.

CORE IDEAS

The story. As a young man Abraham Lincoln worked on flatboats on the Mississippi and saw boats run aground on sandbars and shoals. Years later, as a congressman, he designed a device to lift a stranded boat: inflatable chambers along the hull, filled with air to raise it over the shallows. He whittled a model and on May 22, 1849, received U.S. Patent No. 6,469, "A Device for Buoying Vessels over Shoals." It was never manufactured, but Lincoln remains the only American president to hold a patent.

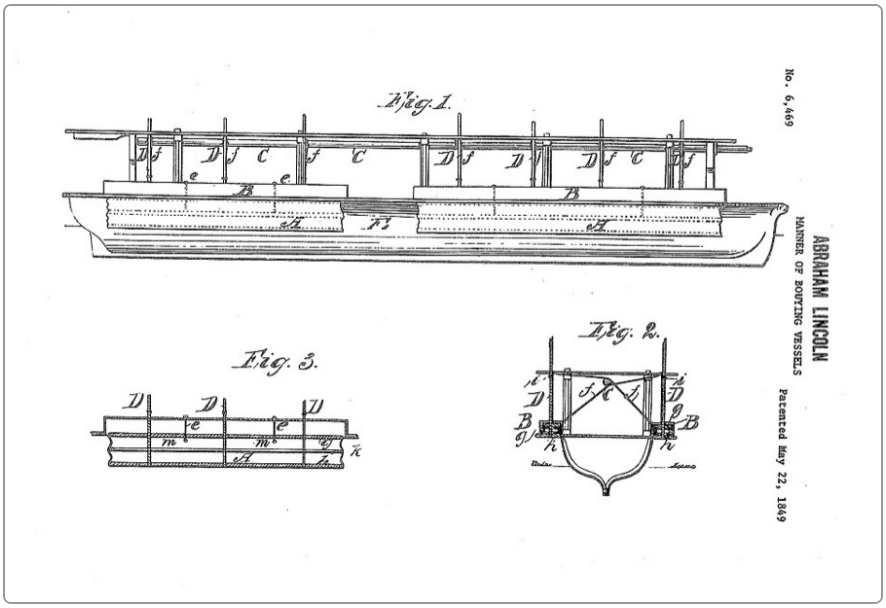
How they figured it out. In lectures on "Discoveries and Inventions" in 1858 and 1859, Lincoln praised the patent system. Before patents, he said, any man might instantly use what another had invented, so the inventor had no special advantage from his own invention. The patent system changed this and "added the fuel of interest to the fire of genius, in the discovery and production of new and useful things." The idea was already in the U.S. Constitution, Article I, Section 8, which gives Congress power to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their writings and discoveries.

The big idea. Intellectual property law protects four kinds of value. A **patent** protects an invention for a limited time in exchange for publishing how it works, so others can build on it later. A **trademark** protects a brand name or symbol as long as it is used, chiefly to protect customers from confusion. A **copyright** protects original writing, music, pictures and software from copying. A **trade secret** protects confidential know-how for as long as it stays secret. Each balances the creator's reward against the public's benefit.

Honesty with others' work. The eighth commandment, "Thou shalt not steal" (Exodus 20:15), applies to ideas and creative work as well as goods. Do not copy another business's logo or name, use photographs or music from the internet without permission, or sell items that copy a patented design or a licensed character. Use your own work, works in the public domain (like the pictures in this course), or properly licensed material.

In business today. A small venture should choose a name that does not imitate an existing business (search the USPTO database and your state's business records with a parent), keep its recipes and methods confidential if they are valuable, put a copyright notice on its own original materials, and consult a patent attorney only if it has a truly new invention worth the cost of a patent.

PICTURE STUDY



Lincoln's Patent Drawings, Abraham Lincoln (inventor); U.S. Patent Office drawing, 1849 · Patent drawing, U.S. Patent 6,469 · U.S. Patent and Trademark Office (Wikimedia Commons)
Image: Wikimedia Commons, public domain

These are the drawings from Lincoln's patent. The inflatable chambers along the boat's sides were meant to be filled with air, lifting the vessel off a sandbar. The idea came from his own experience as a young flatboatman.

Look closely

- Find the chambers along the hull. How would they lift the boat?
- Find the ropes and shafts. How would the crew operate them?
- Look at the labels. What makes a patent drawing different from an ordinary picture?

Talk about it

1. Why do you think the device was never manufactured?
2. What problem from your own experience could lead to an invention?
3. Does an invention have to succeed commercially to be worthwhile? Why?

Safety first. Do online searches with a parent. Do not file applications or pay fees without a parent; for any real patent question, a parent should consult a registered patent attorney.

PROJECT

An IP Check for Your Venture

You will check your venture's name and materials for conflicts with others' rights, identify your own intellectual property, and replace anything you do not have the right to use.

You will need

- Computer access with a parent (USPTO trademark search, your state's business-name search)
- Your brand and marketing materials from Unit 6

Steps

1. With a parent, search the USPTO trademark database and your state's business records for your venture's name and similar names.
2. List every image, font, song or text in your materials and record its source and your right to use it.
3. Replace anything you do not have the right to use with your own work or public-domain material.
4. Identify your own intellectual property: name, mark, original designs, recipes or methods.
5. Decide how to protect each (copyright notice, keep confidential, consistent use of your mark).
6. Write a short confidentiality rule for anyone who helps you with a secret recipe or method.
7. Write a paragraph on what Lincoln's "fuel of interest" means for your venture.

Tips

- When in doubt, make it yourself.
- A unique name is easier to protect and remember.

Check your work

☐ I can distinguish the four kinds of intellectual property.

- ☐ My venture's materials use only things I have the right to use.
- ☐ I identified and protected my own intellectual property.

LEDGER NOTEBOOK

1. Make a four-column table: patent, trademark, copyright, trade secret, with what each protects, how long and an example.
2. Copy your materials-source list.
3. Sketch an invention idea of your own with labeled parts, like a patent drawing.

KEY FORMULAS

$$\text{Patent expires} \approx \text{filing year} + 20$$

From history. Lincoln's whittled patent model is in the Smithsonian's National Museum of American History. The first U.S. patent law was passed in 1790; the first patent was issued that year to Samuel Hopkins for a method of making potash.

WORKED EXAMPLES

Example 1. Classify the protection for each: (a) a new kind of folding garden tool; (b) the name and logo of your bakery; (c) the photographs and text on your product page; (d) your grandmother's secret bread recipe.

Show solution

1. (a) Patent (if truly new, useful and not obvious).
2. (b) Trademark.
3. (c) Copyright (automatic when created).
4. (d) Trade secret (as long as you keep it confidential; recipes generally cannot be patented).

Answer: Patent, trademark, copyright, trade secret.

Example 2. A patent application filed in 2026 is granted in 2029. Roughly when does it expire, and how many years of protection after grant does the owner have?

Show solution

1. Utility patents generally run 20 years from filing: $2026 + 20 = 2046$.
2. Years after grant: $2046 - 2029 = 17$.

Answer: About 2046; roughly 17 years of enforceable protection after grant (adjustments can apply).

Example 3. A student designs T-shirts for her venture. A friend suggests printing a famous sports team's logo because it would sell well. Evaluate the idea.

Show solution

1. The logo is a trademark owned by the team; printing it without a license is infringement.
2. It would also deceive buyers about whether the shirts are official.
3. Alternative: create original designs, or use a public-domain image, and build her own brand.

Answer: Refuse: it is both illegal and dishonest. Original designs build a brand she owns.

PRACTICE

1. Easy What did Lincoln's 1849 patent describe?

   Show answer

   A device using inflatable chambers to lift boats over shoals and sandbars.

2. Easy Quote Lincoln's phrase about the patent system.

   Show answer

   It "added the fuel of interest to the fire of genius."

3. Easy Which part of the Constitution provides for patents and copyrights?

   Show answer

   Article I, Section 8.

4. Medium How long do U.S. utility patents, trademarks and copyrights generally last?

Show answer

Patents about 20 years from filing; trademarks as long as used (with renewals); copyrights the author's life plus 70 years.

5. Medium Why does a patent require the inventor to publish how the invention works?

Show answer

In exchange for a limited monopoly, the public learns the idea and can use it freely after the patent expires, so knowledge grows.

6. Medium Why is Coca-Cola's formula protected as a trade secret rather than a patent?

Show answer

A patent would expire and require disclosing the formula; a trade secret lasts as long as it stays secret.

7. Medium A filing in 2030 is granted in 2032. When does it expire, and how many years after grant?

Show answer

About 2050; about 18 years.

8. Hard Is using a photo from a search engine on your product page legal? What should you do instead?

Show answer

Usually not, since photos are copyrighted. Take your own photos, use public-domain images, or license images properly.

9. Hard How does trademark law protect customers?

Show answer

It prevents confusion about who made a product, so customers who trust a brand are not deceived by imitators.

10. Hard Explain how Exodus 20:15 applies to intellectual property.

Show answer

Taking someone's creative work or invention without permission takes the value of their labor, which is a form of stealing.

11. Challenge Lincoln said patents add "fuel of interest" to genius. Give one argument that intellectual property encourages invention and one way it could slow it, and how the law tries to balance them.

Show answer

Encourages: inventors can profit from investment in research. Could slow: others cannot build on the idea during the term. Balance: limited terms, required disclosure, and exceptions such as fair use and independent creation for copyright.

COMMON MISTAKES

- Assuming anything online is free to use.
- Thinking an idea alone can be patented or copyrighted; protection covers specific inventions and expressions.
- Choosing a name close to a famous brand.

Make it a game · Four Shields Riddles. Write four riddles, one each for a patent, trademark, copyright and trade secret, including something about how long each lasts. Your parent answers each one aloud. Then trade roles. Finish by explaining in your own words what Abraham Lincoln meant by adding the fuel of interest to the fire of genius.

Scripture. "Thou shalt not steal." (Exodus 20:15, KJV)

Respecting others' inventions, names and creative work is part of obeying the eighth commandment in a world where much of a business's value is in ideas.

9.3 Employees, Wages and Safety: After the Triangle Fire

OBJECTIVES

- Tell how the Triangle Shirtwaist fire of 1911 led to new factory safety codes and how workers' compensation and federal safety and wage laws followed.
- Explain an employer's basic duties on wages, hours, safety and youth employment.
- Design safe work and fair pay for helpers in a small venture, and calculate payroll.

> **Warm-up.** Walk through the space where your venture works. List three things that could hurt someone and how you would prevent each.

WATCH

Workers Compensation: A Historic Compromise

WCB Manitoba · 4:42

https://www.youtube.com/watch?v=SOkSdG1GKu4

> **WHEN TO WATCH**
> After the story, before the employer's duties.

Note: From WCB Manitoba. It tells how workers' compensation began in Canada with Sir William Meredith's 1913 plan, a close parallel to the American state laws of the 1910s. It opens with a brief staged workplace fall.

KEY TERMS

employee

A person who works for a business under its direction for wages.

independent contractor

A person who does work for a business but controls how it is done and runs his own business.

workers' compensation

Insurance that pays medical costs and lost wages for workers injured on the job, regardless of fault.

workplace safety

Conditions and practices that prevent injury and illness at work, enforced in the U.S. by OSHA since 1970.

youth employment rules

Federal and state rules limiting the hours and jobs of workers under 18.

CORE IDEAS

The story. On March 25, 1911, a fire broke out on the eighth floor of the Asch Building in New York, where the Triangle Waist Company employed hundreds of workers, most of them young immigrant women, sewing shirtwaists. Exits were blocked or locked, the single fire escape collapsed, and the fire spread quickly through the cloth. One hundred forty-six workers died. The disaster shocked the nation.

How they figured it out. New York formed a Factory Investigating Commission, whose investigators, including a young social worker named Frances Perkins who had witnessed the fire, inspected hundreds of workplaces. The state passed dozens of new laws on fire exits, sprinklers, fire drills and working conditions. Fire-safety organizations developed codes for safe exits that are still the basis of building codes. Across the country, states adopted workers' compensation laws in the 1910s, so injured workers would be cared for without lawsuits. Later, the Fair Labor Standards Act of 1938 set a national wage floor, overtime pay and limits on child labor, and the Occupational Safety and Health Act of 1970 set national workplace safety standards.

The big idea. An employer owes workers fair, prompt pay; honest terms; safe conditions; and respect. The law sets minimums: pay at least the required wage and overtime; keep records; carry workers' compensation where required; keep the workplace safe; and follow **youth employment rules** (for example, federal rules limit the hours of 14- and 15-year-olds and bar workers under 18 from hazardous jobs). Whether a helper is an **employee** or an **independent contractor** depends on how the work is controlled, not on what you call it.

Scripture and the worker. "Thou shalt not oppress an hired servant that is poor and needy… At his day thou shalt give him his hire" (Deuteronomy 24:14-15). "The labourer is worthy of his hire" (Luke 10:7). Paul tells masters to give their servants "that which is just and equal" (Colossians 4:1). A Christian employer pays on time, tells the truth about the work, and guards the safety of those who work for him as he would his own children's.

In business today. A student venture may involve siblings or friends helping. Treat them as you would employees: agree on pay in advance, pay promptly, keep records, keep them safe, never ask them to do hazardous tasks, and have a parent supervise. When a business grows to real employees, an adult owner must handle payroll taxes, workers' compensation and labor law with professional advice.

PICTURE STUDY



Frances Perkins, Unknown photographer, about 1932 · Photograph · Library of Congress (Wikimedia Commons)

Image: Wikimedia Commons, public domain

Frances Perkins was having tea near Washington Square when the Triangle fire broke out, and she watched from the street. She devoted her career to workplace safety, first as an investigator for New York's Factory Investigating Commission, later as New York's industrial commissioner, and from 1933 as the first woman to serve as U.S. Secretary of Labor. She was a devout Episcopalian who regularly made retreats at a convent.

Look closely

- Look at her expression. What qualities would an inspector of factories need?
- Look at her plain, practical clothing. What does it suggest?
- Notice the date. How many years after the fire was this taken?

Talk about it

1. How might seeing a disaster shape a person's life's work?
2. Why are inspectors and safety codes good for honest business owners as well as workers?
3. What would a safety inspector notice in your venture's workspace?

> **Safety first.** A parent supervises all work involving heat, tools, chemicals or ladders. Minors must not do hazardous tasks. Keep a first-aid kit and know how to reach help.

PROJECT

A Safety Plan and Fair-Pay Agreement

You will inspect your venture's workspace, write a safety plan, and, if anyone helps you, write a fair-pay agreement and keep pay records.

You will need

- Ledger notebook
- A parent to inspect with you
- Basic safety supplies your family already has (first-aid kit, fire extinguisher, gloves)

Steps

1. With a parent, inspect your workspace for hazards: heat, blades, electricity, chemicals, lifting, tripping, fire exits.
2. Rate each hazard 1–5 for likelihood and severity; multiply for a risk score.
3. Write a control for each hazard with a score of 6 or more (remove, guard, train, protect, supervise).
4. Write a one-page safety plan: rules, supervision, first aid and emergency steps.
5. If anyone helps you, write a fair-pay agreement: tasks (no hazardous tasks for minors), pay, when paid, hours, and a parent's approval.
6. Keep a pay record for every helper.
7. Check the U.S. Department of Labor YouthRules! site with a parent for any rules that apply.

Tips

- The best control removes the hazard entirely.
- Pay helpers when promised, even if a sale is late.

Check your work

- ☐ I can explain employers' duties on pay, hours and safety.
- ☐ My safety plan addresses every significant hazard.
- ☐ Any helper has a written agreement and is paid on time.

LEDGER NOTEBOOK

1. Draw a map of your workspace with hazards circled and exits marked.
2. Copy your hazard risk table.
3. Write a timeline: 1911 Triangle fire; Factory Investigating Commission; 1910s state workers' compensation laws; 1938 FLSA; 1970 OSHA.

KEY FORMULAS

$$\text{Gross pay} = \text{hours} \times \text{wage} \; (+ \, 1.5 \times \text{wage} \times \text{overtime hours})$$

From history. The owners of the Triangle Waist Company were tried in criminal court in 1911 and acquitted; in a later civil suit they paid about $75 for each life lost. Public anger at that outcome helped carry the reform laws through the New York legislature.

WORKED EXAMPLES

Example 1. A small bakery employee earns $14 an hour and works 46 hours in a week. Overtime is paid at 1.5 times the wage for hours over 40. Find gross pay.

Show solution

1. Regular: $40 \times 14 = \$560$.
2. Overtime: $6 \times 1.5 \times 14 = \$126$.
3. Gross: $686.

Answer: $686 for the week.

Example 2. A student's venture pays a younger sibling $8 per batch for packaging. In a month the sibling packages 14 batches. The student also spends $25 on gloves, a first-aid kit and a fire extinguisher check. What is the monthly labor and safety cost, and how much does it reduce contribution of $310?

Show solution

1. Labor: $14 \times 8 = \$112$.
2. Total with safety: $112 + 25 = \$137$.
3. Remaining: $310 - 137 = \$173$.

Answer: $137 a month; $173 remains. Fair pay and safety are real costs that a plan must include.

PRACTICE

1. Easy When did the Triangle Shirtwaist fire occur, and how many workers died?

Show answer

March 25, 1911; 146.

2. Easy Name two kinds of laws that followed the fire.

Show answer

Fire-safety codes (exits, sprinklers, drills) and workers' compensation laws.

3. Easy Define workers' compensation.

Show answer

Insurance paying medical costs and lost wages for workers injured on the job, regardless of fault.

4. Medium $12 an hour, 44 hours, overtime at 1.5× over 40. Find gross pay.

Show answer

$480 + 4 \times 18 = \$552$

5. Medium What did the Fair Labor Standards Act of 1938 establish?

Show answer

A national wage floor, overtime pay and limits on child labor.

6. Medium Name three duties of a Christian employer from Scripture.

Show answer

Pay promptly (Deuteronomy 24:15); pay what is just (Colossians 4:1); do not oppress (Deuteronomy 24:14); honor the worker's hire (Luke 10:7).

7. Medium What makes someone an employee rather than an independent contractor?

Show answer

Mainly control: if the business directs how, when and where the work is done, the worker is usually an employee.

8. Hard Why did locked exits matter so much at the Triangle factory, and what principle does it teach?

Show answer

Workers could not escape; managers had locked doors to prevent theft and unauthorized breaks. The principle: no business convenience justifies risking workers' lives.

9. Hard A helper is promised $10 for a job finished Saturday. Payment is delayed two weeks "until sales come in." What is wrong?

Show answer

It breaks the promise and Deuteronomy 24:15; the worker should be paid on time, so the employer must plan cash to cover wages.

10. Hard Name two tasks a student venture should never assign to a younger helper, and why.

Show answer

Operating power tools or mowers, using a hot stove or fryer, handling chemicals, climbing ladders; they risk serious injury and many are barred for minors.

11. Challenge Two helpers each work 6 hours a week at $9 an hour. Safety supplies cost $40 once. Over 10 weeks, what is the total cost per hour of helper labor including safety?

Show answer

Wages $2 \times 6 \times 9 \times 10 = \$1{,}080$; total $1,120 for 120 hours; $\approx \$9.33$ an hour.

COMMON MISTAKES

- Treating family helpers as if no rules of fairness apply.
- Paying late when cash is short.
- Ignoring small hazards until someone is hurt.

> **Make it a game · Safety Inspector Walk.** Pretend a family workroom is a small shop. Walk through it with a clipboard and mark five safety hazards, such as a blocked exit or an overloaded outlet. Say what a good employer would fix first. Then tell how the Triangle fire of 1911 changed factory rules, and name the difference between an employee and a contractor.

> **Scripture.** “Thou shalt not oppress an hired servant that is poor and needy, whether he be of thy brethren, or of thy strangers that are in thy land within thy gates: At his day thou shalt give him his hire, neither shall the sun go down upon it;” (Deuteronomy 24:14-15, KJV)
>
> God commands prompt, fair pay and forbids oppressing workers, whether neighbors or strangers. Safe conditions are part of not oppressing them.

9.4 Taxes and Licenses: Rendering unto Caesar as a Practical Step

OBJECTIVES

- Explain Jesus' answer about the tribute money and Paul's teaching in Romans 13:7 as the Christian basis for paying taxes honestly.
- List the licenses, permits and taxes a small venture may need, and the records to keep.
- Estimate self-employment tax and set aside money for taxes from each sale.

> **Warm-up.** Look at a store receipt. Find the sales tax. What percent of the purchase is it? Who collected it, and where does it go?

WATCH

Understanding Self-Employment Tax: A Guide for the Newly Self-Employed

Michael Ruger - Greenbush Financial Group · 6:24

https://www.youtube.com/watch?v=WWsoLFqTP6U

> **WHEN TO WATCH**
> After the big idea, before the tax arithmetic.

Note: From a financial-planning firm's channel; a clear explanation of self-employment tax and quarterly payments. Rules and thresholds change, so check current IRS guidance with a parent.

BACKUP VIDEO

Understanding Self-Employment Tax

BizOwner Training · 6:04

https://www.youtube.com/watch?v=P2OQpXgk_4w

Optional, a conversation with an accountant about who owes self-employment tax.

KEY TERMS

business license

Permission from a city or county to operate a business there; requirements vary by place.

sales tax

A tax on retail sales collected by the seller and paid to the state or locality.

self-employment tax

Social Security and Medicare tax paid by people who work for themselves on their net earnings.

deductible expense

A business cost that may be subtracted from income in figuring taxable profit.

record keeping

Keeping receipts, sales records and books that show income and expenses accurately.

CORE IDEAS

The story. When the Pharisees tried to trap Jesus with a question about paying tribute to Caesar, He asked for a coin. “Whose is this image and superscription?” They answered, “Caesar’s.” He said, “Render therefore unto Caesar the things which are Caesar’s; and unto God the things that are God’s” (Matthew 22:21). Paul later wrote, “Render therefore to all their dues: tribute to whom tribute is due; custom to whom custom” (Romans 13:7). And when the chief tax collector Zacchaeus met Jesus, he promised to restore fourfold anything he had taken by false accusation (Luke 19:8).

How they figured it out. Christians have therefore treated honest tax paying and record keeping as a duty, whatever their opinions about particular laws. In practice, a business must find out which licenses and permits it needs, collect and remit any sales tax, keep accurate books, and report its income. The rules differ by country, state and town, and change over time, so the habit that matters is to ask, record and comply. This course treats taxes as practical steps, not as debates about what tax laws should be.

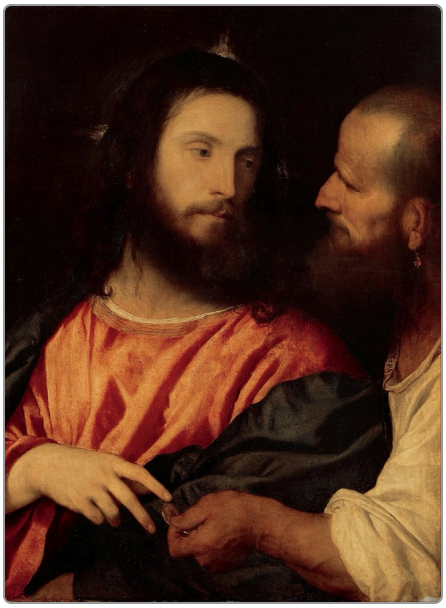
The big idea. A small U.S. venture may need: a local **business license**; a permit for food sales under state cottage-food rules or a health permit; a sales-tax permit if it sells taxable goods; and an employer identification number if it has employees or

certain business forms. Income from self-employment is reported on the owner's tax return; under federal rules, when net earnings from self-employment reach $400 or more in a year, **self-employment tax** for Social Security and Medicare is generally due, about 15.3% of 92.35% of net earnings. **Deductible expenses** reduce taxable profit, which is one more reason to keep every receipt.

Set it aside. Many new business owners spend everything and are surprised by a tax bill. A simple rule is to set aside a percentage of each sale's profit in a separate envelope or account for taxes. **Record keeping** is both a legal duty and a protection: good books show exactly what is owed, no more and no less.

In business today. Students with small ventures should work through these questions with a parent, using official sources (the IRS, the state revenue department, the city or county clerk). When in doubt, a parent should ask a tax professional. Honesty with the government is part of honesty everywhere: "He that is faithful in that which is least is faithful also in much" (Luke 16:10).

PICTURE STUDY



The Tribute Money, Titian, about 1516 · Oil on panel · Gemäldegalerie Alte Meister, Dresden

Image: Wikimedia Commons, public domain

Titian painted the moment in Matthew 22 when a Pharisee shows Jesus the coin with Caesar's image. The painting contrasts Jesus' calm face with the questioner's sly one, and the coin sits between their hands.

Look closely

- Find the coin. Where is it in the painting, and why?
- Compare the two faces. What does each expression suggest?
- Look at the two hands. What does each one seem to be doing?

Talk about it

1. What was the Pharisee trying to do with his question?
2. How does Jesus' answer guide a Christian business owner about taxes?
3. What belongs to God in a business, and what belongs to Caesar?

Safety first. A parent handles all government registrations, tax filings and payments. Never enter personal or tax identification numbers on any website yourself.

PROJECT

A Compliance Checklist and Tax Envelope

With a parent, you will find out which licenses, permits and tax rules apply to your venture, set up a tax set-aside, and organize your records.

You will need

- Computer access with a parent (city or county clerk, state revenue department, IRS small-business pages)
- An envelope or separate jar for tax set-asides
- Your ledger and receipts

Steps

1. With a parent, look up your city or county's rules for small businesses and home businesses.
2. Check your state's cottage-food rules if you sell food, and its sales-tax rules for your products.
3. Make a compliance checklist: each license or permit, whether it applies, its cost, and who is responsible (your parent).
4. Estimate your yearly net earnings and self-employment tax using the formula.
5. Choose a set-aside rate and start setting aside cash from each sale's profit.
6. Organize your records: a receipts envelope by month, your sales log and your ledger.
7. Write a paragraph on how Romans 13:7 applies to your venture.

Tips

- Use official government websites, not advice from forums.
- Rules change; write down the date you checked each one.

Check your work

- ☐ I can list the licenses and taxes that may apply to a small venture.
- ☐ My checklist shows what applies to my venture, with a parent responsible.
- ☐ I set aside money for taxes and organized my records.

LEDGER NOTEBOOK

1. Copy your compliance checklist with dates checked.
2. Show your SE-tax estimate.
3. Write Matthew 22:21 and Romans 13:7 in your notebook.

KEY FORMULAS

$$\text{SE tax} \approx 0.153 \times 0.9235 \times \text{net self-employment earnings}$$

$$\text{Tax set-aside per sale} = \text{profit per sale} \times \text{set-aside rate}$$

From history. The first U.S. Form 1040 for the federal income tax, in 1913, was a few pages long including instructions. Sales taxes were adopted by many states in the 1930s. Rules for every tax change often, which is why checking current official sources matters more than memorizing numbers.

WORKED EXAMPLES

Example 1. A student's venture has net earnings from self-employment of $2,400 for the year. Estimate the self-employment tax.

Show solution

1. Taxable base: $0.9235 \times 2{,}400 = \$2{,}216.40$.
2. SE tax: $0.153 \times 2{,}216.40 \approx \$339.11$.

Answer: About $339 (income tax may also apply depending on total income; a parent should check current rules).

Example 2. A venture sells $60 of taxable goods at a 7% sales tax rate. How much tax does it collect, and what does the customer pay? Whose money is the tax?

Show solution

1. Tax: $0.07 \times 60 = \$4.20$; customer pays $64.20.
2. The $4.20 belongs to the state; the seller only holds it until it is remitted.

Answer: $4.20 collected; $64.20 total. Spending collected sales tax is using someone else's money.

Example 3. A student sets aside 20% of each sale's profit for taxes. Profit per sale is $6, and she makes 150 sales in a year. How much is set aside? Is that enough to cover the SE tax on $900 of net earnings?

Show solution

1. Set aside: $0.20 \times 6 \times 150 = \$180$.
2. Net earnings: $6 \times 150 = \$900$; SE tax $\approx 0.153 \times 0.9235 \times 900 \approx \$127.17$.

Answer: $180 set aside, enough for about $127 of SE tax with some to spare.

PRACTICE

1. Easy What did Jesus say about the tribute money?

   Show answer

   "Render therefore unto Caesar the things which are Caesar's; and unto God the things that are God's" (Matthew 22:21).

2. Easy Name four licenses, permits or registrations a small venture might need.

   Show answer

   Local business license; cottage-food or health permit; sales-tax permit; employer identification number (and others by locality).

3. Easy Define deductible expense.

   Show answer

   A business cost that may be subtracted from income in figuring taxable profit.

4. Medium Estimate SE tax on $1,500 of net earnings.

   Show answer

   $0.153 \times 0.9235 \times 1500 \approx \$211.94$

5. Medium Sales of $250 at a 6.5% sales tax. Find the tax collected.

   Show answer

   $16.25.

6. Medium Why is good record keeping a protection as well as a duty?

Show answer

Accurate books show exactly what is owed, support deductions, and answer any question from the tax authorities.

7. Medium At what level of net self-employment earnings does federal SE tax generally begin to apply?

Show answer

$400 or more in a year.

8. Hard Why is spending collected sales tax a form of dishonesty?

Show answer

The tax belongs to the government; the seller holds it in trust. Spending it is using money that is not his.

9. Hard Explain how Zacchaeus's promise in Luke 19:8 applies to a business owner who finds he underpaid taxes in the past.

Show answer

Repentance includes making restitution: correct the records and pay what was owed, rather than hiding the error.

10. Hard Profit per sale $8; 120 sales; set-aside 18%. How much is set aside?

Show answer

$0.18 \times 8 \times 120 = \$172.80$

11. Challenge Revenue $3,000; deductible expenses $1,100. Estimate SE tax. If the student set aside 15% of revenue, is it enough?

Show answer

Net $1,900; SE tax $\approx 0.153 \times 0.9235 \times 1900 \approx \$268.46$; set-aside $450: enough for SE tax (other taxes may apply).

COMMON MISTAKES

- Assuming a small venture needs no permits.
- Spending money that should be set aside for taxes.
- Throwing away receipts.

Make it a game · Caesar's Envelope. Run a pretend market stall with paper money. For each sale of your parent's item, calculate the sales tax and set it aside in an envelope; keep a simple record of every sale. At the end, reconcile the envelope against your records. Then explain what Jesus meant about rendering to Caesar, and read Romans 13:7 aloud.

Scripture. “Render therefore to all their dues: tribute to whom tribute is due; custom to whom custom; fear to whom fear; honour to whom honour.” (Romans 13:7, KJV)

Paul tells Christians to pay what they owe, including taxes. For a business, that means knowing the rules, keeping honest records and paying in full.

9.5 Failure, Bankruptcy and Starting Again: H. J. Heinz

OBJECTIVES

- Tell how H. J. Heinz's first business failed in 1875, how he repaid creditors he no longer legally owed, and how he built a new company.
- Explain bankruptcy, liquidation and reorganization, and what a creditor and a debtor each lose.
- Plan how to close a venture honestly, including a final accounting and what is owed to each stakeholder.

> **Warm-up.** Think of something you tried that did not work. Write what you learned and what you would do differently. Did you tell anyone it had failed?

WATCH

History Heinz

Heinz Belgium · 4:05

https://www.youtube.com/watch?v=eZFgCOY_REM

> **WHEN TO WATCH**
> After the story of Heinz, before the big idea.

Note: A short company-history film from Heinz.

KEY TERMS

insolvency

Being unable to pay debts as they come due.

bankruptcy

A legal process for a debtor who cannot pay: assets are sold or the business is reorganized under court supervision, and remaining debts may be discharged.

liquidation

Selling a business's assets to pay creditors, then closing it (Chapter 7 in U.S. law).

reorganization

Restructuring debts under court supervision so a business can keep operating (Chapter 11 for businesses).

discharge

A court order releasing a debtor from legal obligation to pay certain debts.

CORE IDEAS

The story. Henry John Heinz grew up near Pittsburgh, selling surplus vegetables from his mother's garden as a boy. In 1869 he and a partner began bottling horseradish in clear glass, so customers could see it was pure, at a time when many sellers padded horseradish with turnip and wood fiber. The business grew into pickles, sauerkraut and vinegar. Then came the financial panic of 1873, tight credit, and a huge cucumber crop that the firm had contracted to buy at a fixed price. In December 1875 the business failed and Heinz was declared bankrupt. Newspapers criticized him, and he wrote in his diary of the shame.

How they figured it out. Under the law, the bankruptcy released Heinz from his old debts. He did not accept that release as the end of the matter. He kept a list of what he still owed, which he headed "M.O.," for moral obligations, and over the following years he repaid those creditors in full. In 1876 he started again with his brother and cousin, with money from his family, as F. & J. Heinz, and he added tomato ketchup. Rebuilt in 1888 as the H. J. Heinz Company, it became famous for its "57 Varieties" slogan, its clean factories open to visitors, and its unusual support for the Pure Food and Drug Act of 1906. Heinz taught Sunday school for most of his life.

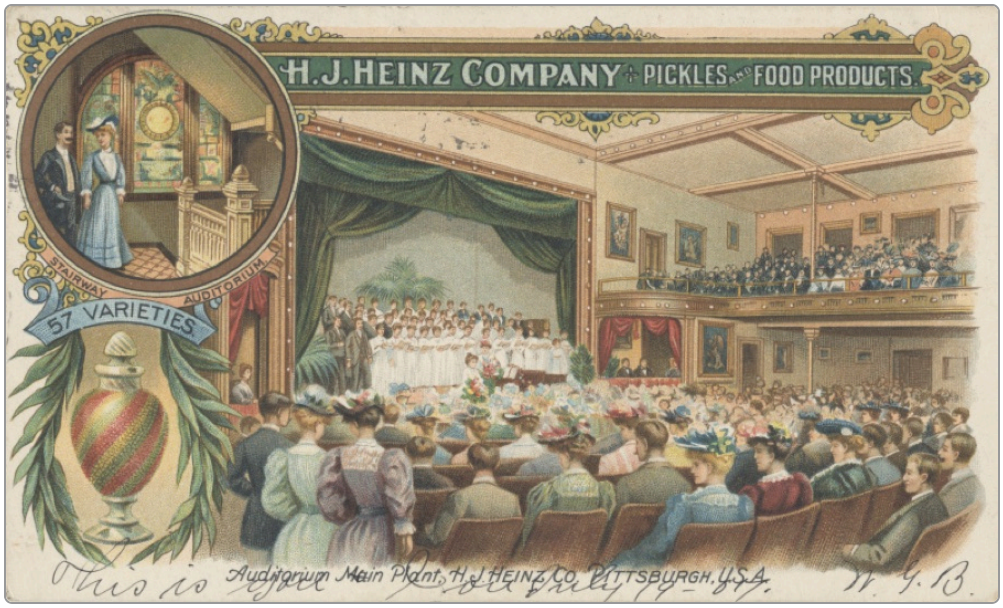
The big idea. Businesses fail; many new ones close within a few years. When a business becomes **insolvent**, the law offers **bankruptcy**: **liquidation**, in which assets are sold and creditors receive a share of what they are owed, or **reorganization**, in which debts are restructured and the business continues. Remaining debts may be **discharged**. The process exists so that honest debtors can start again and creditors are treated fairly according to set rules, rather than by whoever grabs first.

Failing honestly. Scripture warns, "The wicked borroweth, and payeth not again" (Psalm 37:21), and Paul writes, "Owe no man any thing, but to love one another"

(Romans 13:8). A legal discharge does not erase a moral desire to make others whole when one is able, as Heinz showed. Failing honestly means telling stakeholders the truth early, stopping before debts grow, selling assets fairly, paying workers first, refunding customers, keeping records, and learning. Many great entrepreneurs, including Ford, Hershey and Heinz, failed before they succeeded.

In business today. Most small ventures that fail simply close, without bankruptcy. A planned, honest closing (a final count of inventory, collecting what is owed, paying every bill, refunding deposits, and a closing letter to customers) protects relationships and reputation for the next venture.

PICTURE STUDY



The H. J. Heinz Company, Pittsburgh, Unknown photographer, about 1900 · Printed postcard · Wikimedia Commons

Image: Wikimedia Commons, public domain

Heinz printed postcards like this one to show visitors and customers his model factory. This one shows the auditorium where workers gathered for lectures, music and meetings, an unusual benefit at the time, twenty-five years after Heinz's bankruptcy.

Look closely

- Find the "57 Varieties" sign. Why put the slogan on a postcard?
- Look at the workers in the auditorium. What does this room suggest about how Heinz treated them?
- Find the company name. Why would a food company want people to see inside its plant?

Talk about it

1. How might Heinz's bankruptcy have shaped the way he ran this company?
2. Why would a food company welcome visitors into its factory?
3. What would you want people to see if they toured your venture?

PROJECT

An Honest Closing Plan

Even ventures that succeed eventually end or change. You will write a plan for closing your venture honestly, including a final accounting and a letter to stakeholders.

You will need

- Your ledger, sales log and agreements
- Spreadsheet

Steps

1. List every stakeholder you would owe something to if your venture closed tomorrow: helpers, customers with deposits or guarantees, suppliers, lenders, partners.
2. List everything the venture owns that could be sold or returned, with realistic values.
3. Compute whether assets cover obligations and the recovery rate if not.
4. Write a priority order for payment with reasons drawn from this lesson.
5. Write a closing letter to customers: honest reason, how deposits and guarantees will be handled, and thanks.
6. Write what you would do with any leftover money (savings, giving, a next venture).
7. Write a paragraph: what would you most want to learn from a failure, and how would you start again?

Tips

- Planning a closing is not pessimism; it is stewardship.
- The sooner you face a failing venture, the less you owe.

Check your work

- ☐ I can explain bankruptcy, liquidation, reorganization and discharge.
- ☐ My closing plan lists every stakeholder and a fair order of payment.
- ☐ My closing letter is honest and kind.

LEDGER NOTEBOOK

1. Draw Heinz's path: 1869 horseradish; 1875 bankruptcy; M.O. list; 1876 new firm and ketchup; 1888 H. J. Heinz Company; 1906 Pure Food and Drug Act.
2. Copy your closing-plan priority list.
3. Write one lesson from each failure you studied this year.

KEY FORMULAS

$$\text{Recovery rate} = \frac{\text{amount paid to creditors}}{\text{total owed}}$$

From history. The "57 Varieties" slogan came in 1896, when Heinz saw an advertisement for "21 styles" of shoes. The company already made more than 57 products, but he liked the number. He was one of the few food manufacturers to lobby for the Pure Food and Drug Act, believing honest labels would reward honest makers.

WORKED EXAMPLES

Example 1. A failed shop owes $40,000 to creditors. Its assets sell for $14,000, and $2,000 goes to legal costs. What is the recovery rate for creditors?

Show solution

1. Available: $14{,}000 - 2{,}000 = \$12{,}000$.
2. Recovery rate: $12{,}000 / 40{,}000 = 30\%$.

Answer: Creditors recover 30 cents on the dollar and lose $28,000. Heinz's "moral obligations" list is what made his creditors whole.

Example 2. A student closes a venture. Inventory can be sold for \$45; she has \$60 cash; she owes a supplier \$70, a helper \$20, and has \$30 in customer deposits for orders she cannot fill. What should she pay first, and is there enough?

Show solution

1. Available: $45 + 60 = \$105$.
2. Owed: $70 + 20 + 30 = \$120$; short by \$15.
3. Priority: pay the helper (\$20) and refund deposits (\$30) first, then the supplier \$55 of \$70, with an honest letter and a plan to pay the remaining \$15.

Answer: There is \$15 too little. Pay the helper and refund customers in full, pay the supplier what is possible now, and keep the promise to pay the rest from future earnings.

PRACTICE

1. Easy Why did Heinz bottle horseradish in clear glass?

   Show answer

   So customers could see it was pure, at a time when many sellers adulterated horseradish.

2. Easy What did Heinz's "M.O." list mean?

   Show answer

   Moral obligations: debts he chose to repay even though bankruptcy had legally discharged them.

3. Easy Define liquidation and reorganization.

   Show answer

   Liquidation: sell assets, pay creditors, close. Reorganization: restructure debts and keep operating under court supervision.

4. Medium Creditors owed \$25,000 receive \$7,500. Find the recovery rate.

   Show answer

   30%.

5. Medium What three events combined to cause Heinz's 1875 failure?

Show answer

The panic of 1873 and tight credit; a huge cucumber crop; a contract to buy it at a fixed price that the firm could not pay for.

6. Medium Why does bankruptcy law exist?

Show answer

To give honest debtors a fresh start and to divide what remains fairly among creditors by set rules.

7. Medium List five steps of an honest closing for a small venture.

Show answer

Tell stakeholders early; collect what is owed; sell inventory fairly; pay helpers and refund customers; pay suppliers; keep final records; write a closing letter.

8. Hard Is it wrong to accept a legal discharge of debt? Discuss using Psalm 37:21 and Heinz's example.

Show answer

Using a lawful process is not in itself wrong, but Psalm 37:21 commends repaying; Heinz shows a conscience that, once able, made creditors whole. Many Christians see repayment as right when it becomes possible.

9. Hard Why should workers and customers be paid before other creditors when a small venture closes?

Show answer

Workers are owed for labor already given and often depend on it (Deuteronomy 24:15); customer deposits are their money held in trust. Many laws also give wages priority.

10. Hard Name three famous entrepreneurs from this course who failed before succeeding, and what each learned.

Show answer

Hershey (start small with a proven product), Ford (iterate and choose partners carefully), Heinz (honesty and contracts that fit your cash), Tudor (plan the whole chain), Walton (read leases).

11. **Challenge** A business has $18,000 in assets and owes wages $4,000, customer deposits $3,000 and suppliers $20,000. If wages and deposits are paid first, what recovery rate do suppliers get?

    Show answer

    Left for suppliers: $11,000; $11{,}000/20{,}000 = 55\%$.

COMMON MISTAKES

- Hiding trouble from stakeholders until it is too late.
- Treating a legal discharge as the end of all obligation.
- Thinking one failure means you are not an entrepreneur.

Make it a game · Heinz Starts Again. Make a memory match set from five cards of terms: insolvency, bankruptcy, liquidation, reorganization and discharge, and five cards of definitions you write from memory. Match them against your parent, who checks them. Then explain what a creditor and a debtor each lose, and why H. J. Heinz repaid creditors he no longer owed.

Scripture. “Owe no man any thing, but to love one another:” (Romans 13:8, KJV)

Paul’s rule is to clear every debt except the debt of love. Heinz’s “moral obligations” list shows that rule lived out after a legal discharge.

UNIT 9

Law, Ethics and Stakeholders

A business lives inside a web of promises and rules: contracts with customers, suppliers and landlords; rights to inventions, names and creative work; duties to employees; taxes and licenses; and, when things go wrong, the law of debt and bankruptcy. This unit teaches these as practical steps for an honest entrepreneur, not as debates. You will learn contracts from Sam Walton, who lost his first thriving store in 1950 because his lease had no renewal clause; intellectual property from Abraham Lincoln, the only president to hold a patent; and employees, wages and safety from the factory reforms that followed the Triangle Shirtwaist fire of 1911.

Then you will learn the practical steps of taxes and licenses, grounded in Jesus' answer about the tribute money, and close with failure, bankruptcy and starting again, through the story of H. J. Heinz, who went bankrupt in 1875 and then quietly repaid every creditor he legally no longer owed. Throughout, the six stakeholders remind you that the law sets a floor, and character must build above it.

PREREQUISITES

- Has a venture plan, financial model and operations manual (Units 3–8)
- Knows the legal forms of business (Lesson 3.4)
- Can compute percents

MASTERY CHECKLIST

- ☐ I can name the elements of a valid contract, read a simple agreement for key terms, and explain why minors need a parent to sign.
- ☐ I can distinguish patents, trademarks, copyrights and trade secrets, and avoid infringing others' rights.
- ☐ I can explain an employer's basic duties on wages, hours, safety and youth employment, and design a safe workplace for a small venture.
- ☐ I can list the licenses, permits and taxes a small venture may need and estimate self-employment tax.
- ☐ I can explain bankruptcy and its moral dimensions and describe how an honest entrepreneur fails and starts again.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **U.S. Patent and Trademark Office: "Inventors and Entrepreneurs" resources**: Free official explanations of patents and trademarks, with a searchable database. Use with Lesson 9.2. Ages 14+.
- **IRS: Small Business and Self-Employed Tax Center**: Free official information on business taxes, record keeping and self-employment tax. Use with Lesson 9.4 with a parent. Ages 15+.
- **U.S. Department of Labor: YouthRules!**: Free official guide to the hours and jobs teens may work. Use with Lesson 9.3. Ages 13+.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

9.1	**Contracts: Sam Walton's Lost Lease**	3 sessions of 50 minutes

9.2	**Intellectual Property: Lincoln's Patent and the "Fuel of Interest"**	3 sessions of 50 minutes
9.3	**Employees, Wages and Safety: After the Triangle Fire**	3 sessions of 50 minutes
9.4	**Taxes and Licenses: Rendering unto Caesar as a Practical Step**	3 sessions of 50 minutes
9.5	**Failure, Bankruptcy and Starting Again: H. J. Heinz**	3 sessions of 50 minutes

Unit 9 test

Calculators are allowed. Show your work for every calculation: write the formula, put in the numbers and give the answer with its units. Answer the concept questions in complete sentences. The test is worth 100 points.

1. **5 pts**
   Why did Sam Walton lose his Newport store in 1950, and what did he learn?

2. **6 pts**
   Name the elements of a valid contract and identify each in: "Mow my lawn Saturdays in July for $25 each." "Agreed."

3. **6 pts**
   A renewal right costs $8 a month more on a 12-month lease. The location brings $250 a month in contribution. Explain whether the right is worth it.

4. **6 pts**
   Match each to its protection: (a) a new mechanism; (b) a bakery logo; (c) a written cookbook; (d) a confidential spice blend. Give how long each generally lasts.

5. **5 pts**
   What did Lincoln say the patent system added, and what was his own patent?

6. **5 pts**

   Why is printing a famous team's logo on shirts you sell wrong?

7. **6 pts**

   $13 an hour, 47 hours, overtime at 1.5× over 40. Find gross pay.

8. **6 pts**

   Name three reforms that followed the Triangle fire and two later federal laws on work.

9. **5 pts**

   State two Scripture passages about paying workers and what they require.

10. **6 pts**

    Estimate self-employment tax on $3,200 of net earnings.

11. **5 pts**

    Sales of $180 at 7.5% sales tax. Find the tax, and explain who owns it.

12. **5 pts**

    Name four licenses or permits a small venture may need.

13. **6 pts**

    Creditors are owed $50,000; assets bring $16,000 after costs. Find the recovery rate. Define discharge.

14. **6 pts**

    Tell how Heinz handled his debts after his 1875 bankruptcy and why it matters.

15. **6 pts**

    A closing venture has $90 and owes a helper $25, customer deposits $40 and a supplier $50. Give the payment order and amounts.

16. **16 pts**

    Essay: "The law sets a floor; character builds above it." Using two stories from this unit and one Scripture passage, explain what this means for an entrepreneur.

ANSWER KEY

1. His lease lacked a renewal clause, and the landlord refused to renew; he learned to read every contract carefully.
2. Offer (mowing for $25 each Saturday), acceptance (“Agreed”), consideration (mowing for money), capacity (adults or a parent), lawful purpose.
3. It costs $96 a year and protects up to $3,000 of next year’s contribution; even a small chance of losing the site makes it worthwhile.
4. (a) patent, about 20 years from filing; (b) trademark, as long as used; (c) copyright, life plus 70 years; (d) trade secret, as long as kept secret.
5. “The fuel of interest to the fire of genius”; a device for buoying vessels over shoals (Patent 6,469, 1849).
6. It infringes their trademark and deceives buyers about the source; it takes value that belongs to another.
7. $520 + 7 \times 19.50 = \$656.50$
8. Fire exits, sprinklers, fire drills, factory inspections, workers’ compensation; the Fair Labor Standards Act (1938) and OSHA (1970).
9. Deuteronomy 24:14-15 (pay promptly, do not oppress); Luke 10:7 (the laborer is worthy of his hire); Colossians 4:1 (just and equal).
10. $0.153 \times 0.9235 \times 3200 \approx \$452.15$
11. $13.50; it belongs to the state, held in trust by the seller.
12. Business license, cottage-food or health permit, sales-tax permit, employer identification number (as applicable).
13. 32%. Discharge: a court order releasing the debtor from legal obligation to pay certain debts.
14. He listed them as “moral obligations” and repaid creditors in full though legally released; it shows integrity beyond the law and rebuilt trust.
15. Helper $25, deposits $40, supplier $25 of $50 now with a plan to pay the remaining $25.
16. Graded on a clear thesis, accurate use of two stories (Walton’s landlord, Lincoln and IP, the Triangle fire, taxes and Zacchaeus, Heinz’s M.O. list), apt Scripture, and specific application.

PORTFOLIO PIECE: THE COMPLIANCE AND ETHICS FILE

Assemble your customer terms and any supply or space agreement (signed by a parent), your IP check and source list, your safety plan and any fair-pay agreements with pay records, your compliance checklist and tax set-aside records, and your honest closing plan. Add a one-page statement of the ethical rules you will follow in your venture, each linked to a law, a story or a Scripture passage from this unit.

LOOK FOR	WHAT IT MEANS
Completeness	Every required agreement, checklist and plan is present and reviewed by a parent.
Accuracy	Calculations (pay, taxes, recovery) are correct and rules are drawn from official sources.
Stakeholders	Workers, customers, suppliers and the community are each considered.
Character	The ethics statement goes beyond legal minimums with specific commitments.

UNIT 10

The Venture

This is the capstone. Over five or six weeks you will choose a small, safe venture, launch it with a parent as your partner, sell honestly, measure what happens, keep complete books, review it with the six stakeholders, and pitch the results to family "investors." Everything you have learned comes together: the need and the test, the model and the plan, the numbers and the cash, the financing, marketing, selling, operations, law and ethics.

Each lesson pairs a step of your venture with a guide from history. Ewing Kauffman shows how to choose a venture that fits your gifts and values; Clarence Saunders's first Piggly Wiggly store of 1916 shows a launch, and a warning; A. C. Nielsen shows how to measure; Robert Wood Johnson's 1943 Credo shows how to review a business by its duties to every stakeholder; and Elisha Otis, cutting the rope under his own elevator in 1854, shows the power of an honest demonstration. The unit test is your venture file; the course ends with the final exam.

PREREQUISITES

- Has completed Units 1–9, including the business plan, financial model and compliance file
- A parent who agrees to act as partner, supervise every sale and handle money and registrations
- Five to six weeks set aside for the venture

MASTERY CHECKLIST

- ☐ I can choose a venture with a weighted decision matrix that weighs need, fit, cost, safety and values.
- ☐ I can plan and run a launch with a checklist, a soft launch and an opening day.
- ☐ I can choose key performance indicators, track them weekly and act on them.
- ☐ I can prepare an income statement, a balance sheet and a cash summary for my venture and write a stakeholder review.
- ☐ I can deliver an honest, well-structured pitch with a demonstration, real numbers and a clear request.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Junior Achievement (JA) programs**: Many communities have Junior Achievement programs in entrepreneurship for high-school students, sometimes open to homeschool groups. Check your local JA chapter. Ages 14+.
- **SCORE mentors**: SCORE matches small-business owners with free volunteer mentors, many of them retired business owners. A parent may arrange a mentor conversation about the venture and the final pitch. Ages 15+ with a parent.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

10.1 Choosing the Venture: Ewing Kauffman and Marion Laboratories
3 sessions of 50 minutes

10.2 Launch: Clarence Saunders and the First Piggly Wiggly 3 sessions of 50 minutes

10.3 Selling and Measuring: A. C. Nielsen and Key Performance Indicators
3 sessions of 50 minutes

10.4 The Books and a Stakeholder Review: Johnson & Johnson's Credo
3 sessions of 50 minutes

10.5 The Pitch: Elisha Otis and "All Safe, Gentlemen" 3 sessions of 50 minutes

Unit 10 test

The Unit 10 test is a venture-file review with calculations. Calculators are allowed. Show your work for every calculation and answer the concept questions in complete sentences, using your own venture where asked. The test is worth 100 points.

1. **5 pts**
   State Ewing Kauffman's three principles and explain one in a business setting.
2. **6 pts**
   Weights: need 0.4, fit 0.3, safety 0.3. Option A scores 4, 3, 5; option B 5, 4, 2. Find weighted scores.

3. **5 pts**

   Describe Piggly Wiggly’s 1916 innovation and how Saunders later lost the company.

4. **5 pts**

   List six items on a launch checklist and explain the purpose of a soft launch.

5. **6 pts**

   Week 1 sales $150 from 15 customers; week 2 $198 from 18 customers. Find average sale each week and the percent change in sales.

6. **5 pts**

   Distinguish leading and lagging indicators with an example of each from your venture.

7. **6 pts**

   30 customers, 12 repeat. Repeat rate? If repeat customers average $14 and new $9, find total sales.

8. **5 pts**

   State the order of responsibilities in J&J’s 1943 Credo and how it guided the 1982 recall.

9. **8 pts**

   Revenue $720; COGS $290; other expenses $60; owner invested $120; draws $200; ending cash $270; equipment $50; owed to supplier $10. Prepare net income and check the balance sheet.

10. **6 pts**

    Write a six-stakeholder scorecard for your venture with a rating and one line of evidence each.

11. **5 pts**

    Describe Otis’s 1854 demonstration and why it persuaded.

12. **6 pts**

    Net income $410 on $150 invested; 45 hours worked. Find ROI and profit per hour.

13. **6 pts**

    Convert three vague claims about your venture into proof points with numbers.

14. **5 pts**

    Name the parts of a pitch in order and write your venture's ask.

15. **16 pts**

    Essay: Review your venture against your charter. What did it accomplish for each stakeholder, what went wrong, what did you learn about business and about yourself, and what would you do differently? Support your answer with numbers from your books and one Scripture passage.

16. **5 pts**

    What will you do with your venture's profit, and why?

ANSWER KEY

1. Treat others as you would be treated; those who produce should share in the results; give back. Example: profit sharing gave associates a stake in success.
2. A: $1.6 + 0.9 + 1.5 = 4.0$; B: $2.0 + 1.2 + 0.6 = 3.8$. A wins.
3. Self-service: open priced shelves, baskets, a turnstile and checkout, lowering labor costs. In 1923 he borrowed heavily to corner the stock, could not pay when the exchange changed its rules, and lost the company.
4. Product, prices, money handling, permits and safety, customers or location, transaction records, problem plan. A soft launch finds problems with a few friendly customers before the full opening.
5. $10.00; $11.00; 32%.
6. Leading changes before results (samples given, conversations); lagging shows results (sales, profit). Examples from the student's venture.
7. 40%; $12 \times 14 + 18 \times 9 = 168 + 162 = \$330$.
8. Customers, employees, communities, stockholders. Putting customers first led the company to recall about 31 million bottles at great cost to protect the public.
9. Net income $720 - 290 - 60 = \$370$. Equity $120 + 370 - 200 = \$290$. Assets $270 + 50 = \$320$; liabilities plus equity $10 + 290 = \$300$. The books are off by $20, so an error must be found (for example, unrecorded revenue or a missing liability) before reporting.
10. Student's own; graded on specific, honest evidence for each stakeholder.
11. He rode the platform, had the rope cut, and the safety brake stopped the fall; seeing it work with the inventor at risk proved the claim.
12. ROI $410/150 \approx 273\%$; $410/45 \approx \$9.11$ an hour.
13. Student's own; credit for specific, verifiable numbers from the venture records.
14. Problem, solution, proof/demonstration, customers, model, numbers, lessons, ask; the student's specific ask.
15. Graded on honesty, specific numbers from the books, a balanced stakeholder review, clear lessons, and thoughtful use of Scripture.
16. Student's own; credit for a reasoned plan that includes saving, reinvesting or giving in line with the charter.

PORTFOLIO PIECE: THE VENTURE FILE AND FINAL PITCH

Assemble the complete file for your capstone venture: decision matrix and signed charter, launch checklist and report, two-plus weeks of transaction records, the weekly dashboard, the income statement, balance sheet and cash summary, the stakeholder review, the pitch outline and slides, investors' feedback and your final reflection. Together with your portfolios from Units 1–9, this is the record of your year as an entrepreneur.

LOOK FOR	WHAT IT MEANS
Execution	The venture was launched, run and closed with complete records and every obligation settled.
Accuracy	Statements balance, cash matches, and dashboard numbers are correct.
Honesty	The review and pitch present successes and failures truthfully.
Communication	The pitch is clear, well structured, within time and ends with a specific ask.
Character	The venture kept its charter's rules on honesty, safety, fair pay and giving.

10.1 Choosing the Venture: Ewing Kauffman and Marion Laboratories

OBJECTIVES

- Tell how Ewing Kauffman started Marion Laboratories in his basement in 1950 and built it on principles of fairness and shared reward.
- Use a weighted decision matrix to choose a venture that fits a real need, your skills, your resources, safety and your values.
- Write the venture's one-page charter: purpose, customer, offer, goals and rules.

> **Warm-up.** List every venture idea you have had this year. Next to each, write one word for why you liked it and one word for what worried you about it.

WATCH

Mr. Kauffman and Marion Labs

Kauffman Foundation · 4:05

https://www.youtube.com/watch?v=EqIsPw9wDTY

> **WHEN TO WATCH**
> After the story of Kauffman, before the decision matrix.

Note: From the Ewing Marion Kauffman Foundation.

KEY TERMS

decision matrix
A table that scores options against weighted criteria to support a choice.

criterion
A standard used to judge options (need, fit, cost, safety, values).

weight
How important a criterion is relative to the others.

venture charter
A one-page statement of a venture's purpose, customer, offer, goals and rules.

profit sharing
Giving workers a share of the profits they help create.

CORE IDEAS

The story. Ewing Kauffman grew up in Kansas City, served in the Navy in the Second World War, and became a salesman for a pharmaceutical company. He was so successful that in one year his commissions exceeded the company president's salary; the company responded by cutting his territory. In 1950 he left and started his own company in the basement of his home, with very little money, selling a vitamin product and, soon after, calcium tablets made from crushed oyster shells. He called it Marion Laboratories, using his middle name so customers would not think it a one-man operation. In its first year it had modest sales and a small profit.

How they figured it out. Kauffman built Marion on three principles: treat others as you would want to be treated; those who produce should share in the results; and give back to the community. He called employees "associates," gave them profit sharing and stock options, and many became wealthy when the company grew into a major drug maker. He chose products where he could add value through research and selling, and he hired people who shared his values. Later he bought the Kansas City Royals baseball team to keep it in the city and founded the Ewing Marion Kauffman Foundation, which supports education and entrepreneurship.

The big idea. Choosing a venture is a decision with many **criteria**: a real, tested need; fit with your skills and interests; low start-up cost and manageable risk; safety and legality; time available; and fit with your values. A weighted **decision matrix** helps: give each criterion a **weight**, score each option, multiply and add. The matrix does not decide for you, but it makes your reasons visible and guards against choosing by excitement alone.

Values first. Kauffman's three principles were written before his products were chosen, and they shaped everything. Before you launch, write a **venture charter**: why the venture exists, whom it serves, what it offers, its goals for five or six weeks, and the rules you will keep (honesty, safety, fair pay, giving). "Commit thy works unto the LORD, and thy thoughts shall be established" (Proverbs 16:3).

In business today. Successful founders often choose ventures where their own experience gives them an edge, as Kauffman's sales experience did. For your capstone, choose something small, safe and real: a product or service you have tested in Unit 2, that families you know want, that you can make or do well, and that a parent can supervise.

PICTURE STUDY



The Sower, Jean-François Millet, 1850 · Oil on canvas · Museum of Fine Arts, Boston

Image: Wikimedia Commons, public domain

Millet painted a farm laborer sowing grain on a steep field in the late light. The sower cannot see what will grow, but he throws the seed with full commitment. Choosing a venture is like choosing where and what to sow.

Look closely

- Look at the sower's stride and his arm. What do they tell you about his commitment?
- Look at the hillside. Is it easy ground?
- Find the birds. What threat do they represent to his work?

Talk about it

1. How is starting a venture like sowing seed?
2. What "birds" threaten a new venture, and how can you guard against them?
3. Jesus told a parable of a sower (Matthew 13). What kind of "ground" does your venture need?

Safety first. Choose only ventures a parent approves and can supervise. No door-to-door selling, no selling to strangers alone, no online selling without a parent, and follow local rules for food.

PROJECT

Choose Your Venture and Write Its Charter

You will choose your capstone venture with a weighted decision matrix, confirm it with a parent, and write a one-page charter that will guide the next five weeks.

You will need

- Your Units 1–9 portfolio
- Spreadsheet for the matrix
- A parent as partner

Steps

1. List three candidate ventures, at least one tested in Unit 2.
2. Choose five or six criteria and weights that add to 1.
3. Score each venture with evidence from your earlier work, and compute weighted scores.
4. Test the result: change one weight and see if the choice changes.
5. Discuss the choice with a parent, including time, safety and money handling.
6. Write the venture charter: purpose, customer, offer, goals (sales, customers, profit, giving), rules.
7. Both you and your parent sign the charter.

Tips

- Small and done well beats large and half done.
- Choose goals you can measure in five weeks.

Check your work

- ☐ I can build and use a weighted decision matrix.
- ☐ My charter states purpose, customer, offer, goals and rules.
- ☐ My parent agreed and signed.

LEDGER NOTEBOOK

1. Copy your decision matrix.

2. Paste or copy your signed charter.
3. Write Kauffman's three principles and one way each applies to your venture.

KEY FORMULAS

Weighted score $= \sum_i w_i \, s_i, \qquad \sum_i w_i = 1$

From history. When Marion Laboratories merged with Merrell Dow in 1989, more than 300 associates became millionaires through the stock they had earned. Kauffman's foundation sponsors research on entrepreneurship and programs that help students finish school.

WORKED EXAMPLES

Example 1. A student compares three ventures on five criteria with weights: need 0.30, fit 0.20, cost and risk 0.15, safety 0.20, values 0.15. Scores (1–5): Bread delivery 5, 4, 3, 4, 5; Bike repair 3, 5, 4, 3, 4; Custom cards 3, 3, 5, 5, 4. Find each weighted score.

Show solution

1. Bread:
   $0.30(5) + 0.20(4) + 0.15(3) + 0.20(4) + 0.15(5) = 1.5 + 0.8 + 0.45 + 0.8 + 0.75$.
2. Bike repair: $0.9 + 1.0 + 0.6 + 0.6 + 0.6 = 3.70$.
3. Cards: $0.9 + 0.6 + 0.75 + 1.0 + 0.6 = 3.85$.

Answer: Bread 4.30, cards 3.85, bike repair 3.70. Bread delivery leads, mainly because its need is proven.

Example 2. Kauffman's principle "those who produce should share in the results": a venture earns $600 profit; two siblings helped. Design a fair profit-sharing rule if the owner worked 30 hours, sibling A 10 hours and sibling B 5 hours, and the owner also put in $100 of capital.

Show solution

1. Return on capital first, say 10% of profit: $60 to the owner.
2. Remaining $540 by hours (45 total): owner $540 \times 30/45 = \$360$; A $120; B $60.

Answer: Owner $420, A $120, B $60. Any fair rule agreed in advance is acceptable; the point is to decide before the money comes in.

PRACTICE

1. Easy Where and when did Kauffman start Marion Laboratories?

Show answer

In the basement of his Kansas City home in 1950.

2. Easy State Kauffman's three principles.

Show answer

Treat others as you would be treated; those who produce should share in the results; give back to the community.

3. Easy Define a decision matrix.

Show answer

A table scoring options against weighted criteria.

4. Medium Weights 0.5 and 0.5; option A scores 4 and 2; option B scores 3 and 4. Which wins?

Show answer

A: 3.0; B: 3.5. B wins.

5. Medium Why did Kauffman name the company Marion rather than Kauffman?

Show answer

Using his middle name, he hoped customers would not think it was a one-man company.

6. Medium List six criteria for choosing a student venture.

Show answer

Tested need; fit with skills; low cost and risk; safety; legality; time; values.

7. Medium What belongs in a venture charter?

Show answer

Purpose, customer, offer, goals, and rules (honesty, safety, pay, giving).

8. Hard How did profit sharing help Marion Laboratories as well as its workers?

Show answer

Associates acted like owners, worked harder and stayed longer, and the company attracted able people who shared its values.

9. Hard Why should values be written before products are chosen?

Show answer

So that decisions about products, prices and people are shaped by them instead of being bent by short-term gain.

10. Hard A decision matrix ranks a venture first, but you feel uneasy about it. What should you do?

Show answer

Find out why: perhaps a criterion is missing (time, a safety worry, a values concern). Add it or adjust weights, discuss with a parent, and decide; the matrix supports judgment rather than replacing it.

11. Challenge In worked example 1, how high would bike repair's need score have to be (others unchanged) to tie bread delivery?

Show answer

Needs $4.30 - 2.80 = 1.50$ from need: $0.30s = 1.50 \Rightarrow s = 5$. A need score of 5 would tie.

COMMON MISTAKES

- Choosing the most exciting idea rather than the best-tested one.
- Setting goals that cannot be measured.
- Leaving values to be worked out later.

Make it a game · Decision Matrix Duel. Name three pretend ventures. Each of you secretly assigns weights to four criteria: need, skills, resources and values. Score each venture from one to five, multiply and total. Reveal and compare. Does your choice differ? Defend it for thirty seconds. Then tell how Ewing Kauffman built Marion Laboratories in his basement on fairness and shared reward.

Scripture. "Commit thy works unto the LORD, and thy thoughts shall be established." (Proverbs 16:3, KJV)

Before the first sale, commit the venture and its purpose to God. Plans made with that settled trust are steadier.

10.2 Launch: Clarence Saunders and the First Piggly Wiggly

OBJECTIVES

- Tell how Clarence Saunders launched the first self-service grocery, Piggly Wiggly, in Memphis in 1916, and how he later lost the company.
- Plan a launch with a checklist, a soft launch and an opening day.
- Run the first two weeks of your venture and record every transaction.

> **Warm-up.** Imagine your venture's first day. List everything that must be ready by then, from materials to price cards to change for the cash box.

WATCH

Piggly Wiggly, the first true grocery store - Life in America

Recollection Road · 8:02

https://www.youtube.com/watch?v=lVvgAd_5vpo

> **WHEN TO WATCH**
> After the story of Piggly Wiggly, before your launch checklist.

Note: Skip the closing promotion.

KEY TERMS

launch

The start of selling a product or service to customers.

soft launch

A small, quiet first opening to a few customers to find problems before the full launch.

launch checklist

A list of everything that must be ready before opening, with who is responsible and by when.

self-service

A store design in which customers choose goods from open shelves themselves rather than asking a clerk.

transaction record

A written record of each sale or expense: date, item, amount, method of payment.

CORE IDEAS

The story. In 1916 most American grocery stores kept goods behind a counter. A customer handed a list to a clerk, who fetched each item, weighed it and wrapped it. It was slow, and stores needed many clerks. Clarence Saunders, a Memphis grocery wholesaler, had a different idea. On September 11, 1916, he opened Piggly Wiggly at 79 Jefferson Avenue: customers entered through a turnstile, picked up a basket, walked a set path past open shelves with every item clearly priced, and paid at a checkout counter on the way out.

How they figured it out. Saunders planned the launch carefully: he advertised the opening, designed fixtures to guide customers past every shelf, marked every price, and kept labor costs low so prices could be low. Customers liked choosing for themselves and saving money. He patented the "self-serving store" in 1917 and licensed the system to other grocers, and within a few years there were hundreds of Piggly Wiggly stores. But in 1923, when speculators sold Piggly Wiggly's stock short, expecting its price to fall, Saunders borrowed heavily to buy up the shares and drive the price up. The New York Stock Exchange changed its rules in the middle of the contest, Saunders could not pay his debts, and he lost control of the company and went bankrupt. A brilliant launch was undone by overreach.

The big idea. A good **launch** is prepared. Build a **launch checklist**: product ready, prices and terms posted, money handling (cash box, change, receipts, a parent in charge), safety and permits, customer list or location confirmed, a way to record every **transaction**, and a plan for problems. Then do a **soft launch** with a few friendly customers to find the problems while they are small. Only then hold your opening day.

The first weeks. Record every sale and every expense the same day. Watch for bottlenecks and complaints and fix them quickly. Keep your promises to the first customers above all; they will tell others. And remember Saunders: grow from strength, not by borrowing to win a fight.

In business today. Stores have soft openings, software companies release test versions, restaurants hold “friends and family” nights before opening to the public. Your launch can be as simple as a first Saturday of bread deliveries to six families, carefully prepared.

PICTURE STUDY



Inside a Piggly Wiggly Store, Clifford H. Poland (photographer), 1918 · Photograph · Library of Congress (Wikimedia Commons)

Image: Wikimedia Commons, public domain

This 1918 photograph, taken two years after the first store opened, shows the open shelves that made Piggly Wiggly new. Every item is within reach and clearly priced.

Look closely

- Find the price tags. Why were they essential to self-service?
- Look at how goods are arranged. What makes them easy to find?
- Notice how narrow the aisle is. How would that guide customers?

Talk about it

1. What did customers gain from choosing their own goods? What did they lose?
2. What did clerks think of this new design, do you suppose?
3. What “self-service” could make your venture easier for customers?

> **Safety first.** A parent supervises every sale, handles all money and approves every location and customer contact. Follow food-safety and local rules. No door-to-door or online selling without a parent.

PROJECT

Launch and Run Two Weeks

You will prepare a launch checklist, hold a soft launch, open your venture, and run it for two weeks with complete transaction records.

You will need

- Your charter, financial model, marketing plan and operations manual
- A cash box or envelope managed by a parent, a receipt book
- Ledger notebook or spreadsheet

Steps

1. Write a launch checklist with dates and responsibilities.
2. Hold a soft launch with three to six customers you know; ask each for one improvement.
3. Fix what the soft launch revealed.
4. Open: hold your first full selling day or week.
5. Record every sale and expense the same day: date, item, quantity, amount, payment method.
6. At the end of each week, total sales, expenses and cash, and check that the cash matches the records.
7. Write a launch report: what went well, what went wrong, what you changed.

Tips

- Under-promise on your first day; you can always add more.
- Thank every first customer personally.

Check your work

- ☐ I can plan a launch with a checklist and a soft launch.
- ☐ I recorded every transaction for two weeks.
- ☐ My cash matches my records each week.

LEDGER NOTEBOOK

1. Copy your launch checklist with checkmarks.

2. Paste two weeks of transaction records with weekly totals.
3. Write the Piggly Wiggly timeline: 1916 opening; 1917 patent; franchise growth; 1923 stock contest and loss.

KEY FORMULAS

$$\text{Daily sales} = \text{customers} \times \text{average sale}$$

> **From history.** After losing Piggly Wiggly, Saunders started another chain called Clarence Saunders, Sole Owner of My Name Stores, and later designed an automated store he called the Keedoozle. His great pink marble house in Memphis, unfinished when he went bankrupt, became the Pink Palace Museum.

WORKED EXAMPLES

Example 1. A student's soft launch serves 6 customers with an average sale of \$12. Her opening day serves 20 customers with an average sale of \$10. Costs are 40% of sales. Find sales and gross profit for each day.

Show solution

1. Soft launch: $6 \times 12 = \$72$; gross profit $0.60 \times 72 = \$43.20$.
2. Opening day: $20 \times 10 = \$200$; gross profit \$120.

Answer: \$72 and \$43.20; \$200 and \$120.

Example 2. Build a launch checklist for a Saturday baked-goods table at a church fair.

Show solution

1. Two weeks before: confirm permission and table with organizers; check cottage-food rules with a parent; finalize recipe and costs.
2. One week before: order materials; make price cards and a sign; prepare labels with ingredients and allergens.
3. Two days before: test batch; set up the cash box with change and a receipt book; parent assigned as cashier.
4. Day before: bake, cool, package, label; pack table, cloth, sign, napkins, hand sanitizer.
5. Day of: set up early; record every sale; note questions and comments; clean up; count cash with a parent.

Answer: A dated checklist with tasks and responsibilities; each item checked off before opening.

PRACTICE

1. Easy When and where did the first Piggly Wiggly open?

   Show answer

   September 11, 1916, at 79 Jefferson Avenue, Memphis, Tennessee.

2. Easy Describe self-service as Saunders designed it.

   Show answer

   Customers entered through a turnstile, took a basket, walked past open, priced shelves choosing goods themselves, and paid at a checkout.

3. Easy Define soft launch.

   Show answer

   A small first opening to a few customers to find problems before the full launch.

4. Medium 15 customers, $8 average sale. Find daily sales.

Show answer

$120.

5. Medium Why did self-service lower prices?

Show answer

Fewer clerks were needed, so labor costs fell, and customers moved through faster.

6. Medium List five items on any launch checklist.

Show answer

Product ready; prices and terms posted; money handling set up; safety and permits; customer list or location confirmed; transaction records; problem plan.

7. Medium How did Saunders lose Piggly Wiggly?

Show answer

In 1923 he borrowed heavily to buy up the company's stock to defeat speculators; when the exchange changed its rules, he could not repay and lost control and went bankrupt.

8. Hard What lesson does Saunders's fall teach a successful entrepreneur?

Show answer

Do not risk the business on a contest for control or on heavy borrowing; grow from strength and keep debt within what can be repaid.

9. Hard Why record transactions the same day?

Show answer

Memory fades and errors multiply; same-day records are accurate, support the books and catch problems early.

10. Hard Your soft launch shows customers confused by your price card. What should you do before opening day?

Show answer

Rewrite the card in plain words with one clear price per item, test it with two people, and post it.

11. **Challenge** Opening day: 25 customers expected; average sale $11; 10% of customers might ask for a refund on a $4 item due to a known packaging flaw. Should you fix the packaging (costs $15) before opening?

    Show answer

    Expected refunds $2.5 \times 4 = \$10$ plus lost trust; fixing costs $15. Fix it: the reputation of the first day is worth more than $5.

COMMON MISTAKES

- Skipping the soft launch.
- Recording sales from memory at the end of the week.
- Mixing venture money with personal money.

Make it a game · Pantry Piggly Wiggly. Turn the pantry into a self-service store. Price tags on each item, a shopping basket and a parent as customer. Run a soft launch of five minutes, with a written launch checklist and a transaction record for each purchase. Afterward, name three things that went wrong. Then tell how Clarence Saunders launched his first Piggly Wiggly in 1916.

Scripture. “The thoughts of the diligent tend only to plenteousness; but of every one that is hasty only to want.” (Proverbs 21:5, KJV)

A prepared launch is diligence; a rushed one is haste. Saunders prospered when he planned and fell when he acted in haste.

10.3 Selling and Measuring: A. C. Nielsen and Key Performance Indicators

OBJECTIVES

- Tell how Arthur C. Nielsen built a business on measuring what products actually sold, beginning in the 1920s and 1930s.
- Choose key performance indicators for a venture and track them weekly on a simple dashboard.
- Use the measurements to make and test one improvement during the venture.

> **Warm-up.** If you could know only three numbers about your venture each week, which three would you choose? Why?

WATCH

What is a KPI? [KPI MEANING + KPI EXAMPLES]

Adriana Girdler · 5:44

https://www.youtube.com/watch?v=gUU_J6m1Heo

> **WHEN TO WATCH**
> After the story of Nielsen, before you choose your indicators.

KEY TERMS

key performance indicator (KPI)
A number that shows how well a business is meeting an important goal.

dashboard
A one-page display of a business's key indicators, updated regularly.

leading indicator
A number that tends to change before results do (conversations held, samples given).

lagging indicator
A number that shows results after the fact (sales, profit).

market share
A product's sales as a share of all sales in its market.

CORE IDEAS

The story. Arthur C. Nielsen, an engineering graduate of the University of Wisconsin, founded his company in Chicago in 1923 to test the performance of industrial equipment for buyers. In the 1930s he turned to a new question: what were customers actually buying in stores? His firm sent auditors to a sample of grocery and drug stores to count stock and invoices and so measure the sales and market share of each brand. Manufacturers who had guessed at their sales could now see them, store by store and month by month.

How they figured it out. The key was sampling and consistency: the same carefully chosen stores, measured the same way at regular intervals, gave trends a business could trust. Nielsen later measured radio and then television audiences, and his company's ratings shaped which programs advertisers paid for. Nielsen believed that measurement must be honest and that its methods should be open to inspection, because businesses would make large decisions on the numbers.

The big idea. A **key performance indicator** is a number tied to a goal. A good venture tracks a few of them on a **dashboard** every week: sales, units, number of customers, average sale, gross margin, **repeat rate**, and perhaps a **leading indicator** such as samples given or conversations held. **Lagging indicators** like profit tell you how you did; leading indicators tell you what is coming. Too many numbers confuse; choose five or six that matter most.

Measure, then act. Measurement is useful only if it changes decisions. Each week, look at the dashboard, ask what changed and why, and choose one action. Then measure again to see whether it worked. Honest measurement includes the bad weeks; a dashboard that hides problems is worse than none. "Prove all things; hold fast that which is good" (1 Thessalonians 5:21).

In business today. Businesses of every size track indicators, often far too many. The best small owners know a handful of numbers by heart and look at them weekly. For your venture, a simple spreadsheet updated every Saturday is enough.

PICTURE STUDY



The Courtyard of the Exchange in Amsterdam, Emanuel de Witte, 1653 · Oil on panel · Museum Boijmans Van Beuningen, Rotterdam

Image: Wikimedia Commons, public domain

Merchants met daily at the Amsterdam Exchange to trade goods and shares and, above all, information: prices, ship arrivals, news. De Witte painted the busy courtyard where numbers passed from mouth to mouth before they were ever printed.

Look closely

- Look at the groups of merchants. What might they be exchanging besides goods?
- Find the numbered pillars. Some say merchants of each trade met at a particular pillar. Why would that help?
- Look at the light and the crowd. What time of day might trading happen?

Talk about it

1. Why did merchants need accurate, up-to-date numbers?
2. How is a weekly dashboard like a day at the Exchange?
3. Whom could you talk with to learn what your customers are buying?

PROJECT

The Venture Dashboard

You will choose five or six KPIs, build a weekly dashboard, update it through the venture, and test one improvement based on what it shows.

You will need

- Spreadsheet
- Your transaction records and sales log

Steps

1. Choose five or six KPIs tied to your charter's goals, including at least one leading indicator.
2. Build a dashboard with a column for each week and a small chart for two key indicators.
3. Update it every week from your records.
4. Each week, write one sentence on what changed and why.
5. After week 2, choose one improvement suggested by the numbers and test it for the following week.
6. Compare the indicator before and after.
7. Write a paragraph: which indicator taught you the most?

Tips

- Update on the same day each week.
- If a number never changes your decisions, drop it.

Check your work

- ☐ I can choose leading and lagging KPIs.
- ☐ My dashboard is updated weekly with honest numbers.
- ☐ I tested one improvement and measured its effect.

LEDGER NOTEBOOK

1. Paste your dashboard.
2. Write your weekly one-sentence notes.

3. Draw a chart of your most important indicator over the weeks.

KEY FORMULAS

$$\text{Week-over-week change} = \frac{\text{this week} - \text{last week}}{\text{last week}} \times 100\%$$

$$\text{Repeat rate} = \frac{\text{customers who bought again}}{\text{all customers}}$$

From history. Nielsen's audience ratings for radio began in the 1940s using a device attached to radios that recorded which station was tuned in. Arthur Nielsen was also an accomplished tennis player and a generous supporter of the sport.

WORKED EXAMPLES

Example 1. Week 1: 18 customers, $216 sales, 6 repeat customers. Week 2: 22 customers, $253 sales, 11 repeat. Find average sale each week, week-over-week sales change and repeat rate in week 2.

Show solution

1. Average sale: $216/18 = \$12.00$; $253/22 = \$11.50$.
2. Sales change: $(253 - 216)/216 \approx 17\%$.
3. Repeat rate week 2: $11/22 = 50\%$.

Answer: $12.00 and $11.50; sales up about 17%; half of week-2 customers were repeat buyers, a strong sign.

Example 2. A venture gives 30 samples one week and 12 people order; the next week it gives 50 samples and 16 order. Which week converted better, and what should it do?

Show solution

1. Week A: $12/30 = 40\%$; week B: $16/50 = 32\%$.
2. More samples brought more orders but a lower rate, perhaps because the extra samples went to less likely customers.

Answer: Week A converted better; target samples to likely customers rather than simply giving more.

PRACTICE

1. Easy What did Nielsen's store audits measure?

Show answer

Actual sales and market share of brands, by counting stock and invoices in a sample of stores.

2. Easy Define KPI.

Show answer

A number that shows how well a business is meeting an important goal.

3. Easy Give one leading and one lagging indicator.

Show answer

Leading: samples given or conversations held. Lagging: sales or profit.

4. Medium Sales $180 last week, $207 this week. Find the percent change.

Show answer

15%.

5. Medium 40 customers, 14 bought again. Find the repeat rate.

Show answer

35%.

6. Medium Why did Nielsen measure the same sample of stores consistently?

Show answer

So changes over time reflected real trends rather than differences in which stores were counted.

7. Medium Choose five KPIs for a lawn-care venture.

Show answer

Sample: jobs completed, revenue, average job price, repeat customers, on-time rate (or customer satisfaction).

8. Hard Why is a dashboard with 25 numbers often worse than one with 5?

Show answer

Too many numbers hide what matters and lead to no action; a few key numbers focus attention and decisions.

9. Hard Sales rose 20% but gross margin fell from 50% to 40%. Did gross profit rise? Use $200 base sales.

Show answer

Before: $100. After: $240 \times 0.40 = \$96$. Gross profit fell slightly.

10. Hard Why must a dashboard include bad weeks honestly?

Show answer

Hiding problems prevents fixing them and misleads partners; honest numbers are the basis of every good decision.

11. Challenge Over four weeks, customers were 12, 15, 18, 20 and repeat customers 3, 6, 9, 11. Find each week's repeat rate and describe the trend.

Show answer

25%, 40%, 50%, 55%: repeat buying is rising steadily, a sign customers are satisfied.

COMMON MISTAKES

- Tracking too many numbers.
- Measuring without acting.
- Changing how a number is measured partway through, which breaks the trend.

Make it a game · Dashboard Dash. Choose three key performance indicators for a pretend lemonade stand and label each leading or lagging. Your parent reads a week of invented numbers, and you fill in a one-page dashboard in ninety seconds. Calculate market share if your stand sold thirty cups out of two hundred. Then tell how Nielsen measured what products actually sold.

Scripture. "Prove all things; hold fast that which is good." (1 Thessalonians 5:21, KJV)

Paul's instruction about testing teaching applies by analogy to running a venture: test, measure, and keep what proves good.

10.4 The Books and a Stakeholder Review: Johnson & Johnson's Credo

OBJECTIVES

- Tell how Robert Wood Johnson wrote Johnson & Johnson's Credo in 1943 and how it guided the company in the 1982 Tylenol recall.
- Prepare an income statement, a balance sheet and a cash summary for your venture.
- Write a six-stakeholder review of your venture with ratings and evidence.

> **Warm-up.** List the groups your venture has affected so far: who gained, who paid, who was inconvenienced? Is anyone missing from your list?

WATCH

FINANCIAL STATEMENTS: all the basics in 8 MINS!

Accounting Stuff · 9:05

https://www.youtube.com/watch?v=Fi1wkUczuyk

> **WHEN TO WATCH**
> Before you prepare your venture's statements.

BACKUP VIDEO

Robert Wood Johnson Vignette for NJ Hall of Fame

NJ Hall of Fame · 1:20

https://www.youtube.com/watch?v=KDO1WqtYfO8

After the story of the Credo.

KEY TERMS

income statement

Revenue minus expenses over a period, giving net income.

balance sheet

What a business owns (assets), owes (liabilities) and the owner's equity at a moment: assets = liabilities + equity.

cash summary

Beginning cash, cash in, cash out and ending cash for the period.

credo

A statement of beliefs; for a company, its responsibilities in order of priority.

stakeholder review

An honest assessment of how a business has served each of its stakeholders.

CORE IDEAS

The story. Robert Wood Johnson II, son of a founder of the health-products company Johnson & Johnson, led it from the 1930s. In 1943, before the company sold shares to the public, he wrote a one-page Credo setting out its responsibilities in order: first to the doctors, nurses, patients, mothers and fathers who use its products; then to its employees; then to the communities where they live and work; and last to its stockholders, who he said should receive a fair return if the company served the others well. He had it carved in stone at headquarters.

How they figured it out. The Credo was tested in 1982. In the Chicago area, someone tampered with bottles of Tylenol, the company's best-selling pain reliever, on store shelves, and seven people died. The company had not caused the tampering, but its leaders turned to the Credo, which put customers first. They warned the public, stopped advertising, and recalled about 31 million bottles across the country at a cost of roughly $100 million. They then reintroduced the product in new tamper-resistant packaging. The company regained its customers' trust, and the response became a standard example of putting the public's safety ahead of short-term profit.

The big idea. At the end of a venture, two kinds of accounting are due. The first is the books: an **income statement** (revenue, expenses, net income), a **balance sheet** (assets, liabilities, owner's equity, which must balance) and a **cash summary** that matches the cash in hand. The second is a **stakeholder review**: how well did the venture serve its financiers, risk-takers, builders, workers, customers and community? A **credo** written in advance, like Johnson's or your Lesson 10.1 charter, gives a standard to measure against.

Honesty in both. The books must report what happened, not what you hoped. The stakeholder review must include what went wrong: the customer who was disappointed, the helper who was paid late, the neighbor bothered by noise. "Let us not love in word, neither in tongue; but in deed and in truth" (1 John 3:18).

In business today. Companies publish annual reports with audited financial statements, and many also report on their workers, customers and communities.

Investors and the public compare the words with the numbers. For your venture, the books and the review together tell the truth about what it accomplished.

PICTURE STUDY



Portrait of Luca Pacioli, Attributed to Jacopo de' Barbari, 1495 · Oil on panel · Museo di Capodimonte, Naples

Image: Wikimedia Commons, public domain

Luca Pacioli, a Franciscan friar and mathematician, published the first printed description of double-entry bookkeeping in Venice in 1494. This portrait shows him teaching geometry. His book taught merchants to keep accounts that balance, the same test your venture's books must pass.

Look closely

- Find the open book and the slate. What is Pacioli doing?
- Find the glass polyhedron hanging in the air. Why might the painter include it?
- Look at the young man beside him. What is his role?
- Look at the objects on the table. What do they say about careful work?

Talk about it

1. Why would a friar write about merchants' accounts?
2. What does it mean for books to "balance," and why does it prove anything?
3. What would Pacioli say about your venture's records?

PROJECT

Close the Books and Review the Stakeholders

At the end of your venture, you will prepare its financial statements, make them balance and match your cash, and write an honest stakeholder review against your charter.

You will need

- All transaction records, receipts and the dashboard
- Spreadsheet
- Your venture charter

Steps

1. Total revenue, cost of goods sold and other expenses; prepare the income statement.
2. Count cash with a parent and list other assets (equipment, unsold inventory) and liabilities (anything owed).
3. Prepare the balance sheet and check that assets equal liabilities plus equity. If not, find the error.
4. Prepare the cash summary and confirm ending cash matches the count.
5. Settle every obligation: pay helpers and suppliers, refund any deposits, deliver any promised orders.
6. Write a six-stakeholder scorecard with ratings and evidence, measured against your charter.
7. Decide and record what you will do with the profit: save, reinvest, give (as your charter states).

Tips

- Do the books before celebrating.
- Ask a parent to check one total independently.

Check your work

☐ I can prepare an income statement, balance sheet and cash summary.

☐ My balance sheet balances and my cash matches.

- [ ] My stakeholder review is honest and specific.

LEDGER NOTEBOOK

1. Copy your three statements.
2. Copy your stakeholder scorecard.
3. Write your own one-paragraph credo for any future venture.

KEY FORMULAS

$$\text{Assets} = \text{liabilities} + \text{owner's equity}$$
$$\text{Ending equity} = \text{beginning equity} + \text{net income} - \text{owner's draws}$$

> **From history.** Robert Wood Johnson II was called "the General" because of his wartime service overseeing small-business production for the military. His Credo has been revised a few times in wording, but its order of responsibilities has stayed the same.

WORKED EXAMPLES

Example 1. A five-week venture: revenue $640; cost of goods sold $256; other expenses (booth fee, flyers, gas) $54; a $100 owner investment at the start; an owner's draw of $150; equipment bought for $60 still owned; $20 owed to a supplier at the end; cash on hand at the end $260. Prepare the income statement and balance sheet.

Show solution

1. Income statement: revenue $640 − COGS $256 = gross profit $384; − expenses $54 = net income $330.
2. Assets: cash $260 + equipment $60 = $320. Liabilities: supplier $20.
3. Equity: beginning $100 + net income $330 − draw $150 = $280.
4. Check: $20 + 280 = 300 \neq 320$. The books do not balance by $20.

Answer: Net income $330. The balance sheet is off by $20, so something was not recorded: perhaps $20 of materials were bought on credit but not included in COGS, or $20 more cash came in. Find the error before reporting; balancing is how books prove themselves.

Example 2. Write a short stakeholder scorecard for a bread-delivery venture.

Show solution

1. Financiers (a parent's $100 start-up loan): 5, repaid in full in week 4.
2. Risk-taker (the student): 4, earned $300 profit for about 40 hours but missed one study session.
3. Builders (the student and a sister who shaped loaves): 4, quality consistent after week 1.
4. Workers (sister paid $8 a batch): 4, paid on time but one week late.
5. Customers (11 families): 5, all satisfied, two bad loaves replaced at once.
6. Community: 4, gave $40 to the church food pantry; no complaints.

Answer: Total 26 of 30, with honest notes on the late pay and the missed study session.

PRACTICE

1. Easy When did Robert Wood Johnson write the Credo, and in what order did it list responsibilities?

   Show answer

   1943; customers (doctors, nurses, patients, parents), employees, communities, stockholders.

2. Easy What did J&J do in the 1982 Tylenol crisis?

   Show answer

   Warned the public, stopped advertising, recalled about 31 million bottles nationwide, and reintroduced the product in tamper-resistant packaging.

3. Easy Write the accounting equation.

   Show answer

   Assets = liabilities + owner's equity.

4. Medium Revenue $500; COGS $180; expenses $70. Find net income.

   Show answer

   $250.

5. Medium Beginning equity $50; net income $250; draws $100. Find ending equity.

Show answer

$200.

6. Medium Assets $230; liabilities $30. Find equity.

Show answer

$200.

7. Medium Why did the Credo put stockholders last?

Show answer

Johnson believed that if the company served customers, employees and communities well, stockholders would receive a fair return as a result.

8. Hard Your balance sheet is off by $15. Name three possible causes.

Show answer

An unrecorded sale or expense; a purchase on credit not recorded as a liability; a cash counting error; an owner's draw not recorded.

9. Hard The 1982 recall cost about $100 million. Was it a good business decision? Explain with stakeholders.

Show answer

Yes: it protected customers (the first duty), preserved trust and the brand, and the company recovered its market; short-term cost to stockholders bought long-term value.

10. Hard Why must a stakeholder review include failures?

Show answer

Without them it is advertising, not a review; honest failures show what to fix and build credibility.

11. **Challenge** Start: owner invests $80 cash. Buys $40 of equipment with cash, $120 of materials on credit. Sells all products for $300 cash. Pays the supplier $90. Takes a $50 draw. Prepare the ending balance sheet and check it.

    Show answer

    Cash: $80 - 40 + 300 - 90 - 50 = \$200$; equipment $40; assets $240. Liabilities: supplier $30. Net income $300 − $120 = $180; equity $80 + 180 - 50 = \$210$. Check: $30 + 210 = 240$.

COMMON MISTAKES

- Reporting sales as profit.
- Forgetting unpaid bills or unsold inventory on the balance sheet.
- Writing a stakeholder review that mentions only successes.

> **Make it a game · Sort the Statements.** Write twelve items on slips: revenue, rent, a loan, cash on hand, inventory and so on. Race to sort them into income statement, balance sheet or cash summary within sixty seconds. Your parent checks and times you. Then write a four-line credo for your venture. Finish by telling how Johnson and Johnson's Credo guided the 1982 Tylenol recall.

> **Scripture.** “My little children, let us not love in word, neither in tongue; but in deed and in truth.” (1 John 3:18, KJV)
>
> A credo is words; a stakeholder review asks whether the deeds matched. John calls us to the deeds.

10.5 The Pitch: Elisha Otis and "All Safe, Gentlemen"

OBJECTIVES

- Tell how Elisha Otis demonstrated his safety elevator at New York's Crystal Palace in 1854.
- Structure an honest pitch: problem, solution, proof, customers, model, numbers, lessons and the request.
- Deliver a ten-minute pitch of your venture's results to family "investors" and answer questions honestly.

> **Warm-up.** In one minute, tell a parent what your venture did, for whom, and what you learned. Then ask: what was clear, and what was missing?

WATCH

Make Inventions: Otis Safety Elevator

Make: · 4:12

https://www.youtube.com/watch?v=sSjJjKcoNRk

> **WHEN TO WATCH**
> After the story of Otis, before you outline your pitch.

Note: From Make: magazine; a builder explains and models Otis's safety brake.

BACKUP VIDEO

The Secret to Successfully Pitching an Idea | The Way We Work, a TED series

TED · 4:47

https://www.youtube.com/watch?v=l0hVIH3EnlQ

Before you write your pitch.

KEY TERMS

pitch

A short, structured presentation asking an audience to support a venture or decision.

demonstration

Showing that a product works, rather than only saying so.

proof point

A specific fact or result that supports a claim (sales, repeat customers, a test).

the ask

The specific request at the end of a pitch (money, advice, a decision, an order).

due diligence

An investor's careful checking of a venture's claims before deciding.

CORE IDEAS

The story. In the early 1850s Elisha Otis, a mechanic at a bedstead factory in Yonkers, New York, needed a safe way to lift heavy equipment to an upper floor. Hoists of the day could drop if the rope broke. He designed a safety device: a spring that, if the rope went slack, would snap outward and lock into toothed rails on either side of the platform. Few people believed it. At the Exhibition of the Industry of All Nations in New York's Crystal Palace in 1854, Otis rode the platform high above the crowd and had an assistant cut the hoisting rope with an axe. The platform dropped a few inches and stopped. Otis is said to have called out, "All safe, gentlemen, all safe."

How they figured it out. Words had not persuaded anyone; a demonstration did. Orders followed, and in 1857 Otis installed the first passenger safety elevator in the E. V. Haughwout & Company store in New York. Safe elevators made tall buildings practical, and the Otis company became one of the largest elevator makers in the world. The demonstration worked because it was honest: the brake truly worked, and Otis staked his own safety on it before asking anyone else to trust it.

The big idea. A **pitch** is a short, structured case for support. A good one follows a clear order: the problem and who has it; your solution; **proof points** and, if possible, a **demonstration**; who your customers are and how many; the business model; the numbers (sales, costs, profit, cash, return on the money invested); what went wrong and what you learned; and **the ask**. Expect questions; investors do **due diligence**. Answer honestly, including "I don't know."

Honest persuasion. Otis's pitch had no exaggeration: he showed exactly what the product did. Your pitch should do the same. Use real numbers from your books, show the weak weeks as well as the strong, and never claim results you did not get.

“Providing for honest things, not only in the sight of the Lord, but also in the sight of men” (2 Corinthians 8:21).

In business today. Founders pitch to investors, lenders, customers, partners and even future employees. The best pitches are short, clear and true, and they end with a specific request. Your pitch closes the course: it tells the story of your venture and asks your family “investors” for one thing, such as advice, a decision to continue, or support for a next step.

PICTURE STUDY



Otis Demonstrates the Safety Elevator, Unknown engraver, 1854 (event) · Engraving · Wikimedia Commons

Image: Wikimedia Commons, public domain

This engraving shows the famous moment at the Crystal Palace. Otis stands on the platform with the rope cut above him, raising his hat to the crowd. His body was the proof.

Look closely

- Find the cut rope. What should have happened next?
- Find the toothed rails on either side. How did they stop the fall?
- Look at Otis's posture. What does it communicate to the crowd?
- Look at the crowd. How would watching this change their minds?

Talk about it

1. Why would Otis risk his own safety for a demonstration?
2. What is the most convincing demonstration you could give for your venture?
3. How is a demonstration more honest than a slogan?

PROJECT

The Final Pitch

You will prepare and deliver a ten-minute pitch of your venture to family "investors" (parents, grandparents, a mentor), with a demonstration, real numbers, honest lessons and a clear ask, followed by questions.

You will need

- Your venture file: charter, records, dashboard, statements, stakeholder review
- A product sample or demonstration
- Simple slides or poster boards (optional)

Steps

1. Outline the pitch in the order taught, with times.
2. Prepare a demonstration or a sample.
3. Make three to six simple slides or boards: problem and solution, proof points, numbers, lessons, ask.
4. Rehearse at least three times with a timer; cut to ten minutes.
5. Prepare answers to the five hardest questions you can imagine.
6. Deliver the pitch to your family investors and take questions.
7. Ask each listener for written feedback: what was convincing, what was unclear, and their decision on your ask.
8. Write a final reflection: what you learned this year about business and about yourself, and what you will do next.

Tips

- Start with the customer, not with yourself.
- Speak to the people, not to the slides.

Check your work

☐ I can structure an honest pitch with proof and a clear ask.

☐ I delivered my pitch in ten minutes and answered questions honestly.

- [ ] I collected feedback and wrote a final reflection.

LEDGER NOTEBOOK

1. Copy your pitch outline with times.
2. Paste the feedback you received.
3. Write your final reflection and a one-sentence purpose for any future venture.

KEY FORMULAS

$$\text{Return on investment} = \frac{\text{net income}}{\text{money invested}} \times 100\%$$

From history. Elisha Otis died in 1861, but his sons built the Otis Elevator Company. Steel-frame skyscrapers depended on safe passenger elevators; the Otis company installed elevators in many famous towers, including the Eiffel Tower's original lifts and the Empire State Building.

WORKED EXAMPLES

Example 1. A venture raised $100 from a parent, earned $330 net income, and repaid the $100. What return on investment can the pitch honestly report?

Show solution

1. $330/100 \times 100\% = 330\%$.
2. Honest note: the figure leaves out the value of the student's 40 hours; at $10 an hour that is $400, so in economic terms the venture paid less than a wage.

Answer: 330% on the money invested, reported together with the hours, so the investors see the whole picture.

Example 2. Outline a ten-minute pitch for a bread-delivery venture with times for each part.

Show solution

1. Problem and customer (1 min): busy families who want good bread without baking.
2. Solution and demonstration (2 min): a fresh loaf for tasting; how delivery works.
3. Proof points (1.5 min): 11 families, 9 repeat customers, satisfaction survey results.
4. Model and numbers (2 min): price, cost per loaf, five-week income statement, cash and ROI.
5. What went wrong and what I learned (1.5 min): the late week, the bad batch, what changed.
6. The ask (1 min): approval and $60 to buy a second loaf pan to continue through the summer, with a written plan to repay.
7. Questions (1 min, plus as needed).

Answer: A ten-minute outline that moves from problem to ask, with a demonstration and honest numbers.

PRACTICE

1. Easy What did Otis do at the Crystal Palace in 1854?

   Show answer

   Rode his safety platform high above the crowd and had the hoisting rope cut; the safety brake stopped the fall.

2. Easy Where was the first passenger safety elevator installed, and when?

   Show answer

   The E. V. Haughwout & Company store in New York, 1857.

3. Easy Name the parts of a good pitch in order.

   Show answer

   Problem, solution, proof (and demonstration), customers, model, numbers, lessons learned, the ask.

4. Medium Net income $240 on $80 invested. Find ROI.

Show answer

300%.

5. Medium Why was Otis's demonstration more persuasive than a description?

Show answer

People could see the brake work under real conditions, with the inventor risking his own safety.

6. Medium Write a clear "ask" for your venture.

Show answer

Sample: "I ask for your approval and a $50 loan to buy supplies for four more weeks, repaid from the first two weeks' profit."

7. Medium What is due diligence, and why should a founder welcome it?

Show answer

Investors' careful checking of claims; it builds trust and catches errors before decisions are made.

8. Hard An investor asks a question you cannot answer. What should you say?

Show answer

"I don't know, but I will find out and send you the answer by [date]," and then do it.

9. Hard Why include what went wrong in a pitch?

Show answer

It shows honesty and learning, lets investors judge risk accurately, and makes the good results more believable.

10. Hard A pitch claims "customers love it." Turn it into proof points.

Show answer

Sample: "9 of 11 customers reordered; average satisfaction 4.7 of 5 on a survey of 10."

11. **Challenge** Your venture made $330 on 40 hours with $100 invested. A summer continuation would need $60 more and is projected to earn $500 over 8 weeks at 6 hours a week. Compute the projected profit per hour and ROI on the new $60, and state one risk.

    Show answer

    Profit per hour $500/48 \approx \$10.42$; ROI $500/60 \approx 833\%$. Risk: summer demand may fall when families travel.

COMMON MISTAKES

- Telling the history of your effort instead of the customer's problem and your results.
- Hiding weak numbers.
- Ending without a specific ask.

Make it a game · All Safe, Gentlemen. Hold a pitch duel. You get ninety seconds to pitch a pretend venture in order: problem, solution, proof, customers, model, numbers, lessons and the ask. Use a household prop for a demonstration, as Otis did at the Crystal Palace in 1854. Your parent asks one due diligence question and scores honesty first, then clarity.

Scripture. "Providing for honest things, not only in the sight of the Lord, but also in the sight of men." (2 Corinthians 8:21, KJV)

Paul took care that his handling of money would be honest and seen to be honest. A pitch built on true numbers and a real demonstration does the same.

UNIT 10

The Venture

This is the capstone. Over five or six weeks you will choose a small, safe venture, launch it with a parent as your partner, sell honestly, measure what happens, keep complete books, review it with the six stakeholders, and pitch the results to family "investors." Everything you have learned comes together: the need and the test, the model and the plan, the numbers and the cash, the financing, marketing, selling, operations, law and ethics.

Each lesson pairs a step of your venture with a guide from history. Ewing Kauffman shows how to choose a venture that fits your gifts and values; Clarence Saunders's first Piggly Wiggly store of 1916 shows a launch, and a warning; A. C. Nielsen shows how to measure; Robert Wood Johnson's 1943 Credo shows how to review a business by its duties to every stakeholder; and Elisha Otis, cutting the rope under his own elevator in 1854, shows the power of an honest demonstration. The unit test is your venture file; the course ends with the final exam.

PREREQUISITES

- Has completed Units 1–9, including the business plan, financial model and compliance file
- A parent who agrees to act as partner, supervise every sale and handle money and registrations
- Five to six weeks set aside for the venture

MASTERY CHECKLIST

- ☐ I can choose a venture with a weighted decision matrix that weighs need, fit, cost, safety and values.
- ☐ I can plan and run a launch with a checklist, a soft launch and an opening day.
- ☐ I can choose key performance indicators, track them weekly and act on them.
- ☐ I can prepare an income statement, a balance sheet and a cash summary for my venture and write a stakeholder review.
- ☐ I can deliver an honest, well-structured pitch with a demonstration, real numbers and a clear request.

OPTIONAL BOOKS AND GAMES FOR THIS UNIT

- **Junior Achievement (JA) programs**: Many communities have Junior Achievement programs in entrepreneurship for high-school students, sometimes open to homeschool groups. Check your local JA chapter. Ages 14+.
- **SCORE mentors**: SCORE matches small-business owners with free volunteer mentors, many of them retired business owners. A parent may arrange a mentor conversation about the venture and the final pitch. Ages 15+ with a parent.

Not required. Every project in this unit works without them. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

10.1 Choosing the Venture: Ewing Kauffman and Marion Laboratories
3 sessions of 50 minutes

10.2 Launch: Clarence Saunders and the First Piggly Wiggly 3 sessions of 50 minutes

10.3 Selling and Measuring: A. C. Nielsen and Key Performance Indicators
3 sessions of 50 minutes

10.4 The Books and a Stakeholder Review: Johnson & Johnson's Credo
3 sessions of 50 minutes

10.5 The Pitch: Elisha Otis and "All Safe, Gentlemen" 3 sessions of 50 minutes

Unit 10 test

The Unit 10 test is a venture-file review with calculations. Calculators are allowed. Show your work for every calculation and answer the concept questions in complete sentences, using your own venture where asked. The test is worth 100 points.

1. **5 pts**
   State Ewing Kauffman's three principles and explain one in a business setting.
2. **6 pts**
   Weights: need 0.4, fit 0.3, safety 0.3. Option A scores 4, 3, 5; option B 5, 4, 2. Find weighted scores.

3. **5 pts**

   Describe Piggly Wiggly’s 1916 innovation and how Saunders later lost the company.

4. **5 pts**

   List six items on a launch checklist and explain the purpose of a soft launch.

5. **6 pts**

   Week 1 sales $150 from 15 customers; week 2 $198 from 18 customers. Find average sale each week and the percent change in sales.

6. **5 pts**

   Distinguish leading and lagging indicators with an example of each from your venture.

7. **6 pts**

   30 customers, 12 repeat. Repeat rate? If repeat customers average $14 and new $9, find total sales.

8. **5 pts**

   State the order of responsibilities in J&J’s 1943 Credo and how it guided the 1982 recall.

9. **8 pts**

   Revenue $720; COGS $290; other expenses $60; owner invested $120; draws $200; ending cash $270; equipment $50; owed to supplier $10. Prepare net income and check the balance sheet.

10. **6 pts**

    Write a six-stakeholder scorecard for your venture with a rating and one line of evidence each.

11. **5 pts**

    Describe Otis’s 1854 demonstration and why it persuaded.

12. **6 pts**

    Net income $410 on $150 invested; 45 hours worked. Find ROI and profit per hour.

13. **6 pts**

    Convert three vague claims about your venture into proof points with numbers.

14. **5 pts**

    Name the parts of a pitch in order and write your venture's ask.

15. **16 pts**

    Essay: Review your venture against your charter. What did it accomplish for each stakeholder, what went wrong, what did you learn about business and about yourself, and what would you do differently? Support your answer with numbers from your books and one Scripture passage.

16. **5 pts**

    What will you do with your venture's profit, and why?

ANSWER KEY

1. Treat others as you would be treated; those who produce should share in the results; give back. Example: profit sharing gave associates a stake in success.
2. A: $1.6 + 0.9 + 1.5 = 4.0$; B: $2.0 + 1.2 + 0.6 = 3.8$. A wins.
3. Self-service: open priced shelves, baskets, a turnstile and checkout, lowering labor costs. In 1923 he borrowed heavily to corner the stock, could not pay when the exchange changed its rules, and lost the company.
4. Product, prices, money handling, permits and safety, customers or location, transaction records, problem plan. A soft launch finds problems with a few friendly customers before the full opening.
5. $10.00; $11.00; 32%.
6. Leading changes before results (samples given, conversations); lagging shows results (sales, profit). Examples from the student's venture.
7. 40%; $12 \times 14 + 18 \times 9 = 168 + 162 = \$330$.
8. Customers, employees, communities, stockholders. Putting customers first led the company to recall about 31 million bottles at great cost to protect the public.
9. Net income $720 - 290 - 60 = \$370$. Equity $120 + 370 - 200 = \$290$. Assets $270 + 50 = \$320$; liabilities plus equity $10 + 290 = \$300$. The books are off by $20, so an error must be found (for example, unrecorded revenue or a missing liability) before reporting.
10. Student's own; graded on specific, honest evidence for each stakeholder.
11. He rode the platform, had the rope cut, and the safety brake stopped the fall; seeing it work with the inventor at risk proved the claim.
12. ROI $410/150 \approx 273\%$; $410/45 \approx \$9.11$ an hour.
13. Student's own; credit for specific, verifiable numbers from the venture records.
14. Problem, solution, proof/demonstration, customers, model, numbers, lessons, ask; the student's specific ask.
15. Graded on honesty, specific numbers from the books, a balanced stakeholder review, clear lessons, and thoughtful use of Scripture.
16. Student's own; credit for a reasoned plan that includes saving, reinvesting or giving in line with the charter.

PORTFOLIO PIECE: THE VENTURE FILE AND FINAL PITCH

Assemble the complete file for your capstone venture: decision matrix and signed charter, launch checklist and report, two-plus weeks of transaction records, the weekly dashboard, the income statement, balance sheet and cash summary, the stakeholder review, the pitch outline and slides, investors' feedback and your final reflection. Together with your portfolios from Units 1–9, this is the record of your year as an entrepreneur.

LOOK FOR	WHAT IT MEANS
Execution	The venture was launched, run and closed with complete records and every obligation settled.
Accuracy	Statements balance, cash matches, and dashboard numbers are correct.
Honesty	The review and pitch present successes and failures truthfully.
Communication	The pitch is clear, well structured, within time and ends with a specific ask.
Character	The venture kept its charter's rules on honesty, safety, fair pay and giving.

COURSE EXAM

Midterm Exam

Covers Units 1–5. Time: 100 minutes.

You have 100 minutes. A calculator is allowed; no notes. For every calculation write the formula, put in the numbers and give the answer with its units; correct work earns partial credit even if the final number slips. Answer concept questions in complete sentences. The exam has 23 problems worth a total of 100 points.

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1. **4 pts** **Lesson 1.1**

   Define entrepreneur as Cantillon, Say and Schumpeter each did, in one sentence each.

2. **4 pts** **Lesson 1.1**

   A tool costs a customer $200, saves him $70 a year for 4 years and needs $10 a year of upkeep. Find the value to the customer.

3. **4 pts** **Lesson 1.2**

   Name the five habits of great builders and give one example from Andrew Carnegie.

4. **4 pts** **Lesson 1.3**

   Find the expected value: 50% chance of +$300, 30% chance of +$50, 20% chance of −$400. What is the downside?

5. **4 pts** **Lesson 1.5**

   Name the six stakeholders and explain why “big” is not the same as “great.”

6. **4 pts** **Lesson 2.1**

   12,000 households; 25% have the need; 20% of those would pay $15 a month. Find the monthly market.

7. **4 pts** **Lesson 2.2**

   Rewrite as a good interview question: “Wouldn’t you love a dog-walking service?” Explain what makes yours better.

8. **4 pts** **Lesson 2.3**

   What is a minimum viable product? Explain why Ford’s Quadricycle was one.

9. **4 pts** **Lesson 2.4**

   You offered a product to 60 people and 9 bought. Find the conversion rate and project buyers among 400 similar people, and give a cautious projection one-third lower.

10. **4 pts** **Lesson 2.5**

    You have spent $500. Continuing costs $200 more for an expected $150; pivoting costs $120 for an expected $260. What do you do, and why does the $500 not matter?

11. **4 pts** **Lesson 3.1**

    Boots A cost $40 and last 1 year; boots B cost $90 and last 3 years. Compare cost per year and write a one-sentence value proposition for B.

12. **4 pts** **Lesson 3.2**

    A water-filter pitcher sells for $25; filters cost $8 and a customer buys 6 a year. Find revenue per customer over 3 years.

13. **4 pts** **Lesson 3.3**

    Explain why a bottom-up estimate is better for planning than a top-down one, using numbers of your choice.

14. **4 pts** **Lesson 3.4**

    Compare a general partnership and a corporation on liability and taxes. Why did Procter & Gamble incorporate in 1890?

15. **4 pts** **Lesson 3.5**

    200 tons of ice are shipped; 30% melts. At $0.04 a pound (2,000 lb per ton), find revenue. What planning lesson did Tudor learn in 1806?

16. **4 pts** **Lesson 4.1**

    Equipment $180, inventory $90, setup $50, working capital $80; add a 15% contingency. Then find runway if monthly costs are $300 and sales $180 (use only the working capital and contingency as cash on hand).

17. **4 pts** **Lesson 4.2**

    Cost $6; price $10. Find markup and margin. What price gives a 50% margin?

18. **4 pts** **Lesson 4.3**

F = $360, P = $14, V = $5. Find break-even units and profit at 70 units.

19. **4 pts** **Lesson 4.4**

Revenue $900; COGS $360; operating expenses $210. Find gross profit, gross margin and net income.

20. **4 pts** **Lesson 4.5**

Start $100. Month 1: in $250, out $400. Month 2: in $500, out $200. Find ending cash each month and explain what the forecast warns.

21. **4 pts** **Lesson 5.2**

Find the monthly payment on a $2,400 loan at 12% annual interest over 2 years, and the total interest.

22. **4 pts** **Lesson 5.3–5.4**

Pre-money $12,000; investment $4,000. Find the investor's share. Then explain why a fund that invests in ten startups depends on one or two big successes.

23. **12 pts** **Lesson Units 1–5**

Essay: Choose one person from Units 1–5 who failed before succeeding (for example, Hershey, Tudor, Ford, or Kraft). Explain what went wrong, what they changed, and how the tools of this course (testing, planning, the numbers, financing choices) would have helped them. Close with what the story teaches about risk and character.

ANSWER KEY

1. Cantillon: one who bears uncertainty, paying known costs to sell at unknown prices. Say: one who combines land, labor and capital and directs them to higher value. Schumpeter: an innovator who brings new products, methods, markets or organizations into use.
2. $280 - (200 + 40) = \$40$
3. Large need, careful measurement, reinvestment, good partners, persistence. Example: cost sheets for every step at the Edgar Thomson Works (measurement).
4. $150 + 15 - 80 = \$85$; downside a $400 loss.
5. Financiers, risk-takers, builders, workers, customers, community. Size measures reach; greatness means serving all six well over a long time.
6. $12{,}000 \times 0.25 \times 0.20 \times 15 = \$9{,}000$
7. Sample: “Tell me about a recent day when your dog didn’t get walked. What did you do?” It is open, asks about past behavior and does not lead.
8. The simplest version that lets you learn from reality, aimed at the riskiest assumption. The Quadricycle tested whether a light gasoline vehicle would work; Ford sold it and used the lessons and money for his next car.
9. 15%; 60; about 40.
10. Pivot: +$140 vs −$50. The $500 is sunk and the same under every choice.
11. $40 vs $30 a year. Sample: “For farm workers who wear out boots every year, B costs a quarter less per year and saves the trouble of replacing them.”
12. $25 + 3 \times 6 \times 8 = \$169$
13. Top-down counts the whole market (e.g., $200,000); bottom-up counts customers you can reach and convert (e.g., 100 × 10% × $50 = $500). Plans must rest on what you can actually win.
14. Partners have unlimited personal liability and are taxed on their shares; a corporation gives limited liability and may be taxed at the company level and again on dividends. P&G incorporated to raise capital through shares and limit owners’ liability.
15. $140 \times 2{,}000 \times 0.04 = \$11{,}200$. Plan the whole chain, including storage and customer education, not just the voyage.
16. Total $400 \times 1.15 = \$460$; cash on hand $80 + $60 = $140; burn $120; runway about 1.2 months.

17. Markup 67%; margin 40%; $6 / 0.5 = \$12$.
18. 40 units; $9 \times 70 - 360 = \$270$.
19. \$540; 60%; \$330.
20. −\$50; \$250. Cash goes negative in month 1 even though the venture is profitable over two months; plan deposits, smaller batches or more starting cash.
21. $M = 2400 \times 0.01 / (1 - 1.01^{-24}) \approx \$112.98$; interest $\approx 24 \times 112.98 - 2400 \approx \$312$.
22. 25%. Most startups fail or grow slowly; only rare large exits return enough to cover the losses and earn a profit.
23. Graded on accurate history, correct use of at least three course tools with specifics, a clear thesis, and thoughtful reflection on risk and character (12 points).

COURSE EXAM

Final Exam

Covers Units 1–10. Time: 120 minutes.

You have 120 minutes. A calculator is allowed; no notes. For every calculation write the formula, put in the numbers and give the answer with its units; correct work earns partial credit. Answer concept questions in complete sentences. The exam has 28 problems worth a total of 100 points.

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1. **3 pts** **Lesson 1.1**

   Explain the difference between an inventor and an entrepreneur with an example.

2. **3 pts** **Lesson 1.3**

   A venture costs $600 and returns $2,000 with probability p, otherwise nothing. For what p is expected profit positive?

3. **3 pts** **Lesson 1.4**

   A customer brings $4 profit per visit, visits weekly for 50 weeks a year, for 3 years. Find lifetime value.

4. **3 pts** **Lesson 2.2**

   Why should interviews ask about past behavior instead of opinions about your idea?

5. **3 pts** **Lesson 2.4**

   Test A: 6 of 20 buy. Test B: 30 of 200 buy. Compute both rates and say which to plan on.

6. **3 pts** **Lesson 3.2**

   Name the nine boxes of the business model canvas.

7. **3 pts** **Lesson 3.4**

   Three partners split 50/30/20. Profit $3,000. Find each share.

8. **3 pts** **Lesson 4.2**

   Cost $15, target margin 40%. Find price and markup.

9. **3 pts** **Lesson 4.3**

   F = $480, P = $20, V = $8. Break-even units and revenue?

10. **3 pts** **Lesson 4.5**

    Why can a profitable business run out of cash? Give two causes.

11. **3 pts** **Lesson 5.1**

    Net income $280 a month, owner's draw $80. Months to fund a $1,000 purchase?

12. **3 pts** **Lesson 5.2**

    Simple interest on $3,000 at 7% for 18 months?

13. **3 pts** **Lesson 5.3**

    Founders own 3,000 shares; an investor buys 1,000 new shares. Investor's percentage?

14. **3 pts** **Lesson 5.5**

    Name four types of crowdfunding and why equity crowdfunding requires disclosure.

15. **3 pts** **Lesson 6.1–6.2**

    Name the four P's and explain what makes a brand valuable.

16. **3 pts** **Lesson 6.3**

    Spend $400, gain 25 customers. Each orders $40 at a 30% margin, 3 times a year for 2 years. Find CAC, LTV and the ratio.

17. **3 pts** **Lesson 6.4**

    Distinguish puffery, a factual claim and deception with one example of each.

18. **3 pts** **Lesson 7.2**

    Close rate 25%; goal 30 sales. Conversations needed? Base $200 + 5% commission on $6,000 sales: pay?

19. **3 pts** **Lesson 7.3–7.4**

    Write a problem question and an implication question for a customer considering yard care, and name two high-pressure tactics you will never use.

20. **3 pts** **Lesson 7.5**

Seller's minimum $150; buyer's maximum $210. ZOPA and midpoint? Define BATNA.

21. **3 pts** **Lesson 8.1**

Steps take 40, 75, 50 and 30 seconds. Bottleneck, throughput per hour and labor time per unit?

22. **3 pts** **Lesson 8.2–8.3**

Throughput 20 a day, WIP 80: lead time? 600 units with 24 defective: defect rate?

23. **3 pts** **Lesson 8.4–8.5**

Daily use 6, lead time 5 days, safety stock 10: reorder point? 50 customers, 70% retention, 25 new a year: customers next year?

24. **3 pts** **Lesson 9.1–9.2**

Name the elements of a contract and the four kinds of intellectual property.

25. **3 pts** **Lesson 9.3–9.4**

$14 an hour, 45 hours, overtime 1.5× over 40: gross pay? Estimate SE tax on $2,000 of net earnings.

26. **3 pts** **Lesson 9.5**

Creditors owed $30,000 receive $9,000. Recovery rate? What did H. J. Heinz do after his discharge?

27. **6 pts** **Lesson 10.4**

A venture: revenue $800, COGS $320, other expenses $80, owner investment $150, draws $250, ending cash $280, equipment $40, owed to supplier $20. Find net income and equity, and check the balance sheet.

28. **16 pts** **Lesson Units 1–10**

Essay: "A business is great when it creates real value and serves all six stakeholders over a long time." Defend or qualify this claim using at least three businesses from this course (at least one with a serious failing) and your own venture, with specific evidence and one Scripture passage. End with the one principle you most intend to carry into any future work.

ANSWER KEY

1. An inventor creates something new; an entrepreneur brings a product to customers and bears the risk. McCormick was both; his agents were entrepreneurs without inventing.
2. $2000p > 600 \Rightarrow p > 0.3$
3. $600.
4. People are polite and optimistic about the future; what they actually did and paid reveals real needs.
5. 30%; 15%. Plan near B, the larger, more reliable sample.
6. Customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partners, cost structure.
7. $1,500, $900, $600.
8. $25; 67%.
9. 40 units; $800.
10. Sales on credit not yet collected; cash tied up in inventory or equipment; growth requiring spending before collections.
11. 5.
12. $315.
13. 25%.
14. Donation, reward, pre-order, equity. Equity backers are investors who can be defrauded, so the law requires written disclosure through registered platforms.
15. Product, price, place, promotion. A brand is valuable because consistent quality earns trust, repeat purchases and a price premium.
16. CAC $16; LTV $72; ratio 4.5.
17. Puffery: “the friendliest shop in town.” Factual: “made with real butter” (must be true). Deceptive: a fake “was $40” price.
18. 120; $500.
19. Sample: “Which yard jobs are hardest for you?” “When mowing is put off, what happens?” Never: false scarcity, false deadlines (also guilt, refusing to take no).
20. $150–$210; $180. BATNA: best alternative if no agreement is reached.
21. 75 s step; 48 per hour; 195 s.
22. 4 days; 4%.

23. 40; 60.
24. Offer and acceptance, consideration, capacity, lawful purpose; patent, trademark, copyright, trade secret.
25. $560 + 105 = \$665$; $0.153 \times 0.9235 \times 2000 \approx \$282.59$.
26. 30%. He kept a list of “moral obligations” and repaid creditors in full though legally released.
27. Net income \$400; equity $150 + 400 - 250 = \$300$; assets \$320 = liabilities \$20 + equity \$300. It balances.
28. Graded on a clear thesis; accurate, specific evidence from three businesses across units (e.g., Cadbury, Carnegie, the VOC, NCR, Ford, Heinz, J&J); honest evaluation of the student’s own venture with numbers; apt Scripture; and a thoughtful closing principle (16 points).