

FABRICS & SEWING I

First edition

8 units

32 lessons • one school year

A video for every lesson

FIRST EDITION

COURSE GUIDE

This course follows cloth from the field to the finished piece through one school year. The student meets the fibers God made in plants and animals and the fibers people learned to make in the laboratory; looks closely at spinning, weaving, knits and finished edges; learns the hand stitches every household needs; sews on a machine; crochets and knits; sews for a real room in the home; and finishes the year with design, a simple garment and a costume for a play. Each unit is built around real people and real moments: Eli Whitney's cotton gin, Joseph-Marie Jacquard's loom that read punched cards, Elias Howe's needle with the eye at the point, Isaac Singer's lockstitch machine, the girls who stitched alphabet samplers, the Red Cross knitters of 1917-1918, William Lee's stocking frame and the neighbors at a quilting bee.

Every lesson follows the same path. First comes **the story**. Then **how they figured it out**: the problem they faced, what they tried and what they learned. Then **the fabric science** (or **the craft**): what is happening in the fiber, the yarn, the fabric or the stitch, explained for a student in grades 3-5. Last, **let's sew**: the student makes something real, practicing one skill well and safely, and records it in a sewing notebook, then improves it the next time.

Sewing here is skill, stewardship and service. Students learn to make useful and beautiful things, to mend instead of throwing away, and to give: a pillowcase for a neighbor, a scarf for someone in need, a costume for the church play. Scripture is full of cloth, from the coats of skins God made for Adam and Eve to the skilled weavers of the tabernacle, the capable woman of Proverbs 31 and Dorcas with the coats she made for the widows. The year ends with a family sewing fair, where the student shows the year's work, teaches the family a stitch and gives one piece away. *Fabricando fit faber*: by making, one becomes a maker.

Most videos come from trusted public and teaching sources:
museums such as the Smithsonian, the Met, the Victoria and Albert

Museum, Mount Vernon and the Jamestown-Yorktown museums; science channels such as SciShow Kids and How It's Made; the official channels of sewing-machine and yarn companies; and careful sewing, crochet and knitting teachers chosen lesson by lesson. Every video was previewed for content, accuracy, safe practice and modest dress. Most are short; a few run longer and are best watched together. Some channels end with an invitation to subscribe or a mention of their other videos or products; you can stop the video when the teaching ends. Many lessons ask the student to watch once all the way through and then again with needle, hook or yarn in hand, pausing after each step.

Start with Lesson 1.1 →

WHO IT IS FOR

Written for students in grades 3–5 (about ages 8–11), the middle of the band in mind. A student ready for this course can read simple directions with help, cut along a line with scissors, and sit with a small task for 20 minutes; threading a needle and tying a knot are taught in Unit 3, so no sewing experience is needed. A parent or responsible adult reads along and supervises every sewing session. To begin, buy a basic hand-sewing kit (embroidery or chenille needles, all-purpose thread, embroidery floss, pins, a pincushion and small scissors), a pair of fabric scissors, a tape measure, felt and cotton fabric scraps, a skein or two of worsted-weight cotton and wool yarn, a 5 mm (H-8) crochet hook and a pair of US 8 (5 mm) knitting needles. A sewing machine is needed only in Unit 4; borrowing one from a relative or a friend at church is perfectly fine.

HOW TO USE THIS COURSE

1. **The weekly rhythm.** The year has 32 lessons, one a week, in two sessions. Session 1 (about 45–60 minutes) is the warm-up, the video, the teaching and the picture study. Session 2 (about 45–60 minutes) is the sewing project: make the thing, run the little test inside it, count the needles and pins back in, clean up, and write in the sewing notebook. In the last week of each unit, add a third session for the unit review and the unit challenge.
2. **A leveled course.** Fabrics & Sewing I is written for the whole grades 3–5 band, not one grade. A third grader may take the course slowly, or over two years, doing the

shorter version of a project (a smaller pouch, a four-patch instead of a nine-patch) and answering the unit review aloud. A fifth grader may move faster, add the “older students” steps and make the bigger version. Look for the “younger students” and “older students” tips in the projects.

3. **An adult supervises all sewing tool use.** A parent or responsible adult is present for every session in which needles, pins, scissors, the iron or the sewing machine come out. **Count needles and pins at the start and again at the end of every session**, so that none is lost in the carpet or the couch. Keep them in a pincushion or a magnetic dish, never in your mouth or clothes, and keep needles, pins, buttons and loose yarn away from babies, toddlers and pets.
4. **The grades 3–5 safety ladder.** Students use real hand-sewing needles (embroidery or chenille needles to start) with a pincushion and a needle count. They cut fabric with fabric scissors with an adult nearby, carrying scissors closed and points down and passing them handle first. They use the iron only with an adult beside them; the iron is set upright on its heel, the cord is kept out of the way, and it is unplugged at the end. They use the sewing machine at slow speed with an adult beside them, after the adult has shown them threading and the finger rule (hands flat, fingers at least an inch from the needle, foot off the pedal when threading or adjusting, never sewing over pins). Students do not change machine needles or clear jams alone. A low-temperature glue gun is used with an adult beside them. There is no rotary cutter and no staple gun at this level; an adult does any stapling. Crochet hooks and knitting needles are used freely.
5. **Story, then science, then sewing.** The core ideas are written to be read aloud together or read by the student. The paragraphs marked *The story* and *How they figured it out* tell what happened; *The fabric science* (or *The craft*) explains what is happening in the fiber, the fabric or the stitch; *Let’s sew* names the project and the one skill to do well and safely. After each paragraph, ask the student to tell it back in his or her own words.
6. **Picture study.** Each lesson has one painting, historic photograph, patent model or old piece of needlework that shows spinning, weaving, sewing, cloth or the home. Look at it quietly for two minutes. Then put it away and have the student tell everything he or she remembers. Bring it back and work through the “look for” items and questions, which point to the fibers, tools, stitches and hands in the picture.

7. **The sewing notebook.** Use one notebook (or a binder with page protectors) for the whole year. For every project, write the date, tape in a fabric swatch or a sample of the stitch, sketch the steps, write down measurements, and finish with one sentence: “Next time I will...” Then, when you can, make it again and make that change. Make it, record it, improve it.
8. **Supplies and cost.** The projects use ordinary fabric-store and craft-store supplies, felt, cotton scraps, yarn, and old shirts, sheets, pillowcases and towels from the family’s rag bag. Read the pattern card a few days ahead and gather what you need. A sewing machine is required only in Unit 4; every machine project in Units 4, 7 and 8 also gives a hand-sewn option (backstitch) for families without one.
9. **Optional books and tools.** Some units list free guides, museum pages and simple tools. They are extras. Every project can be made without them.
10. **Unit review and unit challenge.** Each unit ends with a short review (50 points), with one or two “show me” questions the student answers by sewing, and a unit challenge: something real made and recorded, such as a fiber swatch book, a woven placemat, a stitch sampler, a machine-sewn tote bag, a crocheted dishcloth set, a knitted scarf, a pillow for a real room or a costume worn at the sewing fair. Keep the challenge pages and photographs in a folder for the year.
11. **The family sewing fair.** In the last week the student lays out the year’s work with a small card for each piece, shows the family how to sew a favorite stitch, wears one garment or costume, and gives one piece away with a note.

SCOPE AND SEQUENCE

UNIT 1 • WEEKS 1–4

Where Cloth Comes From

Fibers from plants, animals and the laboratory: cotton and Eli Whitney’s gin, wool and the shepherd’s fleece, linen and silk, and rayon, nylon and polyester, with fair tests of what each fiber does well and poorly and a growing fiber swatch book.

- 1.1 Cotton: From the Boll to the Bale
- 1.2 Wool: Shepherds and Their Sheep
- 1.3 Linen and Silk
- 1.4 Fibers Made by People

UNIT 3 • WEEKS 9–12

Hand Stitching

Threading a needle and tying a knot; the running stitch, backstitch, whipstitch, slip stitch and blanket stitch; sewing on a button and mending like Dorcas; and alphabet samplers and a little embroidery, ending with a stitch sampler and a real mending job.

- 3.1 The Needle and the Knot
- 3.2 Backstitch and Whipstitch
- 3.3 Dorcas and the Loose Button
- 3.4 Samplers and the Blanket Stitch

UNIT 2 • WEEKS 5–8

Fabric Up Close

How fiber becomes fabric: twist and the spinning wheel, warp and weft on a cardboard loom, Jacquard’s punch-card loom, and knits, felt, thread count and finished edges, ending with a woven placemat.

- 2.1 Spinning: Twist Makes It Strong
- 2.2 Warp and Weft: Weaving on a Loom
- 2.3 Joseph-Marie Jacquard’s Punch Cards
- 2.4 Knits, Felt, Thread Count and Finished Edges

UNIT 4 • WEEKS 13–16

Machine Sewing

Walter Hunt, Elias Howe and Isaac Singer and the lockstitch; the parts of the machine, threading and the bobbin; straight seams, seam allowance, pivoting and pressing; a drawstring bag and a pillowcase, ending with a machine-sewn tote bag.

- 4.1 Elias Howe’s Needle
- 4.2 Isaac Singer and the Lockstitch
- 4.3 Pins, Pressing and the Drawstring Bag
- 4.4 The Pillowcase

UNIT 5 • WEEKS 17–20

Crochet

Crochet with a hook and worsted-weight yarn: the slip knot and chain, single and double crochet, reading a simple pattern in abbreviations, and the granny square, ending with a crocheted dishcloth set.

- 5.1 The Hook and the Chain
- 5.2 Single Crochet Rows
- 5.3 Reading a Pattern
- 5.4 The Granny Square

UNIT 7 • WEEKS 25–28

Home Sewing: Pillows, Drapes & Furniture Covers

Sewing for the home: an envelope pillow cover, curtains measured for a real window, patchwork and the quilting bee with a nine-patch, and covering a cushion or a chair seat, ending with a finished piece for a real room.

- 7.1 The Envelope Pillow
- 7.2 The Curtains of the Tabernacle
- 7.3 Patchwork and the Quilting Bee
- 7.4 Covering Furniture: Cushions and Seats

UNIT 6 • WEEKS 21–24

Knitting

Knitting from casting on to binding off: the knit and purl stitches, garter and stockinette, the Red Cross knitters of 1917–1918 and William Lee’s stocking frame of 1589, ending with a finished knitted scarf, headband or washcloth set.

- 6.1 Hand Knitters and the Knitting Lesson
- 6.2 The Knit Stitch and the Garter Square
- 6.3 Knitting for Others: The Red Cross Knitters
- 6.4 William Lee’s Stocking Frame and the Purl Stitch

UNIT 8 • WEEKS 29–32

Design, Clothing & Costumes

Design and clothing: measuring for fit, a paper pattern, an apron for the kitchen, a shepherd’s or wise man’s tunic for a Christmas or Bible-story play, and a simple garment, ending with the family sewing fair.

- 8.1 Measuring and the Tailor’s Tape
- 8.2 An Apron for the Kitchen
- 8.3 Costumes for a Play
- 8.4 Joseph’s Coat and the Sewing Fair

WEEKLY PACING CALENDAR

WEEK	PLAN
1	• Session 1: Lesson 1.1 Cotton: From the Boll to the Bale: warm-up, video, teaching and picture study • Session 2: Lesson 1.1 sewing project and sewing notebook

WEEK	PLAN
	<i>Two sessions a week is the usual rhythm: one to learn, one to sew. Younger children can split a long session in two. Leave the project out where it can be picked up again during the week.</i>
2	• Session 1: Lesson 1.2 Wool: Shepherds and Their Sheep: warm-up, video, teaching and picture study • Session 2: Lesson 1.2 sewing project and sewing notebook
3	• Session 1: Lesson 1.3 Linen and Silk: warm-up, video, teaching and picture study • Session 2: Lesson 1.3 sewing project and sewing notebook
4	• Session 1: Lesson 1.4 Fibers Made by People: warm-up, video, teaching and picture study • Session 2: Lesson 1.4 sewing project and sewing notebook • Session 3: Unit 1 review and unit challenge
5	• Session 1: Lesson 2.1 Spinning: Twist Makes It Strong: warm-up, video, teaching and picture study • Session 2: Lesson 2.1 sewing project and sewing notebook
6	• Session 1: Lesson 2.2 Warp and Weft: Weaving on a Loom: warm-up, video, teaching and picture study • Session 2: Lesson 2.2 sewing project and sewing notebook
7	• Session 1: Lesson 2.3 Joseph-Marie Jacquard's Punch Cards: warm-up, video, teaching and picture study • Session 2: Lesson 2.3 sewing project and sewing notebook
8	• Session 1: Lesson 2.4 Knits, Felt, Thread Count and Finished Edges: warm-up, video, teaching and picture study • Session 2: Lesson 2.4 sewing project and sewing notebook • Session 3: Unit 2 review and unit challenge
9	• Session 1: Lesson 3.1 The Needle and the Knot: warm-up, video, teaching and picture study • Session 2: Lesson 3.1 sewing project and sewing notebook

WEEK	PLAN
10	• Session 1: Lesson 3.2 Backstitch and Whipstitch: warm-up, video, teaching and picture study • Session 2: Lesson 3.2 sewing project and sewing notebook
11	• Session 1: Lesson 3.3 Dorcas and the Loose Button: warm-up, video, teaching and picture study • Session 2: Lesson 3.3 sewing project and sewing notebook
12	• Session 1: Lesson 3.4 Samplers and the Blanket Stitch: warm-up, video, teaching and picture study • Session 2: Lesson 3.4 sewing project and sewing notebook • Session 3: Unit 3 review and unit challenge
13	• Session 1: Lesson 4.1 Elias Howe's Needle: warm-up, video, teaching and picture study • Session 2: Lesson 4.1 sewing project and sewing notebook
14	• Session 1: Lesson 4.2 Isaac Singer and the Lockstitch: warm-up, video, teaching and picture study • Session 2: Lesson 4.2 sewing project and sewing notebook
15	• Session 1: Lesson 4.3 Pins, Pressing and the Drawstring Bag: warm-up, video, teaching and picture study • Session 2: Lesson 4.3 sewing project and sewing notebook
16	• Session 1: Lesson 4.4 The Pillowcase: warm-up, video, teaching and picture study • Session 2: Lesson 4.4 sewing project and sewing notebook • Session 3: Unit 4 review and unit challenge
17	• Session 1: Lesson 5.1 The Hook and the Chain: warm-up, video, teaching and picture study • Session 2: Lesson 5.1 sewing project and sewing notebook
18	• Session 1: Lesson 5.2 Single Crochet Rows: warm-up, video, teaching and picture study • Session 2: Lesson 5.2 sewing project and sewing notebook
19	• Session 1: Lesson 5.3 Reading a Pattern: warm-up, video, teaching and picture study • Session 2: Lesson 5.3 sewing project and sewing notebook

WEEK	PLAN
20	• Session 1: Lesson 5.4 The Granny Square: warm-up, video, teaching and picture study • Session 2: Lesson 5.4 sewing project and sewing notebook • Session 3: Unit 5 review and unit challenge
21	• Session 1: Lesson 6.1 Hand Knitters and the Knitting Lesson: warm-up, video, teaching and picture study • Session 2: Lesson 6.1 sewing project and sewing notebook
22	• Session 1: Lesson 6.2 The Knit Stitch and the Garter Square: warm-up, video, teaching and picture study • Session 2: Lesson 6.2 sewing project and sewing notebook
23	• Session 1: Lesson 6.3 Knitting for Others: The Red Cross Knitters: warm-up, video, teaching and picture study • Session 2: Lesson 6.3 sewing project and sewing notebook
24	• Session 1: Lesson 6.4 William Lee's Stocking Frame and the Purl Stitch: warm-up, video, teaching and picture study • Session 2: Lesson 6.4 sewing project and sewing notebook • Session 3: Unit 6 review and unit challenge
25	• Session 1: Lesson 7.1 The Envelope Pillow: warm-up, video, teaching and picture study • Session 2: Lesson 7.1 sewing project and sewing notebook
26	• Session 1: Lesson 7.2 The Curtains of the Tabernacle: warm-up, video, teaching and picture study • Session 2: Lesson 7.2 sewing project and sewing notebook
27	• Session 1: Lesson 7.3 Patchwork and the Quilting Bee: warm-up, video, teaching and picture study • Session 2: Lesson 7.3 sewing project and sewing notebook
28	• Session 1: Lesson 7.4 Covering Furniture: Cushions and Seats: warm-up, video, teaching and picture study • Session 2: Lesson 7.4 sewing project and sewing notebook • Session 3: Unit 7 review and unit challenge

WEEK	PLAN
29	• Session 1: Lesson 8.1 Measuring and the Tailor's Tape: warm-up, video, teaching and picture study • Session 2: Lesson 8.1 sewing project and sewing notebook
30	• Session 1: Lesson 8.2 An Apron for the Kitchen: warm-up, video, teaching and picture study • Session 2: Lesson 8.2 sewing project and sewing notebook
31	• Session 1: Lesson 8.3 Costumes for a Play: warm-up, video, teaching and picture study • Session 2: Lesson 8.3 sewing project and sewing notebook
32	• Session 1: Lesson 8.4 Joseph's Coat and the Sewing Fair: warm-up, video, teaching and picture study • Session 2: Lesson 8.4 sewing project and sewing notebook • Session 3: Unit 8 review and unit challenge <i>Last week. Hold a family sewing fair: the student sets out the year's finished pieces with a card for each, shows how to do one skill, shows the sewing notebook, and gives one piece away as a gift.</i>

MATERIALS

Sewing notebook (any notebook or a binder with page protectors)

One for the whole year: fabric swatches, stitch samples, sketches, measurements and “next time I will...” notes. Clear tape or a glue stick for swatches.

A basic hand-sewing kit

Embroidery or chenille needles (sizes 18–24) to start, then sharps; a needle threader; all-purpose polyester or cotton thread in a few colors; embroidery floss; a thimble; dressmaker pins with ball heads; a pincushion or a magnetic dish for the needle-and-pin count.

Fabric scissors, small embroidery scissors and paper scissors

Keep the fabric scissors for fabric only (tie a ribbon on them). Students cut with an adult nearby. A pinking shears is helpful in Unit 2 but optional.

A 60-inch tape measure, a ruler and tailor's chalk or a washable marker

Used for measuring and marking from Unit 1 to the end of the year.

Felt, cotton fabric scraps and the family rag bag

Wool-blend or acrylic craft felt for Unit 3; quilting cotton, old cotton shirts, sheets and pillowcases for Units 2, 4, 7 and 8. Washed old clothing is perfect for practice.

Yarn, a crochet hook and knitting needles

Worsted-weight (#4) cotton and wool or acrylic yarn; a 5 mm (H-8) crochet hook; US 8 (5 mm) straight knitting needles; a large-eye yarn needle. Used in Units 2, 5 and 6.

Cardboard, a small embroidery hoop and fiberfill

Cardboard from a box for looms in Unit 2; a 6- or 7-inch hoop for the sampler in Unit 3; a small bag of polyester fiberfill for ornaments and pincushions.

An iron and an ironing board or pressing mat

Used only with an adult beside the student. A plain cotton dish towel makes a good press cloth.

A sewing machine (Unit 4; optional elsewhere)

Any working home machine with a straight stitch, plus a few spare needles and bobbins that fit it. Borrowing one from a relative or a friend at church is fine. Every machine project also has a hand-sewn option.

A magnifying glass, a timer and a camera or phone

For looking at weaves and counting threads, timing tests, and photographing finished projects and unit challenges.

GRADING

Grades come mostly from the sewing projects and the sewing notebook, because sewing is learned by making, recording and trying again. A project with crooked seams that is honestly recorded and then made again with one improvement earns full credit.

PART	%
Sewing projects (effort, safety, neatness and the improve round)	40
Sewing notebook (swatches, stitch samples, sketches, measurements, next-time notes)	20
Unit reviews	15

PART	%
Unit challenges	25

Scale: A 90–100, B 80–89, C 70–79, D 60–69. Below 60: make the project or redo the review again with help.

- Grade the maker, not only the thing made. Did the student count needles and pins, follow the safety steps, work carefully, record honestly, clean up and try an improvement?
- A notebook page earns full marks when it has a date, a swatch or stitch sample, a sketch or a measurement, and one sentence about what to change next time.
- A project with crooked seams that is honestly recorded and redone earns full credit. Every sewer has unpicked a seam and sewn it again.
- Unit reviews may be answered aloud for a student who writes slowly; the parent writes down the answers. The “show me” questions are always answered by sewing.
- Never grade or comment on anyone’s body or size. When garments are measured in Unit 8, measurements are for fit only.

A NOTE TO PARENTS

You do not need to be a seamstress or a tailor to teach this course. Read the story aloud together, watch the video, and then sit beside the student as a sewing partner: hand over the pincushion, hold the other end of the tape measure, and ask “What do you think will happen?” and “How could we make it better?” Those questions are most of what a good sewing teacher does. Let the student do as much of the work as the safety ladder allows, including the needle count and the cleanup.

Expect knots in the thread, crooked seams and a few stitches pulled out and done again. That is how every sewer learns. The course is built so that a recorded mistake and a second try earn full credit, and so that the student finishes the year able to sew on a button, mend a seam and make a simple bag or pillowcase without help.

Many of the projects are meant to be given away: a pillowcase for a neighbor or a children’s hospital, a scarf for someone in need, a costume for the church play. Cloth

is a quiet way to love people. We hope your family finds, as so many families before you have, that a needle and thread are good tools for serving others.

UNIT 1

WHERE CLOTH COMES FROM

Every shirt, sock and blanket in your house began as a **fiber**: a thin, flexible strand much longer than it is wide. Some fibers grow on plants, like the fluffy cotton around a cotton seed and the long strands inside the stem of the flax plant. Some grow on animals, like the wool on a sheep and the silk a silkworm spins for its cocoon. And some are made by people in a laboratory or factory, like rayon, nylon and polyester. In this unit you will follow each fiber from the farm, the shearing shed or the chemical plant to the store.

You will meet Eli Whitney and his cotton gin, a shepherd at shearing time, the flax workers of old who retted and scutched their flax, the silkworm and its single long thread, and Wallace Carothers, the chemist who made nylon. You will also test fibers fairly, the way a scientist does: Which soaks up water? Which wrinkles? Which stretches? Which dries fastest? You will find that every fiber has real strengths and real weaknesses. By the end you will have a **fiber swatch book** of labeled fabrics that you can use all year.

PREREQUISITES

- Can read simple labels and directions with help
- Can cut paper and felt along a line with scissors
- Can use clear tape or a glue stick to mount small squares neatly

MASTERY CHECKLIST

- ☐ I can name at least two plant fibers, two animal fibers and two fibers made by people.
- ☐ I can tell how cotton, wool, linen and silk get from the farm to the store.
- ☐ I can read the fiber content on a clothing label.
- ☐ I can run a fair test of fibers, changing only one thing at a time, and record the results.
- ☐ I can name one strength and one weakness of cotton, wool, linen, silk, nylon and polyester.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Smithsonian National Museum of American History: textile collection:** Free. Search “National Museum of American History textiles” to find photographs of spinning wheels, looms, cotton gins and old fabrics from the national collection. Good for looking up the machines in this unit.
- **A fabric swatch kit you make yourself:** Ask a fabric store for small cut samples, or cut 3-inch squares from the family rag bag: an old T-shirt, a pair of jeans, a flannel pajama top, a wool sock, a silk tie, a linen tea towel and a fleece jacket. Wash and label them before you begin.
- **A small bag of wool roving and two pet slicker brushes:** Optional, for carding and spinning in Lesson 1.2. Craft-store wool roving or even a handful of cotton balls works too.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

1.1 Cotton: From the Boll to the Bale	2 sessions of 45–60 minutes
1.2 Wool: Shepherds and Their Sheep	2 sessions of 45–60 minutes
1.3 Linen and Silk	2 sessions of 45–60 minutes
1.4 Fibers Made by People	2 sessions of 45–60 minutes

UNIT 1 REVIEW

Answer each question in complete sentences unless it asks for a list or asks you to show something. Questions marked “Show me” are answered by doing the task for your parent. The review is worth 50 points.

1. **5 pts**

Name two fibers from plants, two from animals and two made by people.

2. (5 pts)

What did Eli Whitney's cotton gin do, and what were one good result and one sad result of it?

3. (5 pts)

List the steps from a sheep to a ball of yarn.

4. (5 pts)

Why does a wool sweater keep you warm even when it is damp?

5. (5 pts)

Predict what happens: you wash a wool sweater in hot water and dry it in a hot dryer. Explain why.

6. (5 pts)

Tell how flax becomes linen, naming at least three steps.

7. (5 pts)

What is one fact and one legend about the beginning of silk?

8. (5 pts)

Who led the team that made nylon, and in what year did they make it? Name one thing nylon is good for.

9. (5 pts)

Give one strength and one weakness of polyester and of cotton.

10. (5 pts)

Show me: open your swatch book to any page and explain the fabric to your parent, then read the fiber label of one garment and tell what it is made of.

ANSWER KEY

1. Plants: cotton, flax (linen), hemp or jute. Animals: wool, silk, alpaca or mohair. Made by people: rayon, nylon, polyester, acrylic or spandex. Any two from each group.
2. It pulled cotton fibers away from the seeds with hooks through narrow slots, so one worker could clean far more cotton. Good: cotton and cloth became cheap. Sad: growing cotton became so profitable that slavery in the South grew.
3. Shear the fleece, skirt it, wash (scour) it, card it, and spin it into yarn.
4. Wool's crimp traps air, and the fibers can soak up a lot of moisture inside themselves before the fabric feels wet.
5. It shrinks and felts. The tiny scales on the wool fibers catch and lock together with heat, water and rubbing.
6. Pull the flax, ret it (soak or dew-rot), break it, scutch it, hackle (comb) it and spin it. Any three in order.
7. Fact: people in ancient China raised silkworms on mulberry leaves and unwound the cocoons; one cocoon is one long thread. Legend: Empress Leizu found silk when a cocoon fell into her tea.
8. Wallace Carothers at DuPont, 1935. It is very strong and smooth: toothbrush bristles, stockings, parachutes, ropes, backpacks.
9. Polyester: strong, dries fast, resists wrinkles; but does not soak up sweat, can hold odors, melts under a hot iron. Cotton: soft, absorbent, washable; but wrinkles, shrinks and dries slowly.
10. The student names the fabric, fiber, source, a strength and a weakness, and correctly reads the fiber content from a real label.

UNIT CHALLENGE: FIBER SWATCH BOOK AND CLOSET SURVEY

Finish a fiber swatch book of at least 8 labeled fabrics, with at least two from plants, two from animals and two made by people. Each page shows the swatch, its fiber, where the fiber comes from, one strength and one weakness, using what you learned in your tests.

Add a family closet survey: read the labels on at least 20 garments in your home and make a tally or bar graph of the fibers you found. End with two sentences about what you discovered, and show the book to your family.

LOOK FOR	WHAT IT MEANS
Complete swatch book	At least 8 swatches from all three fiber families, each neatly cut and mounted.
Accurate labels	Every page names the fiber, its source, one true strength and one true weakness.
Closet survey	At least 20 garment labels read and tallied, with a chart and two sentences of findings.
Fair tests recorded	Results of at least two fiber tests from this unit are included, with predictions and what really happened.
Effort and neatness	Careful cutting, clear writing and a book you would be glad to show; any crooked page was redone.

1.1 COTTON: FROM THE BOLL TO THE BALE

OBJECTIVES

- Tell how cotton grows in a boll around its seeds and how it is picked, ginned and baled.
- Explain what Eli Whitney’s cotton gin did and why it mattered.
- Read the fiber labels in your clothes and begin a fiber swatch book with four cotton fabrics.

Warm-up. Find five pieces of clothing in your closet or the laundry basket: a T-shirt, a pair of jeans, a sweater, a pair of socks and a jacket. Look inside each one for the small label sewn into a seam or the neck. Write down what it says about fibers (for example, “100% cotton” or “60% cotton, 40% polyester”). How many of the five have cotton in them? Keep your list for the swatch book.

WATCH

FIELD TO FABRIC

National Cotton Council • 8:45

<https://www.youtube.com/watch?v=0hoHvN289Xs>

WHEN TO WATCH

After the story of the cotton gin and before you start your swatch book. Watch for the gin, the bale and the spinning machines.

Note: From the National Cotton Council, a farm trade group; used here for the facts of growing and processing cotton.

BACKUP VIDEO

Cotton Gin Cart Demonstration

National Museum of American History • 1:06

https://www.youtube.com/watch?v=JzHD7_dWEik

A one-minute look at a small hand-cranked gin at the Smithsonian. Watch the seeds fall away from the lint.

KEY TERMS

fiber

A thin, flexible strand, much longer than it is wide, that can be spun into yarn or thread.

lint

The cotton fibers after the seeds have been taken out.

bale

A tightly pressed, wrapped block of cotton lint, about 500 pounds, ready to be shipped to a mill.

boll

The round seed pod of the cotton plant. When it opens, it shows fluffy white cotton fibers wrapped around the seeds.

cotton gin

A machine that pulls cotton fibers away from the seeds. “Gin” is short for “engine.”

CORE IDEAS

The story. Cotton grows on a bushy plant that loves long, hot summers. After the plant blooms, each flower becomes a green pod called a **boll**. Inside the boll, soft white fibers grow out of the seeds, packed tightly together. When the boll ripens, it cracks open and the cotton fluffs out like a little cloud. For thousands of years, people picked cotton by hand, one boll at a time. Then came the hard part: every fiber was stuck tightly to a seed, and the seeds had to be pulled out by hand. A worker could clean only a few pounds of the short-fibered cotton grown in the American South in a whole day.

How they figured it out. In 1793 a young man from Massachusetts named Eli Whitney was staying on a plantation in Georgia. Planters told him that whoever found a fast way to clean cotton would change the South. Whitney built a box with a turning cylinder covered in wire hooks. The hooks reached through narrow slots in a grate, caught the fibers and pulled them through, but the slots were too narrow for the seeds, so the seeds stayed behind. A brush on a second cylinder swept the cotton off the hooks. With Whitney’s **cotton gin**, one worker could clean many times more cotton in a day. He received a patent for it in 1794.

Think it through. The gin made cotton cheap, and cloth became cheaper for families everywhere. Sadly, it also made growing cotton so profitable that slavery in the American South grew much larger, because planters forced more enslaved people to plant and pick ever more cotton. Slavery was a great wrong, and it ended in the United States in 1865. An invention can do good and also be used for wrong; that is why the people who use tools must also love what is right.

The fabric science. A cotton fiber is a single long, thin plant cell, mostly made of **cellulose**, the same stuff in wood and paper. As it dries in the open boll, it twists and flattens like a ribbon. That natural twist helps the fibers grip each other when they are spun into yarn. Cotton is soft, breathes well and soaks up water (that is why towels are cotton), and it can be washed in hot water. But it wrinkles easily, it can shrink the first time it is washed and dried hot, and it dries slowly. Today most cotton is picked by big machines, ginned, pressed into bales of about 500 pounds and sent to mills to be spun, woven or knitted.

Let's sew. Today you will start your **fiber swatch book**, the book you will add to all through this unit. You will mount four cotton fabrics: denim, T-shirt knit, flannel and a plain cotton like a sheet or a shirt, plus a cotton ball. Then you will be the cotton gin: you will pull apart a cotton ball, and if you can find raw cotton with seeds, you will clean it by hand and time yourself. Your one skill to do well: cut neat, square swatches with fabric scissors, with an adult nearby.

PICTURE STUDY



A Cotton Office in New Orleans, Edgar Degas, 1873 · Oil on canvas · Musée des Beaux-Arts, Pau, France

Image: [Wikimedia Commons](#), public domain

The French painter Edgar Degas visited his relatives in New Orleans, Louisiana, in 1872 and 1873. His uncle ran an office that bought and sold cotton, and Degas painted the men at work there. Cotton came down the Mississippi River to New Orleans in bales, and buyers like these checked its quality before it was shipped to mills far away.

Look closely

- Find the long table covered with white cotton. Is the cotton still in bolls, or has it already been ginned?
- Find the man in the front who is pulling a tuft of cotton between his fingers. What do you think he is checking about the fibers?
- Look at the shelves, papers and account books. What other work happens in a cotton office besides touching cotton?
- Count how many people you can find. What is each one doing?

Talk about it

1. Cotton buyers judged cotton by the length of its fibers and how clean and white it was. Why would long fibers make better thread?
2. This cotton had already been grown, picked, ginned and baled. Tell the steps in order, from the seed to this table.

3. Where do you think this cotton went after it left the office?

Safety first. A parent or responsible adult supervises all sewing tool use in this course: needles, pins, scissors, the iron and the sewing machine. Count needles and pins out at the start of every session and back in at the end. Today, carry fabric scissors closed with the points down, pass them handle first, and cut with an adult nearby.

SEWING PROJECT

Start a Fiber Swatch Book and Be the Cotton Gin

Your swatch book is a little library of fabrics. Every page holds one fabric, its name, its fiber, where the fiber comes from, one thing it does well and one thing it does poorly. Today you will make the cover and the first four cotton pages, and you will feel for yourself how hard it is to clean cotton by hand.

You will need

- Fabric scissors and paper scissors
- A ruler and a pencil or washable marker
- Clear tape or a glue stick
- A timer
- A magnifying glass (optional)

FIBER SWATCH BOOK (COVER AND COTTON PAGES)

Finished size: a booklet of $8\frac{1}{2} \times 11$ in (22×28 cm) pages, begun with 4 cotton swatches · About 40 minutes

Fabric and notions

- 5 sheets of plain or card-stock paper, $8\frac{1}{2} \times 11$ in, punched or stapled into a booklet (or pages in your sewing-notebook binder)
- 4 swatches of cotton fabric, each 3×3 in (7.5×7.5 cm): denim from old jeans, T-shirt knit, flannel, and a plain woven cotton such as an old sheet or shirt
- 2 or 3 cotton balls (check the bag says 100% cotton)
- Raw cotton with seeds, if you can get some from a farm, a museum shop or a craft supplier (optional)

How to make it

1. Draw a 3×3 inch square on paper and cut it out. This is your template.
2. Lay the template on each old garment, trace around it with a washable marker, and cut out the square with fabric scissors, with an adult nearby. Cut through one layer only.

3. Make the cover: write “My Fiber Swatch Book,” your name and the year, and draw a cotton boll.
4. On each cotton page, tape or glue a swatch near the top. Tape only the top edge so you can lift the swatch and feel both sides.
5. Under each swatch, write: the fabric name (denim, knit, flannel, plain weave), the fiber (cotton), where it comes from (the cotton plant), one strength and one weakness.
6. On a fifth page, tape down a cotton ball and pull a few fibers out of a second one so you can see how long they are. Measure the longest fiber you can pull out.
7. Save room at the back for the closet survey and the fibers you will add in Lessons 1.2–1.4.

Fabric check: Use fabrics that are 100% cotton for these pages (check the label before you cut). A cotton-polyester blend is fine for a separate “blend” page later. Wash old clothes before cutting them. Avoid very thin or stretchy scraps for the swatches; they curl and are hard to cut square. If you have no flannel, a cotton dish towel or a corduroy scrap works well.

Steps

1. **Be the gin.** If you have raw cotton with seeds, take one seed with its fluff and pull every fiber off by hand. Time yourself. How long did one seed take? If you have no raw cotton, push three small beads or dried beans into the middle of a cotton ball, then pull them out without losing any fibers, and time that.
2. **Do the math.** A gin cleans thousands of seeds a minute. How many seeds could you clean in one hour at your speed? Write it down.
3. **Twist a thread.** Pull a thin wisp from a cotton ball and roll it between your fingers in one direction. Pull gently on the twisted part and on an untwisted wisp. Which is stronger? Tape both into your book.
4. Make the swatch book pages from the pattern card.
5. **Closet survey, part 1.** Read the labels on ten pieces of clothing in your family (ask first). Make a tally: cotton, wool, polyester, nylon, other. Keep the tally for the unit challenge.
6. **Count and clean up.** Put the scissors away, sweep up threads, and put scraps in a scrap bag for later projects.

7. **Improve it.** Look at your swatches. Are the edges straight and the corners square? Recut any that are crooked, and add a neater label.

Tips

- Long, smooth cuts with the whole blade make straighter edges than many little snips.
- Denim has two sides that look different: blue on the front, lighter on the back. Tape only the top edge so you can show both.
- If you live near cotton country, a local cotton gin or farm may let you have a few bolls in the fall.

Check your work

- ☐ I can tell how cotton gets from the boll to the bale.
- ☐ I can explain what the cotton gin does and name one good and one sad result of it.
- ☐ My first four cotton swatches are cut square and labeled with fiber, source, a strength and a weakness.

SEWING NOTEBOOK

1. Draw a cotton boll split open with the fibers fluffing out, and label the seed, the fibers and the boll.
2. Draw a simple picture of Whitney's gin: the hooks, the slots that stop the seeds, and the brush. Use arrows to show where the cotton goes.
3. Write your closet-survey tally and one sentence: "The fiber I found most often was..."

From history. Eli Whitney had trouble earning money from his gin, because the idea was simple and many people built copies. He later became known for making firearms for the army with parts that were the same size and could be swapped, an important idea for factories. Cotton was so important to the South's farms in the 1800s that people called it "King Cotton."

COMMON MISTAKES

- Thinking cotton comes from a flower petal. The fibers grow from the seeds inside the boll.
- Cutting swatches with paper scissors. Fabric scissors cut cleanly; paper scissors chew fabric and dull quickly.

- Reading only the size on a clothing label. The fiber content is usually on a separate tag sewn into a side seam.
- Calling every soft fabric “cotton.” Many soft fabrics are polyester fleece or rayon; read the label.

Make it a game • Be the Cotton Gin. Your parent pulls a cotton ball into a loose puff and hides five dried beans inside. Set a timer and pick out the seeds by hand. That is how slow it was before Eli Whitney's cotton gin. Say how cotton grows in a boll, is picked and baled. Beat your time on a second puff.

Scripture. “Consider the lilies of the field, how they grow; they toil not, neither do they spin:” (Matthew 6:28, KJV)

Jesus pointed to the flowers of the field, which God clothes without spinning a thread. Every cotton boll is a reminder that God provides the very fibers we spin.

1.2 WOOL: SHEPHERDS AND THEIR SHEEP

OBJECTIVES

- Tell how wool is sheared, washed, carded and spun into yarn.
- Explain why wool keeps you warm even when it is damp, and name one weakness of wool.
- Card a little wool or cotton and spin a short yarn on a homemade pencil drop spindle.

Warm-up. Hold a wool sock or sweater in one hand and a cotton T-shirt in the other. Close your eyes. How are they different? Which feels warmer? Which feels springy when you squeeze it and let go? Now look closely at a strand of the wool yarn with a magnifying glass. Is it straight or wavy?

WATCH

Wonderful Wool!

SciShow Kids · 4:33

<https://www.youtube.com/watch?v=x0HeCL6nano>

WHEN TO WATCH

After the story of the shepherd and before you card your wool. Listen for each step from the sheep to the sweater.

BACKUP VIDEO

Wool: From Sheep to Yarn | MD F&H

Maryland Farm & Harvest · 5:18

<https://www.youtube.com/watch?v=bjPwTeFCAjo>

A visit to a real sheep farm and a small wool mill. Watch the carding machine turn tangled wool into a soft web.

KEY TERMS

fleece

The whole coat of wool sheared from one sheep, which usually comes off in one piece.

shearing

Clipping the wool off a sheep, usually once a year in spring. Like a haircut, it does not hurt the sheep when it is done well.

lanolin

The natural grease in a sheep's wool, which helps shed rain. It is washed out before the wool is spun.

carding

Brushing wool or cotton between two toothed brushes so the fibers lie in the same direction, ready to spin.

crimp

The natural waves in a wool fiber. Crimp makes wool springy and traps air.

drop spindle

A stick with a weight called a whorl, spun by hand to twist fibers into yarn.

CORE IDEAS

The story. Shepherds have kept sheep since the earliest pages of the Bible: Abel was a keeper of sheep, and David watched his father's flock. A sheep's wool grows all year. In spring, before the hot weather, the shepherd or a skilled shearer holds the sheep gently and clips the wool off close to the skin with shears or electric clippers, working so that the **fleece** comes off in one piece, like a woolly blanket. A good shearer can shear a sheep in just a few minutes. One fleece often weighs around 7 to 10 pounds, and some breeds grow much more. The sheep feels cooler, and the wool grows back by the next spring.

How they figured it out. Raw wool is greasy, dusty and full of bits of hay. Long ago, people learned the steps that are still used today. First they **skirt** the fleece, pulling off the dirtiest edges. Then they wash, or **scour**, it in hot, soapy water to take out the dirt and the grease called **lanolin** (lanolin is saved and used in hand creams). Next they **card** the clean wool between two brushes with fine wire teeth, so that the fibers lie side by side in a soft, fluffy roll. Last they **spin** it, twisting the fibers together into yarn on a spindle or a spinning wheel. Today mills do each of these steps with big machines.

The fabric science. A wool fiber is made of a protein called **keratin**, the same kind of protein as your hair and fingernails. Under a microscope, wool has tiny overlapping scales, like shingles on a roof, and it has a natural wave called **crimp**. The crimp keeps the fibers from lying flat, so wool fabric is full of tiny pockets of air, and trapped air keeps you warm. Wool can also soak up a good deal of moisture inside its fibers before it feels wet, so a wool sweater or sock stays warm even when it is damp. Wool is springy and does not wrinkle much. But wool has weaknesses too: in hot

water with rubbing, the scales catch on each other and the fibers mat together, so the sweater **shrinks and felts**. Some people find wool itchy, and moths like to eat it.

Let's sew. You will card a little wool roving (or cotton balls) between two pet slicker brushes and spin it into yarn on a **pencil drop spindle** that you make yourself. Your one skill to do well: keep the spindle turning in one direction while you let the twist travel up into the fibers.

PICTURE STUDY



The Sheepshearers, Jean-François Millet, 1857 · Oil on canvas · Art Institute of Chicago

Image: [Wikimedia Commons](#), public domain

Jean-François Millet grew up on a farm in Normandy, France, and spent his life painting farm families at work: planting, gathering, spinning and caring for sheep. Here he shows the yearly job of shearing. Look at how carefully the workers hold the animal.

Look closely

- Find the sheep. It is held up on a wooden tub. Why would that make shearing easier and safer?
- Find the shears in the workers' hands. Which way are they cutting?
- Look for the fleece that has already come off. What color is the wool before it is washed?
- Look at the shelter and the light. Why would shearing happen when the weather turns warm?

Talk about it

1. Why do you think the shearer tries to keep the fleece in one piece?
2. What would the workers do with this fleece next, before it could be knitted into a sweater?

3. How is a shepherd's care for his sheep like the care Jesus describes in John 10, "I am the good shepherd"?

Safety first. Pet slicker brushes have sharp little wire teeth: brush away from your hands and keep your fingers on the handles. Keep loose wool, yarn and the pencil spindle away from babies and pets. Wash your hands after handling raw wool.

SEWING PROJECT

Card Wool and Spin on a Pencil Drop Spindle

Before there were spinning wheels and mills, every thread was spun on a spindle by hand. You will make a simple spindle from a pencil and a weight, card a handful of fiber, and spin your own yarn, the same way shepherd families did for thousands of years. Then you will add a wool swatch to your swatch book.

You will need

- Two pet slicker brushes (or two wide-tooth combs)
- A pencil sharpener and a small cup hook (optional)
- A towel or tray to work over
- A ruler

PENCIL DROP SPINDLE AND A SHORT HAND-SPUN YARN

Finished size: one spindle and about 1 to 3 yards of hand-spun yarn · About 45 minutes

Fabric and notions

- 1 new unsharpened pencil (or a ½-inch wooden dowel 10 inches long)
- 1 old CD with a small potato or a large rubber eraser pushed onto the pencil to hold it in place, or a raw potato alone as the whorl
- 2 rubber bands
- 1 yard of plain wool or acrylic yarn for a leader (starter string)
- A handful (about ¼ ounce / 7 g) of wool roving, or 10 cotton balls
- 1 swatch of wool fabric, 3 × 3 in (7.5 × 7.5 cm), from an old sweater, sock or felt

How to make it

1. Make the spindle. Push the pencil through the hole of the CD so the CD sits about 2 inches from the top (the eraser end). Wrap a rubber band tightly above and below the CD so it cannot slide. If you use a potato, an adult pokes the pencil through the middle of it with a skewer first.

2. Tie the leader yarn to the pencil just above the CD, wind it around the pencil a few times, then bring it up and loop it once around the top of the pencil with a half hitch so it stays put. Let about 12 inches hang free.
3. Card the fiber. Lay a small tuft of wool on one brush. Gently pull the second brush across it, teeth to teeth, 6 to 8 times, always in the same direction. Lift the fluffy fibers off and roll them loosely into a little sausage called a rolag.
4. Fluff the end of the leader yarn and lay the end of your rolag against it, overlapping about 2 inches.
5. Hold the fibers and the leader together in one hand. With the other hand, twirl the spindle clockwise and let it hang. Pinch the fibers just above where they join so the twist cannot run up too far.
6. Draft: with your back hand, gently pull a few fibers out of the rolag to make a thin wisp. Slide your pinching fingers up and let the twist run into the wisp. Keep the spindle turning clockwise the whole time.
7. When the spindle gets close to the floor, take off the half hitch, wind the new yarn onto the pencil, put the half hitch back, and keep going.
8. Add new rolags by overlapping the fluffy ends, just like the start.
9. When you have a yard or more, unwind your yarn, let it hang, and see how it twists back on itself. Tie a loose knot at each end.

Fabric check: Wool roving from a craft store spins most easily for beginners. If anyone in the family is sensitive to wool, use cotton balls (they spin into a softer, weaker yarn) or acrylic roving, and wear cotton gloves while carding. Wash raw wool from a farm before using it, or ask an adult to do it in warm, soapy water without rubbing so it does not felt.

Steps

1. **Twist test.** Take a 6-inch piece of your hand-spun yarn and a 6-inch wisp of carded fiber that has not been spun. Pull each gently until it comes apart. Which held longer? Write down what you notice about twist.
2. **Practice the park-and-draft way first.** If the spindle keeps falling, sit down, spin it, then trap it between your knees (“park” it) while you draft. Then try again standing.
3. Make the spindle and spin your yarn from the pattern card.

4. **Add to the swatch book.** Make a wool page: tape down a wool swatch, a little tuft of carded wool and a short piece of your hand-spun yarn. Write the fiber, the source (sheep), one strength (warm even when damp) and one weakness (shrinks in hot water).
5. **Count and clean up.** Put the slicker brushes away teeth down, gather loose fluff, and wash your hands.
6. **Improve it.** Spin a second yard trying to keep the thickness more even. Lay both yarns side by side in your notebook. Which is smoother?

Tips

- If your yarn breaks, the wisp got too thin. If it is lumpy, you let too much fiber in at once. Both are normal at first.
- If the yarn kinks up on itself, there is too much twist. Draft out a little more fiber and let the extra twist run into it.
- Younger students: work with a partner, one spinning the spindle and one drafting the fiber.

Check your work

- ☐ I can name the steps from sheep to yarn: shear, skirt, wash, card and spin.
- ☐ I can explain why wool keeps you warm when it is damp and why it shrinks in hot water.
- ☐ I spun at least one yard of yarn and recorded my twist test.

SEWING NOTEBOOK

1. Draw the steps from sheep to sweater as a comic strip of five boxes: shear, wash, card, spin, knit.
2. Draw what a wool fiber looks like under a microscope, with its scales and crimp. Draw a cotton fiber next to it as a twisted ribbon.
3. Tape in a piece of your hand-spun yarn and write: "Next time I will..."

From history. Many American farm families in the 1700s and early 1800s raised a few sheep, sheared them each spring, and spun and wove their own wool. Wool mixed with linen made a sturdy cloth called linsey-woolsey. Sheep shearing was such an important day that families and neighbors often worked together and shared a meal afterward.

COMMON MISTAKES

- Thinking shearing hurts the sheep. It is like a haircut, and in warm weather it keeps the sheep healthy and cool.
- Turning the spindle one way and then the other. Turning backward untwists the yarn and it falls apart.
- Washing a wool sweater in hot water and putting it in a hot dryer. Agitation and heat make the scales lock together, and the sweater shrinks.
- Pulling too much fiber at once when drafting, which makes thick lumps.

Make it a game • Sheep to Sweater Charades. Act out each step of turning wool into yarn without speaking: shearing the sheep, washing out lanolin, carding, and spinning. Your parent guesses each step. Then swap. Finish by telling one reason wool keeps you warm even when damp and one weakness of wool. A correct guess scores a point.

Scripture. “and wringed the dew out of the fleece, a bowl full of water.” (Judges 6:38, KJV)

When Gideon laid out a wool fleece, it soaked up so much dew that he wrung out a whole bowl of water. Wool really can hold a great deal of water, and God used that fleece to answer Gideon.

1.3 LINEN AND SILK

OBJECTIVES

- Tell how flax is pulled, retted, broken and scutched to make linen, and how a silkworm's cocoon gives one long silk thread.
- Retell the legend of Leizu as a legend, and tell what the Silk Road was.
- Run an absorbency and wrinkle test on linen, cotton, silk and polyester and record the results fairly.

Warm-up. Look for linen and silk in your home: a linen tea towel or tablecloth, a silk tie or scarf, a pillowcase that says “satin.” Read the labels. Is every shiny fabric silk? Is every rough-looking towel linen? Make a guess before you check.

WATCH

Invention Of Silk | The Dr. Binocs Show | Best Learning Video for Kids | Preschool Learning

Peekaboo Kidz • 5:26

<https://www.youtube.com/watch?v=f-w5rVTBs4E>

WHEN TO WATCH

After the story of the silkworm and before the absorbency test. Notice which parts of the story are history and which are legend.

Note: A cartoon explainer meant for younger viewers; it tells the Leizu story as the old tale it is. The backup shows linen being made at Mount Vernon.

BACKUP VIDEO

How to Make Linen from Flax

George Washington's Mount Vernon • 2:35

<https://www.youtube.com/watch?v=7Eec859dAhg>

Watch this after the flax story. Look for the flax brake and the scutching knife.

KEY TERMS

flax

A slender plant with blue flowers whose stem holds long, strong fibers. Linen is made from flax.

scutching

Scraping and beating broken flax stems with a wooden blade to knock away the woody bits and free the fibers.

cocoon

The case a silkworm spins around itself from one very long thread of silk before it changes into a moth.

retting

Letting flax stems soak or lie in the dew until the soft parts rot away and the fibers come loose.

linen

Fabric woven from flax fibers. It is strong, cool and absorbent and wrinkles easily.

Silk Road

The name given to the old trade routes that carried silk and other goods between China and the lands to the west.

CORE IDEAS

The story. Linen is one of the oldest fabrics in the world. The Egyptians of the time of Joseph and Moses wove fine linen, and when God told Moses how to build the tabernacle, its curtains were to be made of “fine twined linen.” Linen comes from the stem of the **flax** plant. Farmers do not cut flax; they pull it up by the roots so the fibers are as long as possible. Then they **ret** it: they spread the stems in a dewy field or soak them in water for days or weeks, until the soft parts of the stem rot and loosen. Next they **break** the dry stems in a wooden flax brake, **scutch** them with a wooden knife to knock the woody bits away, and comb them through a bed of nails called a **hackle**. What is left is a bundle of long, shiny, golden fibers ready to spin.

How they figured it out. Silk comes from China. An old Chinese legend says that long ago a young empress named **Leizu** was drinking tea under a mulberry tree when a cocoon fell into her hot cup, and as it softened, she pulled out a long, shining thread. Nobody knows whether that really happened; it is a legend. What we do know is that the people of ancient China learned to raise silkworms on mulberry leaves and to unwind their cocoons, and they kept the secret for a very long time. Silk cloth was carried west by traders along routes that were much later named the **Silk Road**.

The fabric science. A silkworm is really a caterpillar. When it is ready, it spins a cocoon around itself by moving its head in a figure-eight, pushing out **one single thread**, often around 1,000 yards long (more than half a mile). Silk is a protein fiber, like wool, but it is smooth and very fine, so it reflects light and shines. It is strong for its size, soft, and warm in winter and cool in summer, but it can be weakened by sunlight, sweat and harsh washing, and it costs a lot. Linen, like cotton, is a plant fiber made of cellulose. Its fibers are long, strong and smooth, so linen feels cool, soaks up water quickly, dries quickly and gets softer with each washing. Its weakness: it wrinkles very easily.

Let's sew. You will run a fair test of four fabrics, linen, cotton, silk and polyester: how fast each one soaks up a drop of water, and how much each one wrinkles. Your one skill: keep the test fair by changing only one thing, the fabric, and keeping everything else the same.

PICTURE STUDY



The Flax Barn at Laren, Max Liebermann, 1887 · Oil on canvas · Alte Nationalgalerie, Berlin

Image: [Wikimedia Commons](#), public domain

Max Liebermann, a German painter, visited the Dutch village of Laren and painted the workers in its flax barn. The women walk slowly backward in a long line, drawing out fibers from the flax bundles at their waists, while seated workers, many of them children, turn the wheels that twist the fibers into yarn. Everyone in the barn has a job.

Look closely

- Find the long golden bundles of flax. Do they look like the stems of a plant or like soft fibers?
- Find the seated workers at the left turning wheels. What do you think the wheels do to the fibers?
- Look at the women's hands. Is each one holding fiber, thread or both?
- Look at the windows and the light. Why would spinners want good light?

Talk about it

1. Why do you think the women stand in a long line, each one walking backward as she works?
2. What steps had to happen to this flax before it came into the barn?
3. Name something in your house that might be made of linen.

Safety first. Use a dropper or a spoon for the water test and wipe up spills right away so no one slips. Keep the hot iron out of this lesson; the test needs fabrics just as they are. Count any pins you used to hold swatches back into the pincushion.

SEWING PROJECT

The Absorbency and Wrinkle Test

Scientists say a test is **fair** when only one thing changes. You will test four fabrics side by side, linen, cotton, silk and polyester, with the same drop of water and the same squeeze, and you will record what really happens, even if it surprises you. Then you will add the fabrics to your swatch book.

You will need

- A medicine dropper or a teaspoon
- A small cup of water with a drop of food coloring
- A timer or a clock with a second hand
- A tray, a ruler and a pencil

FOUR-FABRIC ABSORBENCY AND WRINKLE TEST

Finished size: 4 test squares, each 4 × 4 in (10 × 10 cm), plus 4 swatch-book squares · About 40 minutes

Fabric and notions

- **Linen:** a linen tea towel, napkin or scrap (check the label for 100% linen)
- **Cotton:** a plain woven cotton scrap such as an old sheet or shirt
- **Silk:** an old silk scarf or necktie (ask first), or a silk scrap from a fabric store
- **Polyester:** a plain polyester scrap such as an old blouse lining or a polyester pillowcase (not fleece)
- **From each fabric:** one 4 × 4 in test square and one 3 × 3 in swatch

How to make it

1. Cut a 4 × 4 inch test square and a 3 × 3 inch swatch from each fabric, with an adult nearby. Label four index cards: linen, cotton, silk, polyester.
2. Lay the four test squares flat on a dry tray, each on its card.
3. Make a prediction chart: which will soak up the drop fastest, and which will wrinkle most?

4. Drop test: from the same height (about 2 inches), let one drop of colored water fall on the middle of each square. Start the timer. Write down how many seconds it takes for the drop to sink in completely. If it is still a bead after 60 seconds, write “more than 60.”
5. After 2 minutes, measure the wet spot across with a ruler. A wider spot means the fabric pulls water along its fibers.
6. Let the squares dry flat.
7. Wrinkle test: crumple each dry square tightly in your fist for one full minute, counting slowly. Open your hand and lay the square flat. Wait 5 minutes.
8. Rate the wrinkles on a scale of 1 (smooth) to 5 (very wrinkled). Have a family member rate them too without knowing which is which.

Fabric check: Use plain, flat-woven fabrics, not knits or fleece, so that the weave is about the same and only the fiber changes. A silk tie can be cut open along the back seam; ask first, or use a fabric-store scrap. If you cannot find silk, test a satin polyester and say so in your notes: shiny does not mean silk. Avoid fabrics treated with stain or water repellent; they will spoil the absorbency test.

Steps

1. Run the drop test and the wrinkle test from the pattern card, recording every number in a chart.
2. **Fair-test check.** Before you begin, write down three things you are keeping the same (the same drop, the same height, the same time crumpled). Only the fabric changes.
3. **Compare with your prediction.** Circle any result that surprised you. Did linen wrinkle the most? Did polyester resist the water?
4. **Add to the swatch book.** Make a page each for linen and silk (and polyester, if you like, or save it for Lesson 1.4). Write the fiber, its source, one strength and one weakness, using your test results as proof.
5. **Clean up.** Wipe the tray, pour out the colored water and put the dropper away.
6. **Improve it.** Repeat the drop test with a second drop on the same squares. Are your numbers about the same? Scientists repeat tests to be sure.

Tips

- Linen and cotton are both cellulose, so they often act alike in the drop test. The wrinkle test usually tells them apart.
- Older students: make a bar graph of the seconds for each fabric.
- Keep a tissue nearby to blot the dropper so every drop is the same size.

Check your work

- ☐ I can tell how flax becomes linen and how a cocoon becomes silk.
- ☐ I can tell the difference between a legend and a fact in the story of silk.
- ☐ I ran a fair test and recorded the results honestly, even the surprising ones.

SEWING NOTEBOOK

1. Draw the flax steps in order: pull, ret, break, scutch, hackle, spin. Label each tool.
2. Draw a silkworm spinning its cocoon in a figure-eight, and write how long one cocoon thread can be.
3. Copy your results chart and write one sentence about the fabric that surprised you most.

From history. In the 1700s many American farm families grew a patch of flax and made their own linen for shirts, sheets and towels. Linen thread was so strong that it was used for sewing shoes and harnesses. The name “Silk Road” was given to the old trade routes in 1877 by a German geographer, Ferdinand von Richthofen, long after the traders themselves had traveled them.

COMMON MISTAKES

- Thinking every shiny fabric is silk. Polyester satin can look just like silk; read the label.
- Calling a legend a fact. Nobody knows who first unwound a cocoon; the Leizu story is a legend.
- Changing two things in a test at once, such as dropping water from different heights. Then you cannot tell which change made the difference.
- Thinking wrinkles mean a fabric is poor. Linen wrinkles easily, but it is one of the strongest and longest-lasting fabrics.

Make it a game • Silk and Flax Fib. Tell three statements about linen and silk. Two are true, such as flax being retted or a cocoon being one long thread, and one is a tall tale. Your parent guesses the fib. Remember that Leizu's story is a legend. Name one thing the Silk Road carried. Switch roles.

Scripture. “She seeketh wool, and flax, and worketh willingly with her hands.” (Proverbs 31:13, KJV)

The capable woman of Proverbs 31 knew good fibers: wool from the flock and flax from the field. She worked with them gladly, and that is a good way to start any project.

1.4 FIBERS MADE BY PEOPLE

OBJECTIVES

- Tell how Hilaire de Chardonnet made the first artificial silk and how Wallace Carothers made nylon.
- Explain what rayon, nylon, polyester, acrylic and spandex do well and poorly.
- Run a fair test of stretch, drying time and warmth, and finish the fiber swatch book.

Warm-up. Hunt for fibers made by people. Look at a fleece jacket, a raincoat, swim goggles' strap, a toothbrush, a pair of tights, a backpack and a sports jersey. Read the labels or packaging. How many say nylon, polyester, acrylic or spandex? Which ones stretch?

WATCH

Fabricating Fabric: Profile of Nylon

NBC News Learn • 6:48

<https://www.youtube.com/watch?v=dXJkA0H8K1c>

WHEN TO WATCH

After the story of Wallace Carothers and before the fair tests. Watch the paper-clip chain: that is a polymer. Then watch nylon being pulled out of a beaker as a thread.

Note: An educational chemistry video with old film of nylon's first years, including a short scene of 1940s shoppers trying on nylon stockings.

BACKUP VIDEO

How Nylon Was Discovered - Christmas Lectures with George Porter

The Royal Institution • 4:00

<https://www.youtube.com/watch?v=1fnHKatL-68>

A scientist at London's Royal Institution builds a molecule chain with balls and then winds a nylon thread out of a glass beaker in front of a hall full of children.

KEY TERMS

synthetic fiber

A fiber made by people from chemicals, such as nylon, polyester, acrylic and spandex.

nylon

A very strong, smooth synthetic fiber first made by Wallace Carothers's team at DuPont in 1935.

spandex

A synthetic fiber that can stretch to several times its length and spring back. A little is added to fabrics to make them stretch.

rayon

A fiber made by people from cellulose, usually from wood pulp. It is soft and drapes well, like silk or cotton.

polyester

A strong, quick-drying synthetic fiber that resists wrinkles. It is the most common fiber in clothing today.

polymer

A very long molecule made of many small pieces linked together in a chain, like a string of paper clips.

CORE IDEAS

The story. For most of history, every fiber came from a plant or an animal. Silk was the finest and the most costly, and in the 1800s silkworms in France were struck by a disease that ruined the harvest. A French count and scientist named **Hilaire de Chardonnet** set out to make a thread like silk without silkworms. He dissolved cellulose, the stuff of plant fibers, into a thick liquid and pushed it through tiny holes so it came out in shining threads. He patented his “artificial silk” in 1884, showed it at the great Paris Exposition of 1889, and opened a factory in 1891. Later inventors found better ways to make it from wood pulp, and in 1924 it was given the name **rayon**.

How they figured it out. In 1928 a quiet chemist named **Wallace Carothers** went to work at the DuPont company in Delaware to study **polymers**, very long molecules built like chains. His team learned to link small molecules into chains so long that the material could be pulled into strong, stretchy threads. In 1935 they made a polymer that became **nylon**, the first fiber made completely from chemicals. Nylon toothbrush bristles went on sale in 1938, and nylon stockings came out in 1939 and 1940; women lined up in crowds to buy them. During World War II nylon was used for parachutes and ropes. In 1941 two British chemists, John Whinfield and James

Dickson, invented **polyester**, and in 1958 a DuPont chemist, Joseph Shivers, made **spandex**, the stretchy fiber some people call Lycra.

The fabric science. Most synthetic fibers are made by melting or dissolving a polymer and pushing it through a **spinneret**, a plate with tiny holes like a shower head, then stretching the threads so the long chains line up and grow strong. Because people make them, they can be made thick or thin, smooth or crimped, long or short. Each one has real strengths and real weaknesses. **Nylon** is very strong and wears well, which is why it is used in backpacks and ropes. **Polyester** is strong, dries fast, resists wrinkles and keeps its shape, but it does not soak up sweat, it can hold odors, and it melts under a hot iron. **Acrylic** is warm and soft like wool and easy to wash, but it can pill. **Spandex** stretches far and springs back. **Rayon** is soft, cool and absorbent, but weak when wet. No fiber is best at everything; that is why many clothes are blends.

Let's sew. You will run three fair tests on fabrics from all three families, plant, animal and made-by-people: a stretch test, a drying test on a clothesline and a warmth test with a thermometer in a wrapped jar. Then you will finish your fiber swatch book. Your one skill: measure carefully and record numbers in a neat chart.

PICTURE STUDY



Wallace Carothers in His Laboratory, Unknown photographer, 1930s · Black-and-white photograph · DuPont Experimental Station, Wilmington, Delaware
Image: [Wikimedia Commons](#), public domain

This photograph shows Wallace Carothers, the chemist whose team made nylon, at work in the laboratory at the DuPont Experimental Station. A fiber made by people does not begin in a field or a barn but at a bench like this one, with careful measuring, mixing and testing.

Look closely

- Find the strip of material in his hands. He seems to be stretching it. What do you think he is testing?
- Look at the bottles and equipment on the bench. How is this workplace different from the flax barn and the sheepshearers' field?
- Look at how he is dressed. Is this the clothing of a farmer, a weaver or a scientist?

Talk about it

1. Carothers's team tried many polymers before they found one that made a good fiber. Why do scientists keep careful notes of the tests that fail?
2. What is one thing nylon does better than silk, and one thing silk does better than nylon?
3. If you could invent a new fiber, what would you want it to do?

Safety first. Use a kitchen or outdoor thermometer, not a glass fever thermometer, and an adult pours any warm water. Synthetic fibers can melt under a hot iron, so this lesson uses no iron at all. Burn tests of fibers are done only by an adult, if at all; students in this course do not do them.

SEWING PROJECT

Fair Tests of Fibers and a Finished Swatch Book

Now you will put plant, animal and made-by-people fibers side by side. You will find out which stretches most, which dries fastest on a clothesline and which keeps a jar of warm water warm the longest. Then you will finish your swatch book with at least eight fabrics.

You will need

- A ruler or tape measure and a clothespin
- A clothesline or drying rack and clothespins
- 4 small jars with lids, all the same size (baby-food or jam jars)
- A kitchen or outdoor thermometer
- Rubber bands and a timer

FIBER FAIR TESTS AND THE FINISHED SWATCH BOOK

Finished size: a finished swatch book of at least 8 labeled fabrics · About 60 minutes, plus drying time

Fabric and notions

- Test strips, each 2 × 8 in (5 × 20 cm), of: cotton T-shirt knit, a wool knit (an old sweater or sock), polyester or nylon knit (a sports jersey or old tights), and a cotton-spandex blend (stretch jeans or a stretchy T-shirt)
- 4 test squares, each 6 × 6 in (15 × 15 cm): cotton, wool, polyester fleece or knit, and acrylic or nylon
- 3 × 3 in swatches of polyester, nylon, acrylic and rayon (or any you can find) for the swatch book
- Warm tap water (not hot)

How to make it

1. Stretch test: lay each 8-inch strip on a table next to a ruler. Hold one end at the 0 mark and pull the other end gently until it will not go farther without strain. Record how many inches it reaches. Let go and measure again after one minute. Did it spring back?

2. Drying test: dip the four 6-inch squares in water, squeeze each one the same way (twist three times), and hang them side by side on the line. Check every 10 minutes and write down when each one feels dry.
3. Warmth test: an adult fills four jars with the same amount of warm tap water. Put a lid on each. Measure the starting temperature of one jar.
4. Wrap each jar in one dry fabric square (cotton, wool, polyester, acrylic) and hold it with a rubber band. Set them side by side away from sun and drafts.
5. After 30 minutes, unwrap each jar, open it and measure the temperature quickly. The jar that stayed warmest had the best insulation.
6. Repeat the warmth test with the fabrics wet if you have time. Which one stayed warm when damp?
7. Finish the swatch book: add pages for each made-by-people fiber with its source (wood pulp for rayon; chemicals, many from petroleum, for nylon, polyester, acrylic and spandex), one strength and one weakness.

Fabric check: Use knits for the stretch test so the comparison is fair, and woven or knit squares of about the same thickness for the warmth test. Old sports jerseys, tights and fleece jackets are good sources of synthetics. A blend label such as “95% cotton, 5% spandex” is a good find: write the percentages in your book. Wool-sensitive students can test a wool sock while wearing cotton gloves, or use acrylic and note that it was chosen to act like wool.

Steps

1. Run the stretch, drying and warmth tests from the pattern card and record them in one big chart with a column for each fabric.
2. **Predict first.** Before each test, write which fabric you think will win. Afterward, put a check or an X by your guess.
3. **Fairness check.** For each test, write the one thing you changed (the fiber) and the things you kept the same.
4. Finish the swatch book with at least 8 fabrics, each labeled with fiber, source, a strength and a weakness.
5. **Closet survey, part 2.** Finish the family closet survey: read the labels on at least 20 garments in all and total the tally for each fiber.
6. **Clean up.** Take down the drying squares, empty and wash the jars, and put the thermometer away.

7. **Improve it.** Look back at your Lesson 1.1 pages. Fix any label that is missing a strength or a weakness, and add a table of contents.

Tips

- Polyester usually dries first and cotton last. Wool may surprise you in the wet warmth test.
- Older students: work out how much each strip stretched as a fraction of its length (for example, 8 inches to 12 inches is half again as long).
- Younger students: do the drying test and the stretch test, and save the warmth test for a second day with a parent.

Check your work

- ☐ I can tell the stories of Chardonnet's rayon and Carothers's nylon.
- ☐ I can name a strength and a weakness of polyester, nylon, acrylic and spandex.
- ☐ My swatch book has at least 8 labeled fabrics from plants, animals and people.

SEWING NOTEBOOK

1. Draw a spinneret like a shower head, with threads coming out of the holes, and label it.
2. Copy your test chart and circle the winner of each test. Write one sentence: "No fiber is best at everything because..."
3. Make a time line from 1793 to 1958: the cotton gin, artificial silk, rayon named, nylon, nylon stockings, polyester and spandex.

From history. When nylon stockings went on sale across the United States in May 1940, stores sold millions of pairs in a few days. Two years later, nylon was needed for parachutes, and stockings became hard to find until the war ended. Today polyester is made in larger amounts than any other fiber in the world, and cotton is second.

COMMON MISTAKES

- Thinking synthetic fibers are always worse than natural ones. Nylon is stronger than cotton, and polyester dries much faster.
- Thinking natural fibers are always better. Cotton wrinkles and shrinks, and wool can shrink and be eaten by moths.

- Ironing polyester or nylon on a high setting. It can melt and stick to the iron. Always use the setting for the fiber.
- Forgetting to keep the jars the same size and the water the same temperature, which spoils the warmth test.

Make it a game • Tag Hunt. Gather five clothing tags from the laundry. Read each fiber out loud and say whether it is natural or made by people. For each made fiber, name one thing it does well and one it does poorly, such as nylon's strength or polyester's feel. Score a point for each right answer.

UNIT 1

WHERE CLOTH COMES FROM

Every shirt, sock and blanket in your house began as a **fiber**: a thin, flexible strand much longer than it is wide. Some fibers grow on plants, like the fluffy cotton around a cotton seed and the long strands inside the stem of the flax plant. Some grow on animals, like the wool on a sheep and the silk a silkworm spins for its cocoon. And some are made by people in a laboratory or factory, like rayon, nylon and polyester. In this unit you will follow each fiber from the farm, the shearing shed or the chemical plant to the store.

You will meet Eli Whitney and his cotton gin, a shepherd at shearing time, the flax workers of old who retted and scutched their flax, the silkworm and its single long thread, and Wallace Carothers, the chemist who made nylon. You will also test fibers fairly, the way a scientist does: Which soaks up water? Which wrinkles? Which stretches? Which dries fastest? You will find that every fiber has real strengths and real weaknesses. By the end you will have a **fiber swatch book** of labeled fabrics that you can use all year.

PREREQUISITES

- Can read simple labels and directions with help
- Can cut paper and felt along a line with scissors
- Can use clear tape or a glue stick to mount small squares neatly

MASTERY CHECKLIST

- ☐ I can name at least two plant fibers, two animal fibers and two fibers made by people.
- ☐ I can tell how cotton, wool, linen and silk get from the farm to the store.
- ☐ I can read the fiber content on a clothing label.
- ☐ I can run a fair test of fibers, changing only one thing at a time, and record the results.
- ☐ I can name one strength and one weakness of cotton, wool, linen, silk, nylon and polyester.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Smithsonian National Museum of American History: textile collection:** Free. Search “National Museum of American History textiles” to find photographs of spinning wheels, looms, cotton gins and old fabrics from the national collection. Good for looking up the machines in this unit.
- **A fabric swatch kit you make yourself:** Ask a fabric store for small cut samples, or cut 3-inch squares from the family rag bag: an old T-shirt, a pair of jeans, a flannel pajama top, a wool sock, a silk tie, a linen tea towel and a fleece jacket. Wash and label them before you begin.
- **A small bag of wool roving and two pet slicker brushes:** Optional, for carding and spinning in Lesson 1.2. Craft-store wool roving or even a handful of cotton balls works too.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

1.1 Cotton: From the Boll to the Bale	2 sessions of 45–60 minutes
1.2 Wool: Shepherds and Their Sheep	2 sessions of 45–60 minutes
1.3 Linen and Silk	2 sessions of 45–60 minutes
1.4 Fibers Made by People	2 sessions of 45–60 minutes

UNIT 1 REVIEW

Answer each question in complete sentences unless it asks for a list or asks you to show something. Questions marked “Show me” are answered by doing the task for your parent. The review is worth 50 points.

1. **5 pts**

Name two fibers from plants, two from animals and two made by people.

2. (5 pts)

What did Eli Whitney's cotton gin do, and what were one good result and one sad result of it?

3. (5 pts)

List the steps from a sheep to a ball of yarn.

4. (5 pts)

Why does a wool sweater keep you warm even when it is damp?

5. (5 pts)

Predict what happens: you wash a wool sweater in hot water and dry it in a hot dryer. Explain why.

6. (5 pts)

Tell how flax becomes linen, naming at least three steps.

7. (5 pts)

What is one fact and one legend about the beginning of silk?

8. (5 pts)

Who led the team that made nylon, and in what year did they make it? Name one thing nylon is good for.

9. (5 pts)

Give one strength and one weakness of polyester and of cotton.

10. (5 pts)

Show me: open your swatch book to any page and explain the fabric to your parent, then read the fiber label of one garment and tell what it is made of.

ANSWER KEY

1. Plants: cotton, flax (linen), hemp or jute. Animals: wool, silk, alpaca or mohair. Made by people: rayon, nylon, polyester, acrylic or spandex. Any two from each group.
2. It pulled cotton fibers away from the seeds with hooks through narrow slots, so one worker could clean far more cotton. Good: cotton and cloth became cheap. Sad: growing cotton became so profitable that slavery in the South grew.
3. Shear the fleece, skirt it, wash (scour) it, card it, and spin it into yarn.
4. Wool's crimp traps air, and the fibers can soak up a lot of moisture inside themselves before the fabric feels wet.
5. It shrinks and felts. The tiny scales on the wool fibers catch and lock together with heat, water and rubbing.
6. Pull the flax, ret it (soak or dew-rot), break it, scutch it, hackle (comb) it and spin it. Any three in order.
7. Fact: people in ancient China raised silkworms on mulberry leaves and unwound the cocoons; one cocoon is one long thread. Legend: Empress Leizu found silk when a cocoon fell into her tea.
8. Wallace Carothers at DuPont, 1935. It is very strong and smooth: toothbrush bristles, stockings, parachutes, ropes, backpacks.
9. Polyester: strong, dries fast, resists wrinkles; but does not soak up sweat, can hold odors, melts under a hot iron. Cotton: soft, absorbent, washable; but wrinkles, shrinks and dries slowly.
10. The student names the fabric, fiber, source, a strength and a weakness, and correctly reads the fiber content from a real label.

UNIT CHALLENGE: FIBER SWATCH BOOK AND CLOSET SURVEY

Finish a fiber swatch book of at least 8 labeled fabrics, with at least two from plants, two from animals and two made by people. Each page shows the swatch, its fiber, where the fiber comes from, one strength and one weakness, using what you learned in your tests.

Add a family closet survey: read the labels on at least 20 garments in your home and make a tally or bar graph of the fibers you found. End with two sentences about what you discovered, and show the book to your family.

LOOK FOR	WHAT IT MEANS
Complete swatch book	At least 8 swatches from all three fiber families, each neatly cut and mounted.
Accurate labels	Every page names the fiber, its source, one true strength and one true weakness.
Closet survey	At least 20 garment labels read and tallied, with a chart and two sentences of findings.
Fair tests recorded	Results of at least two fiber tests from this unit are included, with predictions and what really happened.
Effort and neatness	Careful cutting, clear writing and a book you would be glad to show; any crooked page was redone.

UNIT 2

FABRIC UP CLOSE

In Unit 1 you met the fibers. Now you will find out how loose fibers become cloth you can sew. First the fibers are **spun**: twist turns a weak wisp into strong yarn. Then the yarn is **woven** on a loom, over and under, or **knitted** into loops, or pressed into **felt**. You will meet the spinners of Proverbs 31 and the old spinning wheel, James Hargreaves and his spinning jenny, Samuel Slater and the first American spinning mill, and Joseph-Marie Jacquard, whose loom read patterns from punched cards long before there were computers.

You will weave a coaster on a loom you make from cardboard, design a woven pattern on graph paper, and look at fabric so closely that you can count its threads. You will also learn why the cut edge of woven cloth frays and what sewers do about it: hems, pinking, zigzag stitching and the serger. At the end you will weave a placemat for your own table and explain, in your own words, how it holds together.

PREREQUISITES

- Has finished the fiber swatch book from Unit 1, or knows the main plant, animal and made-by-people fibers
- Can measure to the nearest $\frac{1}{4}$ inch with a ruler
- Can thread a large yarn needle (a parent may help at first)

MASTERY CHECKLIST

- ☐ I can explain why twist makes yarn strong and show a plied cord.
- ☐ I can name the warp and the weft and weave plain weave on a cardboard loom.
- ☐ I can tell plain, twill and satin weaves apart and explain why denim has diagonal lines.
- ☐ I can tell how Jacquard's punched cards controlled a loom and draw a pattern on graph paper.
- ☐ I can tell knit, woven and felt fabrics apart, find the grain and the bias, and name three ways to keep a raw edge from fraying.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **The Met: #MetKids:** Free. Search “MetKids” for the Metropolitan Museum of Art’s pages for children, with short making videos (including the mini-loom video in Lesson 2.2) and art to explore.
- **FTC: Clothes Captioning: Complying with the Care Labeling Rule:** Free. Search “FTC Clothes Captioning care labeling” for the government’s plain guide to the care labels sewn into clothes. A parent can use it to explain the care symbols in Lesson 2.4.
- **A pinking shears and a magnifying glass (or a linen tester):** Inexpensive tools. Pinking shears cut a zigzag edge that frays less; a small folding magnifier with a 1-inch window, sold as a “linen tester” or “thread counter,” makes counting threads easy.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

2.1 Spinning: Twist Makes It Strong	2 sessions of 45–60 minutes
2.2 Warp and Weft: Weaving on a Loom	2 sessions of 45–60 minutes
2.3 Joseph-Marie Jacquard’s Punch Cards	2 sessions of 45–60 minutes
2.4 Knits, Felt, Thread Count and Finished Edges	2 sessions of 45–60 minutes

UNIT 2 REVIEW

Answer each question in complete sentences unless it asks for a list or a drawing. Questions marked “Show me” are answered by doing the task for your parent. The review is worth 50 points.

1. **5 pts**

Why does twisting fibers make yarn strong? Why do spinners ply two strands together?

2. (5 pts)

What did James Hargreaves's spinning jenny do, and what did Samuel Slater do in Pawtucket, Rhode Island?

3. (5 pts)

Draw or describe plain weave and twill. Why does denim have diagonal lines and a pale back?

4. (5 pts)

Name the warp, the weft and the selvage, and tell why the selvage does not fray.

5. (5 pts)

How did Jacquard's punched cards tell the loom what to do?

6. (5 pts)

Why are Jacquard's cards called an early kind of program?

7. (5 pts)

Tell how knit, woven and felt fabrics are made, and give one example of each.

8. (5 pts)

Predict what happens: you wash a square of cotton fabric with raw, unfinished edges five times. What will it look like, and how could you prevent it?

9. (5 pts)

A sheet has 110 threads in one inch going lengthwise and 90 going crosswise. What is its thread count? Name one thing thread count does not tell you.

10. (5 pts)

Show me: find the grain and the bias of a woven scrap by stretching it, then sew five even running stitches in a folded hem.

ANSWER KEY

1. Twist wraps the fibers around each other so they squeeze and grip by friction when pulled. Plying two strands twisted the opposite way balances the twist so the yarn does not kink, and makes it stronger.
2. The spinning jenny (about 1764) let one worker spin many threads at once. Slater built water-powered spinning machines from memory and began the first successful American cotton-spinning mill (1790; his mill was built in 1793).
3. Plain weave is over one, under one, alternating each row. Twill goes over two or more and steps over one each row, making diagonals. Denim is a twill with blue warp and white weft, so the blue shows on the front and the white on the back.
4. The warp is stretched lengthwise on the loom; the weft goes back and forth across it; the selvage is the side edge where the weft turns around. It does not fray because the threads are not cut there.
5. Each card was one row. Where there was a hole, a rod passed through and lifted its warp thread; where there was no hole, the thread stayed down. The chain of cards turned one card per row.
6. They were a list of yes-or-no instructions in order that a machine followed by itself. Babbage planned to use punched cards for his calculating engine, and punched cards were later used with computers.
7. Knit: loops pulled through loops (T-shirt, sock). Woven: warp and weft crossing over and under (sheet, denim). Felt: fibers pressed and matted together (wool felt, craft felt).
8. The edges will fray: threads will work loose and pull out, and long strings will tangle, making the square smaller. A hem, pinked edges, a zigzag stitch or a serged edge would prevent most fraying.
9. $110 + 90 = 200$. It does not tell you the fiber, how long the fibers are, how well the yarn was spun, or how the plies were counted.
10. The student shows the lengthwise grain (little stretch) and the bias (most stretch), and sews five small, even running stitches through a folded hem, with the needle counted back in.

UNIT CHALLENGE: A WOVEN PLACEMAT

Make a bigger cardboard or box-lid loom, about 12 × 16 inches, with slits $\frac{1}{4}$ to $\frac{1}{2}$ inch apart, and weave a placemat for your family table. Use plain weave, twill or a stripe pattern of your own design, and finish the ends with a knotted fringe so nothing unravels.

Add a notebook page with a labeled drawing of your weaving and a paragraph explaining warp and weft, why your edges do not fray (selvages and knotted ends), and one thing you would change next time.

LOOK FOR	WHAT IT MEANS
Finished placemat	A complete placemat at least 10 × 14 inches, with rows beaten down evenly and every tail woven in.
Straight edges	The sides are fairly straight, without a strong hourglass shape, showing the student left an arch in each row.
Explanation page	A labeled drawing and a clear paragraph naming warp, weft and selvege and telling why the edges do not fray.
Design	A planned pattern (plain, twill or stripes) drawn on graph paper first.
Effort and care	Careful, patient work; the needle was counted back in, and mistakes were unwoven and fixed.

2.1 SPINNING: TWIST MAKES IT STRONG

OBJECTIVES

- Tell how spinning moved from the spindle to the spinning wheel, the spinning jenny and Samuel Slater’s mill.
- Explain why twist makes yarn strong and why plying two strands makes it stronger still.
- Test tightly and loosely twisted yarn with a penny cup and ply a twisted friendship cord.

Warm-up. Take a piece of yarn and untwist it slowly between your fingers. What happens to the little fibers inside? Now take a cotton ball and pull it apart. Which was easier to pull apart, the yarn or the cotton ball? What do you think holds the yarn together?

WATCH

An Introduction to the Mechanics of the Spinning Wheel

JYF Museums · 4:50

<https://www.youtube.com/watch?v=M76Bl-YT-5k>

WHEN TO WATCH

After the story of the spinning wheel. Watch how her foot turns the big wheel and how the flyer winds the yarn onto the bobbin.

Note: From the Jamestown-Yorktown Foundation’s living-history museums in Virginia.

BACKUP VIDEO

How To Spin Yarn Using A Drop Spindle

Scribble · 5:08

<https://www.youtube.com/watch?v=bKAJTKvI0nE>

Watch this if you want to spin more on your pencil spindle from Lesson 1.2. Pause after each step and try it.

KEY TERMS

spinning

Drawing out fibers and twisting them together to make yarn or thread.

twist

The turns put into fibers during spinning. Twist makes the fibers grip each other so the yarn is strong.

ply

One strand of yarn; also, to twist two or more strands together the opposite way to make a stronger, balanced yarn.

distaff

A stick that holds the loose fiber waiting to be spun.

spinning jenny

A spinning machine invented by James Hargreaves about 1764 that let one worker spin many threads at once.

CORE IDEAS

The story. For thousands of years, every thread in the world was spun by hand. The capable woman in Proverbs 31 “layeth her hands to the spindle, and her hands hold the distaff”: the distaff held the cleaned fiber, and the spindle twisted it into yarn. Spinning was so slow that a family needed many hours of spinning to make enough yarn for one shirt. About five hundred years ago the **spinning wheel** became common in Europe. A big wheel turned by hand or by a foot treadle spun the spindle much faster than fingers could, and the Saxony wheel, like the one in the video, twisted the yarn and wound it onto a bobbin at the same time.

How they figured it out. In England in the 1760s, weavers could weave faster than spinners could spin, and they were always waiting for yarn. A weaver named **James Hargreaves** built a machine, about 1764, called the **spinning jenny**. One wheel turned eight spindles at once, so one worker could spin eight threads instead of one; later jennies turned many more. Soon after, Richard Arkwright built spinning machines run by water wheels, and the first spinning mills began. A young English mill worker named **Samuel Slater** memorized how those machines were built and sailed to America in 1789. In Pawtucket, Rhode Island, he built water-powered spinning machines from memory and began spinning cotton yarn in 1790; the mill he built there in 1793 still stands as a museum.

The fabric science. A single cotton or wool fiber is only an inch or a few inches long. Laid side by side, fibers slide apart easily. But when you twist them, each fiber wraps around the others like the strands of a rope, and when you pull, the fibers squeeze together and grip each other by **friction**. That is why twist makes yarn strong. Too little twist and the yarn pulls apart; too much and it kinks up and feels hard. Twisted yarn always wants to untwist, so spinners **ply** two strands together, twisting them the opposite way. The two twists balance each other, and the plied yarn lies flat, does not kink and is stronger than both strands alone.

Let's sew. You will run a **twist test**, hanging a cup of pennies from yarn with a tight twist and from yarn with a loose twist to see which holds more. Then you will ply two strands into a **twisted cord** that you can wear as a bracelet or use as a drawstring. Your one skill: keep the twist even and let the cord ply back on itself smoothly.

PICTURE STUDY



Old Woman Spinning, Nicolaes Maes, about 1650–1660 · Oil on canvas · Rijksmuseum, Amsterdam

Image: [Wikimedia Commons](#), public domain

Nicolaes Maes was a Dutch painter who studied with Rembrandt. He loved to paint older women at their daily work in quiet rooms: reading, praying, peeling, sewing and spinning. Here an old woman sits at her spinning wheel, as she has probably done nearly every day of her life.

Look closely

- Find the spinning wheel. Where is the big wheel, and where is the fiber she is spinning?
- Look at her hands. Which hand is holding the fiber, and which is feeding the yarn?
- Find the light in the room. Where is it coming from, and why would a spinner sit near it?
- Look at the room around her: the table, the rack, the jugs. Is this a workshop or a home?

Talk about it

1. How many years do you think this woman has been spinning? What makes you think so?
2. Spinning was slow, steady work. What do you think she might think about or pray about while she spins?

3. How would her day change if she owned a spinning jenny?

Safety first. Hang the penny cup low over a soft surface and keep feet out from under it, because it will drop when the yarn breaks. Keep coins away from babies and toddlers. When twisting the cord, a partner holds the far end firmly so it does not snap back toward anyone's face.

SEWING PROJECT

The Twist Test and a Twisted Friendship Cord

Do you believe that twist makes yarn strong? Now you will prove it with pennies. Then you will use what you learned to ply a strong cord, the same way rope makers and spinners have done for centuries. Make two cords: one to keep and one to give a friend.

You will need

- A paper or plastic cup, a hole punch and a paper clip
- A sturdy chair back, a broom handle across two chairs, or a coat hook to hang from
- About 100 pennies (or metal washers)
- Scissors and a ruler

TWISTED FRIENDSHIP CORD

Finished size: one cord about 9 inches (23 cm) long, for a bracelet, a zipper pull or a drawstring · About 20 minutes

Fabric and notions

- 1 piece of worsted-weight cotton or acrylic yarn, 36 inches (91 cm) long, or two pieces in different colors
- 1 pencil
- 1 doorknob, cup hook or a partner to hold the other end
- Bits of the same yarn for the twist test: four pieces, each 18 inches long

How to make it

1. Fold the 36-inch yarn in half (or hold two colors side by side) and tie the ends together in an overhand knot.
2. Hook the knotted end over a doorknob or give it to a partner to hold tight.
3. Put the pencil through the folded loop at your end. Back away until the yarn is straight and snug.

4. Twist the pencil around and around in one direction, keeping the yarn pulled tight. Count your turns. Keep going (often 60 to 100 turns) until the yarn starts to kink when you let it relax a little.
5. Hold the middle of the twisted yarn with one hand (or have a helper pinch it). Bring the pencil end to the doorknob end, keeping the yarn tight.
6. Let go of the middle slowly. The two halves will twist around each other by themselves into a plied cord. Smooth it with your fingers.
7. Take the pencil out and tie an overhand knot at the loose end so the cord cannot untwist. Trim the ends to make little tassels.

Fabric check: Smooth cotton or acrylic yarn in worsted weight (#4) is easiest to see and twist. Very fuzzy or loosely spun yarn drifts apart instead of twisting. Wool works well if no one is sensitive to it. Embroidery floss makes a finer cord; use all six strands.

Steps

1. **Make the penny cup.** Punch two holes opposite each other near the rim of the cup and tie on a handle of strong string. Hook a paper clip through the handle.
2. **Twist test.** Take one 18-inch piece of yarn and untwist it until it is very loose (count 30 turns backward). Take a second piece and add 30 extra turns of twist. Tie each in turn between the hook and the paper clip, then add pennies one at a time until the yarn breaks. Record the number of pennies.
3. **Ply test.** Twist two strands together into a plied cord and test it the same way. How many pennies does the cord hold compared with one strand?
4. Make the twisted friendship cord from the pattern card, then make a second one to give away.
5. Add a page to your sewing notebook with a bar graph of your three penny counts and a short piece of each yarn taped beside it.
6. **Clean up.** Count the pennies back into a jar, put the cup away and save yarn ends in your scrap bag.
7. **Improve it.** Make a third cord with more or fewer turns. Is it smoother, firmer or kinkier? Write which number of turns made the best cord.

Tips

- If the yarn breaks right at a knot, the knot is the weak spot; tie the test pieces the same way each time so the test is fair.
- Keep the yarn tight while you twist. If it goes slack, it tangles.
- Older students: test three amounts of twist (loose, normal, tight) and make a line graph.

Check your work

- ☐ I can explain why twist makes fibers grip each other.
- ☐ I can tell what Hargreaves's spinning jenny and Slater's mill changed.
- ☐ I made a smooth, plied cord and recorded my penny test.

SEWING NOTEBOOK

1. Draw a magnified piece of yarn showing the fibers wrapped around each other in a spiral. Draw a second picture of two plies twisted together.
2. Draw a spinning wheel and label the wheel, the treadle, the flyer and the bobbin.
3. Tape in your friendship cord or a sample of it and write who you gave the other one to.

From history. Slater's Mill in Pawtucket, Rhode Island, is now part of Blackstone River Valley National Historical Park, and visitors can watch the old machines run. Spinning wheels stayed in many American farmhouses well into the 1800s, even after mills made yarn cheap, because families liked to spin their own wool.

COMMON MISTAKES

- Twisting in one direction and then the other. The yarn just untwists again.
- Letting the twisted yarn go slack before folding it, so it snarls into a tangle.
- Thinking the thickest yarn is always the strongest. A thin, well-twisted, plied yarn can hold more than a thick, loose one.
- Forgetting the knot at the end of the cord, so it untwists.

Make it a game • Strong Strand Contest. Cut three yarn lengths: one straight, one twisted tight, one plied from two twisted strands. Predict which will hold the most paper clips before breaking. Then hang clips one at a time and test, with a soft cushion below. Say why twist makes yarn strong. Score a point for each right prediction.

Scripture. “She layeth her hands to the spindle, and her hands hold the distaff.” (Proverbs 31:19, KJV)

The capable woman’s hands were busy with spinning, the first step in clothing her household. Patient, steady work with our hands is a good way to serve the people we love.

2.2 WARP AND WEFT: WEAVING ON A LOOM

OBJECTIVES

- Name the parts of weaving: warp, weft, shed, selvage and beating.
- Tell plain, twill and satin weaves apart and explain why denim has diagonal lines.
- Make a cardboard loom and weave a mug rug, beating each row down evenly.

Warm-up. Look closely at a pair of jeans, a dish towel and a shiny ribbon or satin pillowcase with a magnifying glass. Do the threads go straight over and under, or do you see diagonal lines or long smooth threads? Draw a tiny square of what you see for each one.

WATCH

#MetKids—Weave on a Mini Loom

The Met • 3:07

https://www.youtube.com/watch?v=AWLly-Um7_0

WHEN TO WATCH

Before you make your loom. Watch it once all the way through, then again with your cardboard and yarn in front of you, pausing after each step.

Note: From the Metropolitan Museum of Art's #MetKids series.

BACKUP VIDEO

How to Make a Cardboard Loom | Step by Step | Art for Kids

Art with Coach T • 5:41

<https://www.youtube.com/watch?v=GQHf8TIYC50>

A slower, step-by-step look at measuring, cutting the notches and warping a cardboard loom.

KEY TERMS

warp

The threads stretched tight on the loom, running the long way of the cloth.

weft

The thread woven over and under the warp, back and forth across the cloth.

selvage

The finished side edge of woven cloth, where the weft turns around. It does not fray.

plain weave

The simplest weave: over one, under one, then the opposite on the next row.

twill

A weave in which the weft goes over two or more warp threads, stepping over by one each row, making diagonal lines, as in denim.

satin weave

A weave with long floats of thread on the surface, which makes the cloth smooth and shiny but easier to snag.

CORE IDEAS

The story. Weaving is one of the oldest crafts. When God gave Moses the plans for the tabernacle, He filled skilled men and women with wisdom “to work all manner of work... of the embroiderer... and of the weaver.” Ancient looms were simple: the warp threads hung from a beam with stones tied on to keep them tight, or were stretched between two beams staked to the ground. Later, people built big wooden floor looms with foot pedals called treadles. A weaver could press a treadle to lift half the warp threads at once, throw a **shuttle** holding the weft through the opening, and press the next treadle for the next row. Colonial American towns had weavers who wove the families’ homespun yarn into cloth.

How they figured it out. The secret of every loom is the **shed**, the opening between the raised and lowered warp threads. Weaving one thread over and under by hand is slow. Weavers discovered that if the warp threads are tied in groups to bars called heddles, one movement can lift every other thread at once. Then the weft passes through the whole shed in one throw. After each throw, the weaver pulls a comb-like **beater** toward the cloth to **beat** the weft tightly into place. Lift, throw, beat: lift, throw, beat. With more heddles, a weaver could lift different groups and make patterns.

The fabric science. Woven cloth holds together because the warp and weft cross and press on each other. In **plain weave** (over one, under one), the threads cross as often as possible, so the cloth is firm and wears well: think of a sheet or a shirt. In **twill**, the weft goes over two or three warp threads and steps over one thread each row, so diagonal lines appear. Denim is a twill: the warp is dyed blue and the weft is white, so the front looks blue with diagonal lines and the back looks pale. Twill is strong

and drapes softly. In **satin weave**, threads float over four or more threads at a time, so light shines off the long, smooth floats, but they can snag. Along each side of woven cloth is the **selvage**, where the weft turns back, so it never frays.

Let's sew. You will make a **cardboard loom**, warp it with yarn and weave a **mug rug** (a large coaster) in plain weave. Your one skill: keep the edges straight by leaving a little slack in each row, and beat each row down evenly.

PICTURE STUDY



Weaver at the Loom, Vincent van Gogh, 1884 · Oil on canvas · Kröller-Müller Museum, Otterlo, Netherlands

Image: [Wikimedia Commons](#), public domain

In 1884, before he became famous for his bright colors, Vincent van Gogh lived in the Dutch village of Nuenen, where many families wove linen and cotton cloth at home. He made dozens of paintings and drawings of weavers at their looms. Here the loom is so big that the weaver almost disappears inside it.

Look closely

- Find the weaver. Where are his hands, and what do you think he is holding?
- Find the pale cloth on the loom. Is it the warp, the weft or the finished cloth?
- Look for the long threads stretched from front to back. Those are the warp. Which way do they run?
- Find the hanging lamp. Why would a weaver who works at home need it?

Talk about it

1. How is this huge loom like your little cardboard loom? How is it different?
2. Why do you think the loom is built of such thick, heavy beams?
3. A weaver at a loom like this worked many hours to make a few yards of cloth. How might that change how families cared for their clothes?

Safety first. An adult cuts the cardboard if it is thick, using a craft knife on a cutting mat; you may cut the notches with scissors. Use a blunt plastic or metal yarn needle, keep it in the pincushion when you are not using it, and count it back in at the end.

SEWING PROJECT

A Cardboard Loom and a Woven Mug Rug

A mug rug is a small woven mat, bigger than a coaster, for a mug and a cookie. You will build a loom from a cereal box or shipping box, warp it, and weave a mug rug to use at your own table or give to someone who likes hot cocoa. Then you will look for warp, weft and selvages in the fabrics around your house.

You will need

- Scissors, a ruler and a pencil
- Masking tape
- A blunt yarn needle (plastic or metal) and a wide-tooth comb or a fork for beating
- A craft stick or a strip of cardboard to use as a shed stick (optional)

WOVEN MUG RUG ON A CARDBOARD LOOM

Finished size: about 5 × 6 in (13 × 15 cm), plus fringe · About 60 to 90 minutes, over two sessions

Fabric and notions

- 1 piece of stiff cardboard, 7 × 9 in (18 × 23 cm), cut from a box
- About 8 yards of worsted-weight cotton yarn for the warp (one color)
- About 15 to 20 yards of worsted-weight cotton yarn for the weft, in one to three colors
- Scraps of fabric strips ½ inch wide, or a second yarn, for a stripe (optional)

How to make it

1. Along each short end of the cardboard, mark a line ½ inch in from the edge. Starting ½ inch from a corner, make a mark every ¼ inch across both ends (about 24 marks per end).
2. Cut a short slit at each mark, from the edge to the line, ½ inch deep. Make sure the slits at the top and bottom line up.
3. Warp the loom: tape the end of the warp yarn to the back. Bring it through the first top slit, down the front to the first bottom slit, around

the back to the second bottom slit, up the front to the second top slit, and so on, until all the slits are used. Keep the warp snug but not so tight that the cardboard bends. Tape the end on the back.

4. Thread the blunt needle with about 1½ yards of weft yarn (no knot).
 5. Row 1: start at the right side. Weave under the first warp, over the next, under, over, all the way across. Leave a 3-inch tail.
 6. Row 2: go back the other way, over the threads you went under and under the threads you went over.
 7. Leave a gentle arch (a “hill”) in each weft row before you beat it down with the comb or fork. This keeps the sides from pulling in.
 8. Beat each row down snugly against the row before. To add new yarn or change color, overlap the old and new tails inside the same shed for about 1 inch.
 9. Weave until the cloth is about 5 inches long. Tuck the last tail back into the weaving with the needle.
 10. Bend the cardboard slightly and slip the warp loops off the slits. If the loops are long, cut them in the middle and tie each pair of neighboring threads in an overhand knot against the weaving to make a fringe.
- Weave or trim all tails.

Fabric check: Cotton yarn is best for a mug rug because it soaks up drips and will not melt under a hot mug (acrylic can soften from a very hot pot, so do not use the mug rug as a trivet). Choose a smooth yarn for the warp; fuzzy or very stretchy yarn tangles and breaks. Thin T-shirt strips make a good chunky weft from old clothes.

Steps

1. **Practice first.** Weave three rows of paper strips through a paper warp (slits cut in a folded sheet of paper) to feel “over, under, then the opposite.”
2. Make the loom and weave the mug rug from the pattern card.
3. **Measure your edges.** When you finish, measure the width of the mug rug at the bottom, the middle and the top. Are they the same? If the middle is narrower, your rows were pulled too tight.
4. **Weave hunt.** With a magnifying glass, find plain weave, twill and satin in your house. Look for the selvage on a piece of fabric yardage or a dish towel.

Record what you find.

5. Add a page to your sewing notebook with a small sample of your yarns and a drawing of plain weave on graph paper.
6. **Count and clean up.** Put the yarn needle back in the pincushion, save the loom for the unit challenge, and put scraps in your scrap bag.
7. **Improve it.** Weave a second mug rug, adding a stripe or using twill (over two, under two, stepping over by one each row). Give one of your mug rugs away.

Tips

- If you lose your place, look at the row below. Each row should be the opposite of the one before it.
- Slide a craft stick under every other warp thread and turn it on its side to open a shed. Then the weft slides through in one pass on the over-and-under rows.
- Younger students: use chunky yarn and slits $\frac{1}{2}$ inch apart so the weaving grows quickly.

Check your work

- ☐ I can point to the warp, the weft and the selvage.
- ☐ I can tell plain, twill and satin apart and explain denim's diagonal lines.
- ☐ My mug rug has rows beaten down evenly and edges that are fairly straight.

SEWING NOTEBOOK

1. On graph paper, color a plain-weave pattern (a checkerboard) and a twill pattern (stair steps) 10 squares wide. Label the warp and the weft.
2. Draw a floor loom with its warp, heddles, shuttle and treadles, and write "lift, throw, beat" with arrows.
3. Write the width of your mug rug at the bottom, middle and top, and one sentence: "Next time I will..."

From history. In colonial America, many families spun yarn at home and took it to a town weaver, who wove it on a big floor loom for a fee. Others owned their own looms, often kept in a loom room or a barn. Coverlets woven in blue and white wool and linen were some of the treasures of an American farmhouse.

COMMON MISTAKES

- Pulling each weft row tight, which makes the sides pull in so the weaving looks like an hourglass. Leave a little arch in each row.
- Going over or under two warps by mistake in plain weave, which leaves a long float and a hole. Check each row against the row below.
- Warping so tightly that the cardboard bends, which makes the weaving loose when it comes off.
- Thinking the selvage needs a hem. The selvage does not fray; only cut edges do.

Make it a game • Paper Weave Call. Weave strips of paper through slits in a paper sheet. Your parent calls out plain weave, over one and under one, then twill, over two and under one. Weave it in sixty seconds. Name the warp, weft and selvage on your paper loom. Say why denim has diagonal lines.

Scripture. “Them hath he filled with wisdom of heart, to work all manner of work, of the engraver, and of the cunning workman, and of the embroiderer, in blue, and in purple, in scarlet, and in fine linen, and of the weaver” (Exodus 35:35, KJV)

God gave skill to the weavers who made the cloth for the tabernacle. Skill in our hands is a gift from God to be used well.

2.3 JOSEPH-MARIE JACQUARD’S PUNCH CARDS

OBJECTIVES

- Tell how Joseph-Marie Jacquard’s loom used punched cards to weave patterns automatically.
- Explain how a punched card is like an instruction (lift or do not lift) and how this idea later helped early computers.
- Weave plain and twill paper mats from a chart and design a pattern on graph paper like a punch card.

Warm-up. Look at a patterned fabric in your house: a damask tablecloth, a woven blanket, a tapestry-style pillow or a necktie with a woven design (not printed). Turn it over. Is the pattern on the back too, in reverse? That tells you it was woven in, not printed on top.

WATCH

How was it Made? Jacquard weaving

Victoria and Albert Museum · 3:24

<https://www.youtube.com/watch?v=K6NgMNVK52A>

WHEN TO WATCH

After the story of Jacquard. Watch for the design copied onto squared paper and the cards stitched into a long belt.

Note: From the Victoria and Albert Museum in London. It has captions and no narration.

BACKUP VIDEO

Paradise Mill How The Jacquard Mechanism Works

Macclesfield Museums · 4:32

https://www.youtube.com/watch?v=x_ijmJx7Xys

A guide at an old English silk mill shows up close how the needles feel for the holes in each card.

KEY TERMS

Jacquard loom

A loom with an attachment, invented by Joseph-Marie Jacquard, that uses a chain of punched cards to lift warp threads for a pattern.

draw boy

Before Jacquard, a helper who sat on top of a pattern loom and pulled up groups of warp threads by hand for each row.

program

A list of instructions, in order, that tells a machine what to do.

punched card

A stiff card with holes in it. Each hole, or no hole, is an instruction to the machine.

brocade

A rich fabric with a raised woven pattern, often in silk.

CORE IDEAS

The story. Lyon, France, was famous for its silk weavers, who wove brocades with flowers, leaves and birds for palaces and churches. To weave such a pattern, a different set of warp threads had to be lifted for every single row. The weaver needed a helper, a **draw boy** (often a child), who sat high up on the loom and pulled cords to lift the right threads, row after row, hour after hour. It was slow, tiring work, and one mistake spoiled the pattern. **Joseph-Marie Jacquard**, the son of a Lyon weaver, grew up around these looms and wanted a better way.

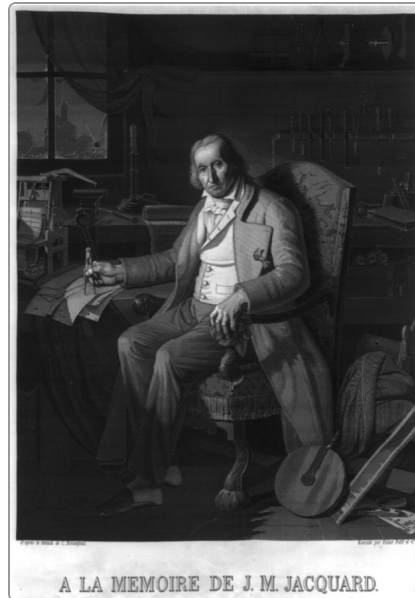
How they figured it out. Earlier French inventors had tried controlling a loom with holes punched in paper. Jacquard improved their ideas and built a loom attachment, first shown in 1801 and improved by 1804, that read a chain of **punched cards**. Each card stood for one row of weaving. Rows of little rods pressed against the card. Where there was a hole, a rod went through and its warp thread was lifted; where there was no hole, the rod was stopped and the thread stayed down. After each row, the chain turned to the next card. Now one weaver could weave the most complicated pattern without a draw boy, and the same chain of cards could weave the same pattern again and again.

Think it through. Jacquard's cards were a set of yes-or-no instructions in order: a kind of **program**. In the 1830s an English mathematician named Charles Babbage planned a calculating engine that would read its instructions from punched cards, borrowing Jacquard's idea. Babbage even owned a portrait of Jacquard woven in silk on a Jacquard loom; it is said to have taken about 24,000 cards. In 1890 Herman Hollerith used punched cards to count the United States census, and punched cards were used with computers for much of the 1900s.

The craft. Every woven pattern can be drawn on **graph paper**: each column is a warp thread and each row is a weft row. A filled square means "this warp thread is on top"; an empty square means "the weft is on top." Plain weave is a checkerboard. Twill is a staircase of filled squares stepping over one square each row. A Jacquard pattern is just a much bigger chart, with a different design in every row, and each row of the chart becomes one punched card.

Let's sew. You will weave two **paper mats**, one in plain weave and one in twill, by following a chart, and then design your own pattern on graph paper, "punch" it like a card, and weave it. Your one skill: read a chart row by row without losing your place.

PICTURE STUDY



In Memory of J. M. Jacquard (woven silk portrait), Woven by Didier Petit and Company after a painting by Claude Bonnefond, 1839 · Silk, woven on a Jacquard loom · Library of Congress, Washington, D.C. (one of several surviving copies)

Image: [Wikimedia Commons](#), public domain

This picture looks like an engraving, but it is not printed or drawn. It was **woven in silk** on a Jacquard loom in Lyon in 1839, five years after Jacquard died, to honor him. Every shade of gray is made by how many black and white threads cross at each point. Weaving it took thousands of punched cards.

Look closely

- Look closely at Jacquard's face and coat. Can you believe these shadows are made only of crossing threads?
- Find the small model of a loom mechanism and the stack of punched cards near him. What are they telling you about him?
- Find his tools on the table. What kind of work do they show?
- Look at the curtain and the window light. How would a weaver make a smooth change from dark to light with only black and white threads?

Talk about it

1. Why do you think Charles Babbage, who was planning a calculating engine, wanted a copy of this woven picture?

2. If each card is one row of weaving, why would a picture this detailed need so many cards?
3. What jobs today still use instructions given in order, one step at a time?

Safety first. Use paper scissors for paper, not your fabric shears. If you use a hole punch or a pencil point to “punch” your card, keep your fingers out from under it.

SEWING PROJECT

Paper Weaving from a Chart and a Punch-Card Design

Before a weaver touches the loom, the pattern lives on squared paper. You will be the pattern maker and the loom: you will follow a chart to weave plain and twill paper mats, then design a pattern of your own and turn it into “cards.”

You will need

- Paper scissors, a ruler and a pencil
- Graph paper with $\frac{1}{4}$ -inch squares and colored pencils
- A glue stick and clear tape
- A hole punch (optional)

PLAIN AND TWILL PAPER MATS

Finished size: two mats, each about $8\frac{1}{2} \times 11$ in (22×28 cm) · About 45 minutes

Fabric and notions

- 2 sheets of construction paper in a dark color (the warp), 9×12 in
- 2 sheets of construction paper in a light color (the weft), cut into strips 1 inch wide and 12 inches long, about 10 strips per mat
- The plain-weave and twill charts you color on graph paper, each 10 squares wide and 10 rows tall

How to make it

1. Make the warp: fold a dark sheet in half across its width. From the fold, cut straight slits 1 inch apart, stopping 1 inch from the open edge. Unfold it. The strips between the slits are your warp threads.
2. Color a plain-weave chart: in row 1, color squares 1, 3, 5, 7, 9; in row 2, color squares 2, 4, 6, 8, 10; repeat. A colored square means the warp is on top.
3. Weave the first weft strip following row 1: where the square is colored, go under the warp so the warp shows; where it is white, go over.
4. Weave each next strip following the next row of the chart. Push each strip snugly against the one before it, as you would beat a row.

5. When the mat is full, glue down the ends of each weft strip on the back.
6. Color a 2/2 twill chart: in row 1, color squares 1, 2, 5, 6, 9, 10; in row 2, shift one square to the right (2, 3, 6, 7, 10); in row 3, shift again (3, 4, 7, 8); and so on.
7. Weave the second mat following the twill chart. Watch the diagonal lines appear.

Fabric check: Construction paper or card stock works best; thin printer paper tears. Two strongly contrasting colors make the pattern easy to see. For a fabric version, older students can weave strips of felt the same way.

Steps

1. Weave the two paper mats from the pattern card.
2. **Design your own card set.** On graph paper, draw a 10×10 design of your own: a cross, a heart, a letter of your name or a sheep. Each row is one “card.”
3. **Punch the cards.** Cut out each row as a strip of graph paper. Punch or color a hole in every square where the warp should lift. Number the strips 1 to 10.
4. **Weave from your cards.** Have a partner read out each card (“lift 3, 4, 5”) while you weave a third paper mat from it. Did your design appear?
5. **Find the mistake.** If a row came out wrong, find whether the card or the weaving was wrong. Fix it.
6. Glue a small corner of each mat into your sewing notebook, or keep the mats as placemats for the family table.
7. **Improve it.** Change only one card and weave again. How much did one changed card change the picture?

Tips

- Lay a ruler under the row you are following on the chart so you do not lose your place.
- If your twill diagonals go the wrong way, you shifted left instead of right. Both directions are real twills!
- Younger students: weave only the plain mat and color a simple checkerboard design.

Check your work

- ☐ I can tell how Jacquard's cards told the loom which threads to lift.
- ☐ I can explain why Jacquard's cards were like a program.
- ☐ I wove a plain and a twill mat from charts and a design from my own cards.

SEWING NOTEBOOK

1. Draw one punched card and the row of rods behind it, showing which rods go through the holes and which are stopped.
2. Tape in your design chart and write the card numbers beside each row.
3. Write two sentences comparing a Jacquard loom with a draw boy's loom.

From history. At first some silk weavers in Lyon feared the new looms would take their jobs. In fact, the Jacquard loom made patterned silk cheaper to weave, and Lyon's silk trade grew. Jacquard was honored by Napoleon's government and received a pension. Jacquard looms, now run by computers instead of cards, still weave brocades, damask tablecloths and patterned blankets.

COMMON MISTAKES

- Thinking Jacquard invented weaving or the loom. He invented a way to control which warp threads lift for patterns.
- Mixing up which mark means "warp on top." Decide before you start and write it in a key.
- Skipping a row of the chart. Every card must be read in order, just like a program.
- Thinking a woven pattern is printed. A woven pattern shows on the back in reverse colors.

Make it a game • Be the Jacquard Loom. On graph paper, your parent draws a card as a row of squares with some circled as holes. A hole means lift, no hole means do not lift. Color the circled squares to reveal a picture, one row at a time. Say how this idea helped early computers. Swap roles with a new design.

2.4 KNITS, FELT, THREAD COUNT AND FINISHED EDGES

OBJECTIVES

- Tell knit, woven and felt or nonwoven fabrics apart, and find the grain and the bias of a woven fabric.
- Count the threads in one inch and explain what thread count does and does not tell you.
- Explain why raw edges fray and test four ways of finishing them: raw, pinked, hemmed and zigzagged or serged.

Warm-up. Pull gently on a T-shirt, a cotton handkerchief or pillowcase, and a piece of craft felt, first straight up and down, then corner to corner. Which one stretches most? Which stretches only when you pull on the diagonal? Which does not stretch at all? Then look at the inside seams of your T-shirt. What keeps the edges from fraying?

WATCH

Sewing Skill Builder: FINISHING SEAMS - 4 METHODS - Pinking Shears, Zigzag Stitch, Overcast Stitch

[LearnCreateSew \(LearnCreateSew\)](#) • 7:59

<https://www.youtube.com/watch?v=CZuyLbWmhq4>

WHEN TO WATCH

Before the fray test. Watch how each edge finish wraps or cuts the threads so they cannot pull out.

Note: The machine parts are for watching only in this unit. In Unit 4 the student sews at slow speed with an adult beside, keeping fingers at least an inch from the needle.

BACKUP VIDEO

Woven vs Knit fabrics Difference Between Woven and Knit Fabric

[Textile Vlog](#) • 3:21

https://www.youtube.com/watch?v=JPaT6z18_7M

A short comparison of woven and knit fabric: structure, stretch, wrinkles and how each is made. Watch it before the stretch test in the warm-up.

KEY TERMS

knit fabric

Fabric made of rows of loops pulled through loops, like a T-shirt or a sweater. It stretches and does not fray much.

grain

The direction of the threads in woven fabric. The lengthwise grain runs along the warp, parallel to the selvage.

thread count

The number of threads in one square inch of woven fabric, counting the lengthwise and the crosswise threads together.

felt

A nonwoven fabric made by pressing and matting fibers together. Wool felt is made with moisture, heat and rubbing.

bias

The diagonal direction across woven fabric, at 45 degrees to the grain. Fabric stretches most on the bias.

serger

A sewing machine, also called an overlock machine, that trims the edge and wraps it in thread loops so it cannot fray.

CORE IDEAS

The story. Not all cloth is woven. **Knit fabric** is made of loops pulled through loops, like a tiny version of the hand knitting you will do in Unit 6. Because loops can open and close, knits stretch, which is why T-shirts, socks and sweaters are knits. **Felt** is not woven or knitted at all. If you rub wet wool with soap and warm water, its scaly fibers grab each other and mat into a solid sheet: that is wool felt, and it may be the oldest fabric of all. Other **nonwovens**, like craft felt, interfacing and dryer sheets, are made by pressing, gluing or needle-punching fibers together.

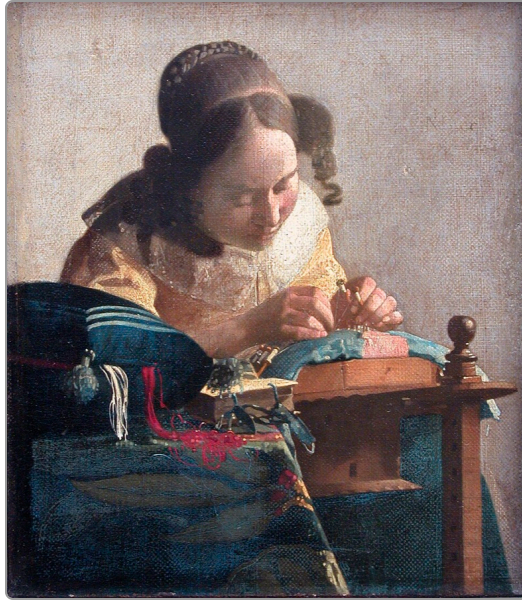
How they figured it out. Sewers have always fought the **raw edge**. When you cut woven cloth, you cut the weft and warp threads short, and nothing holds the ends in place, so they work loose and fall out with every washing. That is fraying. For centuries the answer was to turn the edge under and sew a **hem** by hand, or to wrap it with overcast stitches. Later, tailors cut edges with pinking shears, whose zigzag blades leave short points that fray less. In the 1880s, Joseph Merrow of Connecticut, whose family ran a knitting mill, invented machines that wrapped the edge of fabric in loops of thread. His overlock machine was the ancestor of today's **serger**, which

trims the seam and wraps it in thread in a single pass. Look inside almost any store-bought shirt and you will see a serged edge.

The fabric science. Woven fabric has a **grain**. Along the lengthwise grain (parallel to the selvage), it hardly stretches at all; along the crosswise grain, it stretches a little; on the **bias**, the diagonal, it stretches a lot, because the little squares of the weave can lean into diamonds. Sewers cut most pieces on the grain so clothes hang straight. **Thread count** is the number of threads in a square inch, counting both directions. Lay a ruler on a sheet, count the threads in one inch going one way and one inch going the other, and add them. A higher count usually means finer threads packed more closely, so the cloth feels smoother. But thread count does not tell you everything: the fiber, how long the fibers are and how the yarn was spun matter as much, and some very high numbers are reached by counting thin twisted plies separately. A well-made cotton sheet of about 200 to 400 is soft and strong.

Let's sew. You will run a **fray test**: four fabric squares with four different edges, washed together in a mesh bag, and compared. You will also count the threads in one inch of a sheet with a magnifier. Your one skill: hand-sew a neat folded hem with small, even running stitches.

PICTURE STUDY



The Lacemaker, Johannes Vermeer, about 1669–1670 · Oil on canvas · Musée du Louvre, Paris

Image: [Wikimedia Commons](#), public domain

Johannes Vermeer painted this tiny picture, only about 9 by 8 inches, in the Dutch city of Delft. A young woman bends over her work, making bobbin lace, a fabric that is neither woven nor knitted but made by twisting and crossing many threads around pins. Vermeer painted the thread she is working so finely that you have to lean close, just as she does.

Look closely

- Find her hands. How many bobbins can you see? Each one holds a separate thread.
- Find the pins on the lace pillow. What do you think they are holding in place while she works?
- Look at the red and white threads spilling from the sewing cushion in front. Are they sharp and clear or soft and blurry?
- Look at how close her face is to her work. What does that tell you about how fine the threads are?

Talk about it

1. Lace was often sewn onto the edges of collars and cuffs. Why might a fine edge need to be finished carefully so it would not fray?

2. Lace is neither woven nor knitted. How do you think twisting and crossing threads around pins holds it together?
3. What kind of work do you do that needs the same close attention she is giving?

Safety first. Cut fabric with fabric scissors or pinking shears with an adult nearby, carrying them closed and points down. Count every pin and needle back into the pincushion before the squares go in the washer. If a parent zigzags or serges an edge, the student watches from beside the parent, hands well away from the needle and the serger's knife.

The Fray Test and a Thread Count

What really happens to a raw edge in the wash? You will find out with four squares cut from the same fabric, so the only thing that changes is the edge. You will hand-sew one edge yourself. Then you will count threads like a fabric inspector.

You will need

- Fabric scissors and pinking shears (or a parent's, or borrowed)
- A hand-sewing needle, thread, pins and a pincushion
- A mesh laundry bag or a zippered pillowcase
- A ruler and a magnifying glass or linen tester
- An iron, used by an adult or with an adult beside you (optional, for pressing the hem)

FOUR-EDGE FRAY TEST SQUARES

Finished size: 4 squares, each 6 × 6 in (15 × 15 cm) · About 45 minutes, plus one wash

Fabric and notions

- ¼ yard of plain-weave cotton fabric (quilting cotton or an old cotton sheet), enough for four 6-inch squares, all from the same fabric
- All-purpose thread in a contrasting color
- A permanent fabric marker to label each square (A, B, C, D)

How to make it

1. Draw four 6 × 6 inch squares on the fabric, lined up with the grain (the edges straight along the threads). Cut them out with fabric scissors, with an adult nearby.
2. Label the corners A, B, C and D with the fabric marker.
3. Square A: leave all the edges raw.
4. Square B: trim all four edges about ⅛ inch with pinking shears so they have a zigzag edge.

5. **Square C:** turn each edge under $\frac{1}{4}$ inch, then $\frac{1}{4}$ inch again, and pin. Hand-sew the hem down with small running stitches, about 8 stitches per inch, $\frac{1}{8}$ inch from the inner fold. Pull each pin out before you sew past it. An adult may press the folds with an iron first, with you beside.
6. **Square D:** a parent zigzags or serges the edges on a machine while you watch. If no machine is available, whipstitch the edges by hand, wrapping the thread over the raw edge every $\frac{1}{4}$ inch.
7. Count the pins and needle back into the pincushion. Put all four squares in a mesh bag and wash them with a normal load; dry them in the dryer.
8. Lay the squares side by side. For each one, measure the longest loose threads and count how many threads pulled out along one edge.

Fabric check: Use a loosely woven, plain cotton for the most dramatic results; a cheap cotton or a cotton muslin frays well. Avoid knits for this test (they hardly fray) and avoid tightly woven polyester (it frays less and can melt under a hot iron). If you have no pinking shears, cut one edge of square B in a zigzag with regular scissors, or skip it and say so.

Steps

1. **Predict.** Before washing, rank the four squares from “will fray most” to “will fray least,” and write why.
2. Make and wash the fray-test squares from the pattern card.
3. **Compare.** Make a chart: square, edge finish, longest loose thread, number of threads lost. Was your prediction right?
4. **Thread count.** Lay a ruler (or a linen tester) on an old cotton sheet or pillowcase. With a magnifier, count the threads in one inch going one way and one inch going the other. Add them. Do it on a second fabric, such as a handkerchief or a shirt.
5. **Grain and bias.** Cut a 6-inch square of woven fabric and pull it along the grain and then on the bias. Measure how far each stretches.
6. **Count and clean up.** Count needles and pins back in, put away the scissors, and tape all four squares into your sewing notebook.
7. **Improve it.** Hem one more square with smaller, more even stitches. Compare the two hems side by side.

Tips

- Pull a single thread out of a raw edge before you cut a long straight line. The gap shows you the exact grain line to cut along.
- When you count threads, count in a small section, a quarter inch, and multiply by four if one inch is too many to count.
- Older students: read the care label on three garments and write what each symbol means, using the FTC guide from the book list.

Check your work

- ☐ I can tell knit, woven and felt apart and find the grain and the bias.
- ☐ I can count threads in one inch and explain why thread count is not the whole story.
- ☐ I hand-sewed a hem and can explain which edge finish frayed least and why.

SEWING NOTEBOOK

1. Draw three magnified pictures side by side: woven (over and under), knit (loops) and felt (a tangle of fibers). Label each.
2. Tape in your four fray-test squares and write your results under each one.
3. Draw a square of woven fabric with arrows for the lengthwise grain, the crosswise grain and the bias.

From history. Since 1971, the U.S. Federal Trade Commission's Care Labeling Rule has required most clothing sold in the United States to carry a label telling how to wash or dry-clean it. The little symbols you see (a washtub, a triangle for bleach, a square for drying, an iron, a circle for dry cleaning) are a picture language that works in any country.

COMMON MISTAKES

- Thinking a higher thread count is always better. Fiber, yarn and weave matter as much as the number.
- Cutting pieces off-grain, so they twist and hang crooked after washing.
- Forgetting to finish raw edges inside a bag or garment, so the seams fray apart after a few washes.
- Sewing over pins. Pull each pin out just before your needle reaches it.

Make it a game • Pull and Predict. Gather a knit, a woven and a felt or nonwoven scrap. Before you pull each one, predict which way it stretches most: along the grain, across it or on the bias. Test it. Then count threads in one inch of the woven cloth. Closest guess to the true count wins.

UNIT 2

FABRIC UP CLOSE

In Unit 1 you met the fibers. Now you will find out how loose fibers become cloth you can sew. First the fibers are **spun**: twist turns a weak wisp into strong yarn. Then the yarn is **woven** on a loom, over and under, or **knitted** into loops, or pressed into **felt**. You will meet the spinners of Proverbs 31 and the old spinning wheel, James Hargreaves and his spinning jenny, Samuel Slater and the first American spinning mill, and Joseph-Marie Jacquard, whose loom read patterns from punched cards long before there were computers.

You will weave a coaster on a loom you make from cardboard, design a woven pattern on graph paper, and look at fabric so closely that you can count its threads. You will also learn why the cut edge of woven cloth frays and what sewers do about it: hems, pinking, zigzag stitching and the serger. At the end you will weave a placemat for your own table and explain, in your own words, how it holds together.

PREREQUISITES

- Has finished the fiber swatch book from Unit 1, or knows the main plant, animal and made-by-people fibers
- Can measure to the nearest $\frac{1}{4}$ inch with a ruler
- Can thread a large yarn needle (a parent may help at first)

MASTERY CHECKLIST

- ☐ I can explain why twist makes yarn strong and show a plied cord.
- ☐ I can name the warp and the weft and weave plain weave on a cardboard loom.
- ☐ I can tell plain, twill and satin weaves apart and explain why denim has diagonal lines.
- ☐ I can tell how Jacquard's punched cards controlled a loom and draw a pattern on graph paper.
- ☐ I can tell knit, woven and felt fabrics apart, find the grain and the bias, and name three ways to keep a raw edge from fraying.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **The Met: #MetKids:** Free. Search “MetKids” for the Metropolitan Museum of Art’s pages for children, with short making videos (including the mini-loom video in Lesson 2.2) and art to explore.
- **FTC: Clothes Captioning: Complying with the Care Labeling Rule:** Free. Search “FTC Clothes Captioning care labeling” for the government’s plain guide to the care labels sewn into clothes. A parent can use it to explain the care symbols in Lesson 2.4.
- **A pinking shears and a magnifying glass (or a linen tester):** Inexpensive tools. Pinking shears cut a zigzag edge that frays less; a small folding magnifier with a 1-inch window, sold as a “linen tester” or “thread counter,” makes counting threads easy.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

2.1 Spinning: Twist Makes It Strong	2 sessions of 45–60 minutes
2.2 Warp and Weft: Weaving on a Loom	2 sessions of 45–60 minutes
2.3 Joseph-Marie Jacquard’s Punch Cards	2 sessions of 45–60 minutes
2.4 Knits, Felt, Thread Count and Finished Edges	2 sessions of 45–60 minutes

UNIT 2 REVIEW

Answer each question in complete sentences unless it asks for a list or a drawing. Questions marked “Show me” are answered by doing the task for your parent. The review is worth 50 points.

1. **5 pts**

Why does twisting fibers make yarn strong? Why do spinners ply two strands together?

2. (5 pts)

What did James Hargreaves's spinning jenny do, and what did Samuel Slater do in Pawtucket, Rhode Island?

3. (5 pts)

Draw or describe plain weave and twill. Why does denim have diagonal lines and a pale back?

4. (5 pts)

Name the warp, the weft and the selvage, and tell why the selvage does not fray.

5. (5 pts)

How did Jacquard's punched cards tell the loom what to do?

6. (5 pts)

Why are Jacquard's cards called an early kind of program?

7. (5 pts)

Tell how knit, woven and felt fabrics are made, and give one example of each.

8. (5 pts)

Predict what happens: you wash a square of cotton fabric with raw, unfinished edges five times. What will it look like, and how could you prevent it?

9. (5 pts)

A sheet has 110 threads in one inch going lengthwise and 90 going crosswise. What is its thread count? Name one thing thread count does not tell you.

10. (5 pts)

Show me: find the grain and the bias of a woven scrap by stretching it, then sew five even running stitches in a folded hem.

ANSWER KEY

1. Twist wraps the fibers around each other so they squeeze and grip by friction when pulled. Plying two strands twisted the opposite way balances the twist so the yarn does not kink, and makes it stronger.
2. The spinning jenny (about 1764) let one worker spin many threads at once. Slater built water-powered spinning machines from memory and began the first successful American cotton-spinning mill (1790; his mill was built in 1793).
3. Plain weave is over one, under one, alternating each row. Twill goes over two or more and steps over one each row, making diagonals. Denim is a twill with blue warp and white weft, so the blue shows on the front and the white on the back.
4. The warp is stretched lengthwise on the loom; the weft goes back and forth across it; the selvage is the side edge where the weft turns around. It does not fray because the threads are not cut there.
5. Each card was one row. Where there was a hole, a rod passed through and lifted its warp thread; where there was no hole, the thread stayed down. The chain of cards turned one card per row.
6. They were a list of yes-or-no instructions in order that a machine followed by itself. Babbage planned to use punched cards for his calculating engine, and punched cards were later used with computers.
7. Knit: loops pulled through loops (T-shirt, sock). Woven: warp and weft crossing over and under (sheet, denim). Felt: fibers pressed and matted together (wool felt, craft felt).
8. The edges will fray: threads will work loose and pull out, and long strings will tangle, making the square smaller. A hem, pinked edges, a zigzag stitch or a serged edge would prevent most fraying.
9. $110 + 90 = 200$. It does not tell you the fiber, how long the fibers are, how well the yarn was spun, or how the plies were counted.
10. The student shows the lengthwise grain (little stretch) and the bias (most stretch), and sews five small, even running stitches through a folded hem, with the needle counted back in.

UNIT CHALLENGE: A WOVEN PLACEMAT

Make a bigger cardboard or box-lid loom, about 12 × 16 inches, with slits $\frac{1}{4}$ to $\frac{1}{2}$ inch apart, and weave a placemat for your family table. Use plain weave, twill or a stripe pattern of your own design, and finish the ends with a knotted fringe so nothing unravels.

Add a notebook page with a labeled drawing of your weaving and a paragraph explaining warp and weft, why your edges do not fray (selvages and knotted ends), and one thing you would change next time.

LOOK FOR	WHAT IT MEANS
Finished placemat	A complete placemat at least 10 × 14 inches, with rows beaten down evenly and every tail woven in.
Straight edges	The sides are fairly straight, without a strong hourglass shape, showing the student left an arch in each row.
Explanation page	A labeled drawing and a clear paragraph naming warp, weft and selvege and telling why the edges do not fray.
Design	A planned pattern (plain, twill or stripes) drawn on graph paper first.
Effort and care	Careful, patient work; the needle was counted back in, and mistakes were unwoven and fixed.

HAND STITCHING

A needle and thread are some of the oldest tools people have, and still some of the most useful. With a few hand stitches you can make a bookmark, a pouch or a Christmas ornament, sew a button back on, and mend a split seam so a favorite shirt can be worn for years more. In this unit you will learn to thread a needle, tie a knot and sew the five stitches every household needs: the **running stitch**, the **backstitch**, the **whipstitch**, the **slip stitch** and the **blanket stitch**, plus two pretty embroidery stitches.

You will meet the needle makers of Redditch, England; Dorcas of Joppa, whose coats and garments were so loved that the widows showed them to Peter with tears; and the girls of the 1700s and 1800s who stitched alphabet samplers to practice. You will also start a habit that every good sewer has: counting needles and pins out and back in, and keeping a mending basket. At the end you will make a stitch sampler of your own and do one real mending job for your family.

PREREQUISITES

- Can cut felt and paper along a line with scissors
- Can sit and work carefully on a small task for 20 minutes
- Knows the needle-and-pin count rule from the course introduction

MASTERY CHECKLIST

- ☐ I can thread a needle and tie a knot at the end of the thread.
- ☐ I can sew the running stitch, backstitch, whipstitch, slip stitch and blanket stitch, and tell what each one is for.
- ☐ I can sew on a flat button with a thread shank so it stays.
- ☐ I can mend a split seam and a loose hem.
- ☐ I can tie off my thread with a finishing knot and count my needles and pins back in every time.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A beginner hand-sewing kit:** Look for a kit with a pincushion, a needle threader, a thimble, small scissors and a pack of assorted needles that includes embroidery (crewel) and chenille needles, which have large eyes and are easy to thread. A small tin or box keeps it all together.
- **Felt, embroidery floss and a 6-inch embroidery hoop:** Craft felt in several colors, a pack of six-strand cotton embroidery floss and a wooden or plastic hoop are inexpensive at any craft store and are used all through this unit.
- **Pilgrim Hall Museum: the Loara Standish sampler:** Free. The museum in Plymouth, Massachusetts, that keeps the earliest known American sampler, stitched by Loara Standish, daughter of Myles Standish, in the 1640s. Search the site for “sampler.”

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

3.1 The Needle and the Knot	2 sessions of 45–60 minutes
3.2 Backstitch and Whipstitch	2 sessions of 45–60 minutes
3.3 Dorcas and the Loose Button	2 sessions of 60–90 minutes
3.4 Samplers and the Blanket Stitch	2 sessions of 45–60 minutes

UNIT 3 REVIEW

Answer each question in complete sentences unless it asks for a list. Questions marked “Show me” are answered by sewing for your parent. Count your needle out and back in. The review is worth 50 points.

1. **5 pts**

Name the three parts of a needle. How long should your thread be, and why?

2. **5 pts**

Show me: thread a needle, tie a quilter’s knot and sew five even running stitches.

3. **5 pts**
Why is a backstitch stronger than a running stitch?
4. **5 pts**
What is a whipstitch used for, and how does it work?
5. **5 pts**
Who was Dorcas, and what did the widows show Peter?
6. **5 pts**
Why do we make a thread shank under a button?
7. **5 pts**
Show me: sew three backstitches and three blanket stitches on a felt scrap, then tie a finishing knot.
8. **5 pts**
Predict what happens: a shirt has a seam that has split open 1 inch. If no one mends it, what will happen after a few more wears and washes?
9. **5 pts**
Why did girls in the 1700s and 1800s stitch samplers?
10. **5 pts**
Name the safety habits you use every time you hand-sew.

ANSWER KEY

1. The eye, the shaft and the point. About 18 inches (arm's length); longer thread tangles and knots.
2. The student threads the needle, wraps the thread around the needle and pulls it into a neat knot at the end, and sews five running stitches about the same length in a straight line.
3. Each backstitch goes back to touch the last one, so there are no gaps and each stitch is locked by the next. A running stitch has gaps and can pull out or stretch open.
4. To join two edges (as on a felt pouch or a stuffed toy). The needle goes through both layers from the same side each time, wrapping the thread over the edge in a spiral.
5. A disciple in Joppa, full of good works, who sewed for people in need. The widows showed Peter the coats and garments Dorcas had made.
6. The shank lifts the button above the fabric so the buttonhole fabric has room to sit underneath; the button is easier to button and lasts longer.
7. The student sews three touching backstitches and three even blanket stitches along an edge, and ties off on the back.
8. The split will grow longer, because the broken stitches next to it keep pulling out and the raw edges fray; it may become too big to mend easily. A small mend now saves the shirt.
9. To practice stitches and letters so they could mark the family's linens with initials and numbers, and to learn neatness and patience. They often signed and dated them.
10. Count needles and pins out and back in; keep them in the pincushion, never in your mouth or clothes; push the needle away from your body; cut with scissors with an adult nearby; keep small items away from babies and pets; find any dropped needle.

UNIT CHALLENGE: A STITCH SAMPLER AND A REAL MENDING JOB

Stitch a sampler on a piece of cotton, linen or burlap held in a 6- or 7-inch embroidery hoop. Show at least five stitches from this unit (running stitch, backstitch, whipstitch, blanket stitch, stem stitch, French knot or slip stitch), each in its own row and each labeled with its name in backstitch or stem stitch. Add your initials and the year, just as girls did long ago.

Then do one real mending job for your family from the mending basket: a button, a seam or a hem. Record it in your mending log with a before-and-after photo or drawing.

LOOK FOR	WHAT IT MEANS
Five or more stitches	At least five different stitches, each in its own row and correctly made.
Labels and signature	Each row labeled in stitching, with the student's initials and the year.
Neatness	Stitches are even in length and spacing, knots are hidden on the back, and the fabric is not puckered.
Real mending job	One real garment or linen mended so it can be used again, recorded with a before-and-after picture.
Safety and improvement	Needles and pins counted every session; at least one row was unpicked and redone better.

3.1 THE NEEDLE AND THE KNOT

OBJECTIVES

- Tell how needles were made long ago and in the needle town of Redditch, England, and name the parts of a needle.
- Thread a needle, choose single or double thread, and tie a quilter's knot.
- Sew an even running stitch and finish with a knot, making a felt bookmark with a stitched initial.

Warm-up. Lay three different needles on a white paper: an embroidery or chenille needle, a sharp sewing needle and a big yarn needle. Look at them with a magnifying glass. Which has the biggest eye? Which is sharpest? Which would you use for yarn? Write your guesses, then put all three straight back in the pincushion and count them.

WATCH

How to Thread a Needle for Hand Sewing – Beginner Sewing Tutorial 1

Stitch My Style • 3:56

<https://www.youtube.com/watch?v=S6u173Ap2mc>

WHEN TO WATCH

After the story of the needle, with your needle and thread in hand. Pause after each step and try it yourself.

Note: Close-up of hands only. The backup shows the running stitch.

BACKUP VIDEO

Running Stitch How To - Basic Sewing (Hand Embroidery & Hand Sewing)

Red Ted Art (Maggy Woodley) • 2:28

<https://www.youtube.com/watch?v=i1-B01FB56s>

Watch this right before you sew the running-stitch border on your bookmark.

KEY TERMS

eye

The hole at the top of a hand-sewing needle that the thread goes through.

point

The sharp end of a needle. Embroidery and sewing needles are sharp; yarn and tapestry needles are blunt.

thimble

A small metal, plastic or leather cap worn on the middle finger to push the needle through cloth without hurting your finger.

quilter's knot

A neat knot made by wrapping the thread around the needle a few times and pulling it down to the end of the thread.

running stitch

The simplest stitch: the needle goes in and out of the fabric in a straight line, making even stitches and even spaces.

CORE IDEAS

The story. Long ago, people made needles from slivers of bone, ivory or wood, scraping one end to a point and boring a tiny hole at the other. Later, needles were made of bronze, then iron, then steel. Steel needles were hard to make well, and for centuries they were costly; a family might own only a few and keep them in a special needle case. By the 1800s the town of **Redditch**, in the English Midlands, had become the needle-making center of the world, and its workshops and mills made a large share of all the needles people used. Many steel needles in your sewing kit today are still called by the old Redditch sizes.

How they figured it out. Making a steel needle took many steps. Workers cut steel wire into short pieces, straightened them, ground the points on spinning grindstones, stamped and punched the eyes two at a time, broke them apart, hardened them by heating and cooling, and polished them for days in bags of oil and emery powder until they were smooth enough to glide through cloth. Grinding the points was dusty, dangerous work, so in the 1800s inventors added fans and hoods to carry the dust away. Today machines do every step, and a pack of needles costs very little: one more reason to take care of each one.

The craft. A needle has an **eye**, a **shaft** and a **point**. To thread it, cut the thread at a slant with sharp scissors (never bite it), hold the needle eye toward the light, and push the thread through; a needle threader helps. Use a piece of thread about as long as your arm, 18 inches (46 cm); longer thread tangles. For most sewing, use a **single thread**: pull a short tail through the eye and knot only the long end. For buttons and strong seams, use a **double thread**: pull the ends even and knot them together. To tie a **quilter's knot**, hold the needle and lay the thread end across it, wrap the thread around the needle three times, pinch the wraps, and pull the needle through the wraps all the way to the end. A **running stitch** goes up and down through the cloth in a straight line, with stitches and spaces the same size. Finish by taking a tiny stitch on the back, making a loop, and pulling the needle through the loop twice to make a finishing knot.

Let's sew. You will make a **felt bookmark** with a running-stitch border and your initial stitched in the middle. Your one skill: make running stitches that are even, about ¼ inch long with ¼-inch spaces, in a straight line.

PICTURE STUDY



Schoolgirl with a Slate and a Sewing Basket, Albert Anker, 1878 · Oil on canvas · Private collection

Image: [Wikimedia Commons](#), public domain

Albert Anker was a Swiss painter who loved to paint village children and their grandparents. In Swiss villages of his time, girls learned sewing and knitting at school along with reading and arithmetic. This little girl is walking to school through the snow, carrying her slate for lessons in one hand and her sewing basket in the other.

Look closely

- Find her sewing basket. What do you think is inside it?
- Find her slate and books. What other lessons is she going to have today?
- Look at her clothing: the head scarf, the shawl, the apron, the warm skirt. Which ones do you think were sewn or knitted by hand?
- Look at the snowy village behind her. How is her walk to school different from yours?

Talk about it

1. Why would a village school teach sewing alongside reading and arithmetic?
2. What do you think was the first thing she learned to sew?
3. What would you carry to school in a sewing basket of your own?

Safety first. A parent or responsible adult supervises all sewing tool use, and the needle-and-pin count happens at the start and end of every session. Keep needles in the pincushion when you are not sewing, never in your mouth, your clothes or the couch, and pull the needle away from your body as you sew. If a needle drops, stop and find it, sweeping the floor with a magnet if you need to.

SEWING PROJECT

A Felt Bookmark with a Running-Stitch Border

Felt is the friendliest fabric for a first project: it does not fray, it is easy to hold, and the needle slides right through it. You will stitch a border around a felt bookmark and sew your initial in the middle. Make one for yourself and, when you are faster, one for a grandparent or a friend.

You will need

- An embroidery or chenille needle (size 22–24) and a needle threader
- A pincushion or magnetic dish for the needle count
- Small sharp scissors (for thread) and fabric scissors (for felt)
- A ruler and a washable fabric marker or chalk pencil
- A thimble (optional)

FELT BOOKMARK WITH A STITCHED INITIAL

Finished size: $2\frac{1}{2} \times 8$ in (6.5 × 20 cm) · About 40 minutes

Fabric and notions

- 1 piece of stiff craft felt, $2\frac{1}{2} \times 8$ in (cut from a 9×12 in sheet)
- 1 skein of six-strand embroidery floss in a contrasting color; split it to use 3 strands
- A small felt shape (a heart, a cross or a star), about 1 inch across, in another color (optional)
- A 6-inch piece of ribbon or yarn for a tassel (optional)

How to make it

1. With an adult nearby, cut the felt to $2\frac{1}{2} \times 8$ inches with fabric scissors.
2. With the ruler and marker, draw a dotted line $\frac{1}{4}$ inch in from every edge. Write your initial in large block letters, about $1\frac{1}{2}$ inches tall, near the top.
3. Cut 18 inches of floss and separate 3 of the 6 strands. Thread them through the needle, using a needle threader if needed. Tie a quilter's knot in the long end.

4. Start at a corner. Bring the needle up from the back on the dotted line and pull until the knot stops against the felt.
5. Sew the running stitch around the border: down $\frac{1}{4}$ inch along the line, up $\frac{1}{4}$ inch farther on. Keep the stitches and spaces even. Pull each stitch snug but not so tight that the felt puckers.
6. When you come back to the corner where you started, push the needle to the back and tie a finishing knot. Trim the thread to $\frac{1}{4}$ inch.
7. Rethread and stitch your initial with small running stitches along the lines of the letter, then tie off on the back.
8. If you like, sew the little felt shape near the bottom with a few running stitches, and tie a ribbon tassel through a small hole an adult snips at the top.

Fabric check: Stiff craft felt (acrylic or polyester) keeps its shape best for a bookmark; wool-blend felt is softer and lovely if no one is sensitive to wool. Use cotton embroidery floss, not sewing thread, so the stitches show. Avoid thin, floppy felt, which stretches when you stitch.

Steps

1. **Count out.** Put your needle in the pincushion and write “1 needle out” at the top of your notebook page.
2. **Practice first.** On a felt scrap, practice threading the needle three times and tying three quilter’s knots. Then sew one row of ten running stitches. Measure them with a ruler: are they all about $\frac{1}{4}$ inch?
3. Make the bookmark from the pattern card.
4. **Single or double?** Sew a short row with single thread and a short row with double thread on the scrap. Which looks bolder? Which pulls through more easily?
5. **Count in and clean up.** Put the needle back in the pincushion and check it off: “1 needle in.” Put thread ends in the trash, not on the floor, and felt scraps in your scrap bag.
6. **Improve it.** Make a second bookmark as a gift with smaller stitches ($\frac{1}{8}$ inch) and compare it with the first.

Tips

- If the floss keeps slipping out of the needle, hold the short tail against the needle with your thumb while you sew.
- If the thread twists and knots, let the needle hang down and spin freely for a moment to untwist.
- Younger students: draw dots every $\frac{1}{4}$ inch along the line and stitch from dot to dot.

Check your work

- ☐ I can thread a needle and tie a quilter's knot without help.
- ☐ My running stitches are about the same length and in a straight line.
- ☐ I counted my needle out and back in.

SEWING NOTEBOOK

1. Draw a needle large and label the eye, the shaft and the point. Draw a thimble beside it.
2. Draw the steps of the quilter's knot in three pictures: wrap, pinch, pull.
3. Tape in your practice scrap and write the length of your shortest and longest stitch.

From history. The Forge Mill Needle Museum in Redditch, England, still shows the old water-powered machines that scoured and polished needles. In the 1700s and 1800s, needles were often sold in small paper packets with pictures on them, and a girl's needle case was a treasured gift.

COMMON MISTAKES

- Using a thread as long as your whole body. It tangles; use about 18 inches, arm's length.
- Biting or licking the thread. Cut it at a slant with sharp scissors for a clean end.
- Pulling the stitches so tight that the fabric puckers. Pull until the thread lies flat.
- Leaving a needle stuck in the arm of a chair or in your shirt. It always goes back into the pincushion.

Make it a game • Thread the Blunt Needle. Use a yarn and a blunt tapestry needle, seated at a table. Time yourself threading it, tying a quilter's knot and then naming the eye and the point. Three rounds, then beat your best time. Keep the needle in a pincushion when it is not in your hand. Never walk with it.

3.2 BACKSTITCH AND WHIPSTITCH

OBJECTIVES

- Sew a backstitch and explain why it is strong like a machine stitch.
- Sew a whipstitch to join two edges.
- Make a felt coin pouch with a backstitched design and whipstitched sides.

Warm-up. Look at a seam on the inside of a store-bought shirt or bag. Is it one row of stitches touching end to end, or are there gaps between the stitches like a running stitch? Pull gently on both sides of the seam. Then look at the edge of a stuffed animal or a felt toy. How is that edge sewn?

WATCH

Backstitch How To - Basic Sewing (Embroidery & Hand Sewing)

Red Ted Art (Maggy Woodley) • 2:59

<https://www.youtube.com/watch?v=sjHm8CL9WDA>

WHEN TO WATCH

After the teaching on the backstitch. Watch once, then again with your practice scrap, pausing after each stitch.

BACKUP VIDEO

How to Sew: Whip Stitch | Hand Sewing Tutorial along a Seam or Raw Edge | Beginner's Quick Lesson

Rokolee DIY • 5:06

<https://www.youtube.com/watch?v=pG86hhrDdzQ>

Watch before you whipstitch the sides of your pouch.

KEY TERMS

backstitch

A strong hand stitch in which each stitch goes back to meet the end of the one before, making a solid line like a machine stitch.

whipstitch

A stitch that wraps over the edges of two pieces of fabric to join them, going through from the same side each time.

seam

The line where two pieces of fabric are sewn together.

embroidery

Decorative stitching with thread or floss on the surface of fabric.

pucker

Small wrinkles in fabric caused by pulling stitches too tight.

CORE IDEAS

The story. Before the sewing machine, every seam in every shirt, sail, tent and saddle bag was sewn by hand. The apostle Paul worked with Aquila and Priscilla as a **tentmaker** (Acts 18:3), sewing heavy cloth or leather into tents with strong hand stitches. Tailors, sailmakers and mothers all knew that a seam that must hold, like the seat of a pair of trousers, needed the strongest stitch they had: the **backstitch**. And to join two edges, like the sides of a leather purse, they wrapped the thread over and over in a **whipstitch**.

How they figured it out. A running stitch has a gap between every stitch, so if one stitch breaks, the whole row can pull out, and a seam sewn with it can stretch open. Sewers found that if each new stitch went **back** to touch the last one, the thread made a solid line on the front and overlapping loops on the back, so every stitch was locked by the next. A backstitch is slower than a running stitch, but it is so strong that it was the hand sewer's way to make a seam as tough as one sewn by a machine.

The craft. To **backstitch**: bring the needle up at point 1. Go down $\frac{1}{8}$ to $\frac{1}{4}$ inch *behind* it (back toward where you started), at point 2. Come up one stitch length *ahead* of point 1, at point 3. Go back down into point 1. Each stitch goes back to the end of the last one. To **whipstitch**: hold two edges together. Push the needle through both layers from back to front, close to the edge. Bring the thread over the top of the edges and go through again from the back, $\frac{1}{8}$ to $\frac{1}{4}$ inch along. The thread wraps over the edge like a spiral. Keep the stitches the same depth and spacing so the edge looks neat.

Let's sew. You will make a **felt coin pouch** with a design backstitched on the front flap and the sides whipstitched closed. Your one skill: backstitches that touch end to end with no gaps.

PICTURE STUDY



The Embroiderer, Jean-Siméon Chardin, about 1733–1735 · Oil on panel · Nationalmuseum, Stockholm, Sweden

Image: [Wikimedia Commons](#), public domain

Jean-Siméon Chardin was a French painter who found beauty in quiet household work. Here a young woman has paused over her needlework. Perhaps she is deciding which color of wool to use next. Chardin painted small pictures like this one for people who loved calm, ordinary scenes of home life.

Look closely

- Find the needlework in her lap. Does it look finished or only begun?
- Find the basket on the floor. How many balls of yarn can you count, and what colors are they?
- Look at how she bends over her work. Why does needlework need good light and a steady hand?
- Look at her apron and cap. Why would a woman at work wear them?

Talk about it

1. What do you think she is making? Give a reason from the picture.
2. Why might a needleworker keep her yarns in a basket on the floor beside her?

3. If you were to embroider a design on your pouch, which colors would you choose?

Safety first. Count needles and pins out and back in. When you whipstitch, hold the fabric so the needle points away from your fingers as it comes through, and use a thimble on the pushing finger if the felt is thick. Cut felt with fabric scissors with an adult nearby.

SEWING PROJECT

A Felt Coin Pouch

This little envelope pouch holds coins, a few buttons, a treasure or a folded note. It uses both new stitches: the backstitch for a design on the flap, and the whipstitch to close the sides. Make one for yourself or tuck a coin inside and give it to a younger brother or sister.

You will need

- An embroidery or chenille needle and a pincushion
- Fabric scissors and small thread scissors
- A ruler, a washable marker or chalk pencil, and a few pins or sewing clips
- A thimble (optional)

ENVELOPE COIN POUCH

Finished size: about 4 × 4 in (10 × 10 cm) closed · About 60 minutes

Fabric and notions

- 1 piece of craft felt, 4 × 10 in (10 × 25 cm)
- Six-strand embroidery floss in two colors (use 3 strands)
- 1 sew-on snap or a ¾-inch button (optional; you will learn buttons in Lesson 3.3)
- A paper pattern: a 4 × 10 in rectangle with one short end trimmed into a curve for the flap

How to make it

1. Trace the paper pattern onto the felt and cut it out, with an adult nearby. Keep the curved end as the flap.
2. Lay the felt flat. Measure 4 inches up from the straight end and draw a light line; this is the fold for the pocket. Measure 4 inches more and draw a second line; this is the fold for the flap.
3. On the flap (the curved part), draw a simple design: your initial, a heart, a fish or a cross, about 1½ inches across.

4. Backstitch the design with 3 strands of floss, stitches about $\frac{1}{8}$ inch long, each one touching the last. Tie off on the back.
5. Fold the bottom 4 inches up along the first line so the pocket is formed. Pin or clip the sides together.
6. Whipstitch up one side of the pocket from the fold to the top, through both layers, with stitches about $\frac{1}{8}$ inch from the edge and $\frac{1}{4}$ inch apart. Remove each pin before you reach it. Tie off.
7. Whipstitch the other side the same way.
8. Fold the flap down over the pocket. If you like, sew a snap under the flap or save a button to sew on in Lesson 3.3.

Fabric check: Craft felt works best because its cut edges do not fray, so the whipstitch does not need a hem. If you use woven cotton instead, cut two layers, turn the edges under $\frac{1}{4}$ inch and slip-stitch or whipstitch them, or the edges will fray. Avoid thin, stretchy felt that tears when the stitches are pulled.

Steps

1. **Count out** your needle and pins and write the number in your notebook.
2. **Practice first.** On a felt scrap, sew a row of 10 running stitches and, just below it, a row of 10 backstitches. Then whipstitch two small scraps together along one edge.
3. **Strength test.** Pull gently on each row. Which row lets the felt stretch and gap open? Which holds? Write what you found.
4. Make the coin pouch from the pattern card.
5. **Count in and clean up.** Count the needle and every pin back into the pincushion before you stand up. Put scraps in the scrap bag.
6. **Improve it.** Look at your whipstitches. Are they all the same depth and spacing? Make a second pouch with more even stitches, or backstitch a second design on the back.

Tips

- Draw your design lightly. A simple shape stitched neatly looks better than a complicated one stitched in a hurry.
- For curves, make the backstitches shorter so they follow the line smoothly.
- Older students: hide the starting knot inside the fold of the pouch so it does not show.

Check your work

- ☐ I can sew a backstitch with every stitch touching the one before.
- ☐ I can whipstitch two edges together evenly.
- ☐ My pouch's sides are closed all the way to the top, and my knots are tied off.

SEWING NOTEBOOK

1. Draw the backstitch from the front (a solid line) and from the back (overlapping stitches). Number the needle holes 1, 2, 3 in the order you use them.
2. Draw the whipstitch wrapping over two edges like a spiral.
3. Tape in your practice scrap with the running stitch, backstitch and whipstitch rows, and label each one.

From history. Sailors on old sailing ships sewed and mended their own sails and clothes, using a leather sailmaker's palm on the hand instead of a thimble to push heavy needles through canvas. They used stitches very much like the backstitch and whipstitch you learned today.

COMMON MISTAKES

- Moving forward instead of back with each backstitch, which leaves gaps like a running stitch.
- Whipstitching through only one layer, so the edges do not join.
- Pulling the whipstitch so tight that the edges curl or pucker.
- Forgetting to remove pins before sewing past them.

Make it a game • Lace a Backstitch. Your parent punches holes in a cardstock strip in two rows. With yarn and a blunt needle, seated, lace a backstitch along one row and a whipstitch along the edge of the other. Say why backstitch is strong like a machine stitch. Count your stitches aloud. Fewest gaps wins.

3.3 DORCAS AND THE LOOSE BUTTON

OBJECTIVES

- Tell the story of Dorcas and the coats and garments she made for the widows of Joppa.
- Sew a flat button on with a thread shank so it stays and buttons easily.
- Mend a split seam with a backstitch and a loose hem with a slip stitch.

Warm-up. Look through your family's laundry or closets (ask first) for things that need mending: a missing or loose button, a split seam, a hem that has come down, a small hole. Make a list. Put the items in a basket; this is your family's mending basket.

WATCH

How to sew a Button (Craft Basic Sewing)

Red Ted Art (Maggy Woodley) • 4:25

<https://www.youtube.com/watch?v=8mIGGn3AS1E>

WHEN TO WATCH

After the story of Dorcas, with your practice cuff, button and needle in hand.
Pause after each step.

BACKUP VIDEO

How to Sew a Button - for Absolute BEGINNERS

Treasurie • 5:08

<https://www.youtube.com/watch?v=Du6gq3ks0SQ>

Shows two-hole, four-hole and shank buttons and how to knot off. Watch before sewing a button on a real garment.

KEY TERMS

shank

The little stem of thread (or the loop on the back of some buttons) that lifts the button above the fabric so there is room for the buttonhole.

mending

Repairing clothes or linens so they can be used again: sewing on buttons, closing seams, fixing hems and patching holes.

slip stitch

A nearly invisible stitch that slides inside a fold, used to close openings and sew hems.

hem

A finished edge made by folding the raw edge under and sewing it down.

seam allowance

The strip of fabric between the stitching and the cut edge of a seam.

CORE IDEAS

The story. In the city of Joppa, by the sea, lived a disciple named Tabitha, which means Dorcas. The Bible says she “was full of good works and almsdeeds which she did” (Acts 9:36). Dorcas sewed. When she fell sick and died, the believers sent for the apostle Peter. When he came, “all the widows stood by him weeping, and shewing the coats and garments which Dorcas made.” Peter prayed, and God raised Dorcas to life. Her needle had clothed the poor, and her neighbors could not forget her kindness. For centuries, church sewing groups have called themselves “Dorcas societies” and made clothes for people in need.

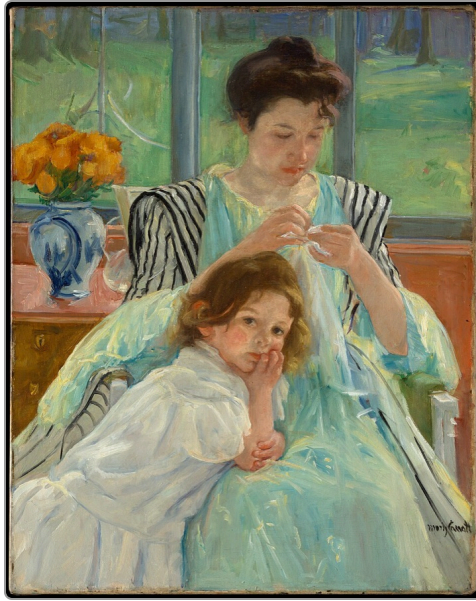
How they figured it out. For most of history, clothes were too costly to throw away. Families mended them again and again: they sewed on buttons, closed seams, turned worn collars and patched holes. Sewers learned that a button sewn flat and tight against the cloth is hard to button and pulls out quickly, because the buttonhole has no room. So they left a little space under the button and wrapped the thread around the stitches to make a **shank**, a little stem that lets the button sit up on top of the buttonhole. They also learned that a seam that has split is mended best with a backstitch over the old stitching line, and that a hem is held best by a **slip stitch** that hides inside the fold.

The craft. To sew on a flat button: mark the spot, knot a double thread, and take a small stitch at the mark. Lay a toothpick across the top of the button and sew over it through the holes 4 to 6 times (in two-hole buttons, up one hole, down the other; in four-hole buttons, make an X or two parallel bars). Pull out the toothpick, lift the button, and wrap the thread around the stitches under the button 4 or 5 times to make the shank. Push the needle to the back and knot off. To mend a seam: turn the garment inside out, start ½ inch before the split in the old stitching, and backstitch

along the old seam line until $\frac{1}{2}$ inch past the split. To slip-stitch a hem: hide the knot in the fold, catch one or two threads of the outside fabric, then slide the needle inside the fold for $\frac{1}{4}$ inch, and repeat.

Let's sew. You will practice on a cuff cut from an old shirt, then sew a button onto a real garment from the mending basket and mend one split seam. Your one skill: a button with a thread shank that stays and buttons easily.

PICTURE STUDY



Young Mother Sewing, Mary Cassatt, 1900 · Oil on canvas · The Metropolitan Museum of Art, New York

Image: [Wikimedia Commons](#), public domain

Mary Cassatt was an American painter who lived in France and loved to paint mothers and children in everyday moments. Here a mother is busy with her sewing, while her little girl leans on her knee to keep her company. The sewing may be clothes for the family, mended or newly made.

Look closely

- Find the mother's hands. What is she holding, and what do you think she is sewing?
- Look at the little girl. Where is she leaning, and what is she doing while her mother sews?
- Find the window and the light. Why would a sewer sit near a window?
- Look for the flowers on the dresser. What colors did Cassatt use to make the room feel bright?

Talk about it

1. How is this mother like Dorcas, sewing for the people around her?
2. What do you think the little girl is learning just by watching?
3. Who in your family mends things? What could you mend for them?

Safety first. Count needles and pins out and back in. Use a sharp hand-sewing needle carefully: push it away from your body, and keep your other hand behind the fabric, not in front of the needle's path. Always ask before sewing on a family member's clothes, and never sew a garment while someone is wearing it.

SEWING PROJECT

Sew a Button That Stays, and Mend a Seam

Mending is one of the most useful skills you will ever learn. Today you will practice a button on a cuff cut from an old shirt, then sew a real button on a real garment, and close a split seam from the family mending basket. Like Dorcas, you will be sewing for someone else.

You will need

- A sharp hand-sewing needle (size 7–9) and a pincushion
- Small scissors, a toothpick and a few pins
- A thimble (optional) and a seam ripper (used only with an adult nearby)
- A washable marker or chalk pencil

FOUR-HOLE BUTTON ON A PRACTICE CUFF

Finished size: one button · About 20 minutes

Fabric and notions

- 1 flat four-hole button, ½ to ¾ inch (12 to 19 mm)
- 24 inches of all-purpose thread to match (used double, so 12 inches long when folded)
- A cuff or placket cut from an old cotton shirt, or a 6-inch square of folded cotton scrap

How to make it

1. Mark the spot for the button with a small dot.
2. Thread the needle with the 24-inch thread, pull the ends even and knot them together (double thread).
3. From the right side, take a tiny stitch through the dot so the knot is hidden under where the button will sit.
4. Bring the needle up through one hole of the button and slide the button down to the fabric.
5. Lay a toothpick across the top of the button between the holes.

6. Sew down through the hole opposite, over the toothpick, and up through the fabric again. Make 4 to 6 stitches through each pair of holes, crossing in an X or making two parallel bars.
7. Bring the needle up through the fabric under the button (but not through the holes). Pull out the toothpick and lift the button up.
8. Wrap the thread tightly around the stitches under the button 4 or 5 times to make the shank.
9. Push the needle to the back, take two tiny stitches in place, and tie a finishing knot. Trim the thread.
10. Button it through a buttonhole (or the other side of the cuff) to test it.

Fabric check: Practice on a woven cotton or cotton-blend shirt cuff, which holds stitches well. Avoid thin knits and stretchy fabrics for a first button; they pucker. For the real garment, choose a button that matches the others, or the spare button sewn inside many shirts near the side seam or the label.

Steps

1. **Count out** your needle and pins.
2. **Practice the button** on the cuff from the pattern card. Button and unbutton it ten times. Does it stay firm? Is there room for the buttonhole?
3. **Real button.** Choose a garment from the mending basket that needs a button. Match the thread color and sew the button where the old one was (look for the old thread holes).
4. **Mend a seam.** Turn a garment with a split seam inside out. Pin the seam closed along the old stitching line. Starting $\frac{1}{2}$ inch before the split, backstitch along the old line until $\frac{1}{2}$ inch past the split, removing pins as you go. Tie off well.
5. **Slip stitch (older students).** Mend a hem that has come down with a slip stitch, or practice one on a folded scrap.
6. Record each mending job in your notebook: the item, what was wrong, what you did and how long it took.
7. **Count in and clean up.** Count the needle and every pin back in. Return the mended clothes to their owners.
8. **Improve it.** Sew one more button on another garment, trying to make the shank neater. Keep the mending basket going all year.

Tips

- Use a double thread for buttons; it is twice as strong and needs half the stitches.
- On a coat, sew a small flat button on the inside behind the big one (a stay button) so the stitches do not tear the fabric.
- Younger students: sew a big two-hole button on a felt scrap first, then try the shirt cuff.

Check your work

- ☐ I can sew a button on with a thread shank so it buttons easily and does not wobble.
- ☐ I mended a real seam with a strong backstitch.
- ☐ I can tell the story of Dorcas and why mending is a way to serve others.

SEWING NOTEBOOK

1. Draw a button from the side, showing the shank under it and the buttonhole fabric sitting on top of the shank.
2. Make a mending log: date, item, problem, what you did, and the owner's name.
3. Write a thank-you note from the garment's point of view: "Thank you for sewing my button back on..."

From history. In the 1800s and 1900s many American churches had a Dorcas Society, often a group of women and girls who met to sew clothing and quilts for the poor, for missionaries and for families who had lost their homes. Many churches still have sewing groups that make quilts, blankets and pillowcases to give away.

COMMON MISTAKES

- Sewing a button flat and tight with no shank, so it is hard to button and soon pulls off.
- Using a single thin thread for a button. Use double thread and 4 to 6 passes.
- Mending a seam on the outside of the garment. Turn it inside out and sew along the old seam line.
- Using a seam ripper toward your hand. Rip away from your body, with an adult nearby, and only where you mean to.

Make it a game • Dorcas Story Chain. Tell the story of Dorcas in Joppa, one sentence at a time, trading with your parent. Include the coats she made for the widows, her death and Peter. Then hold up a button and point to where the shank belongs and why it keeps buttons from pulling. Finish when the story ends.

Scripture. “and all the widows stood by him weeping, and shewing the coats and garments which Dorcas made, while she was with them.” (Acts 9:39, KJV)

The widows wanted Peter to see the clothes Dorcas had sewn for them. Her stitches were a picture of her love, and our mending and making can be too.

3.4 SAMPLERS AND THE BLANKET STITCH

OBJECTIVES

- Tell why girls in the 1700s and 1800s stitched alphabet samplers and what they practiced on them.
- Sew a blanket stitch around the edge of felt.
- Sew two embroidery stitches, the stem stitch and the French knot, and make a stuffed blanket-stitched ornament or pincushion.

Warm-up. Look for initials and monograms in your home: on towels, handkerchiefs, an old pillowcase, a quilt label. Did a person stitch them or a machine? Why would a family mark its linens with initials?

WATCH

Blanket Stitch How To - Basic Sewing (Embroidery & Hand Sewing)

Red Ted Art (Maggy Woodley) • 3:15

<https://www.youtube.com/watch?v=S9zegUYdPmg>

WHEN TO WATCH

After the story of the samplers, with two felt scraps and your needle ready.
Pause after each stitch and copy it.

BACKUP VIDEO

How to do a French Knot

Cutesy Crafts • 2:46

<https://www.youtube.com/watch?v=pjI5yo656U4>

Watch before you add French knots for eyes or stars to your ornament.

KEY TERMS

sampler

A piece of cloth on which a girl (or boy) practiced stitches, alphabets and numbers, often signed and dated.

blanket stitch

An edging stitch that makes a row of little L shapes along the edge, used to finish blankets and to join felt.

stem stitch

An embroidery stitch that makes a smooth, twisted line, good for stems, letters and outlines.

French knot

A small raised knot made by wrapping the thread around the needle, used for dots, eyes and flower centers.

embroidery hoop

Two rings that hold fabric tight like a drum while you embroider.

CORE IDEAS

The story. In colonial America and in Britain in the 1700s and 1800s, a girl often stitched a **sampler** when she was about seven to twelve years old. She stitched rows of capital and small letters, the numbers 1 to 10, borders of flowers or vines, and often a Bible verse or a short poem, and then signed her name, her age and the year. The earliest known American sampler was stitched in the 1640s by Loara Standish, daughter of Captain Myles Standish of Plymouth Colony; it is kept at Pilgrim Hall Museum. Many samplers were made at school, under a schoolmistress, and families framed and kept them for generations.

How they figured it out. Why practice the alphabet in thread? In those days, every family's sheets, towels, shirts and handkerchiefs were sewn by hand and were valuable. Marking each piece with the owner's initials and a number kept it from being lost in the wash or mixed up with the neighbors' at the laundry. A girl who could stitch neat letters could mark the family linens. The sampler was her practice cloth and her reference: when she needed a letter, she copied it from her sampler. Along the way she learned patience, neatness and many stitches she would use all her life.

The craft. The **blanket stitch** finishes an edge with a row of little L shapes. Bring the needle up from the back $\frac{1}{4}$ inch in from the edge. Go in again $\frac{1}{4}$ inch along, from front to back, and bring the needle out past the edge with the thread loop *under* the needle point. Pull snug so the thread lies along the edge, and repeat. The **stem stitch** is like a backstitch that overlaps: each stitch comes up halfway along the stitch before, with the thread always held to the same side, so the line twists like a rope. For a **French knot**, bring the needle up, wrap the thread around the needle twice,

then put the needle back down right next to where it came up, holding the wraps snug while you pull through.

Let's sew. You will make a **blanket-stitched felt ornament or pincushion**, a star, a heart or a sheep, with stem-stitch details and French-knot eyes or dots, stuffed with fiberfill. It is just right to give at Christmas. Your one skill: blanket stitches all the same height and the same distance apart.

PICTURE STUDY



Sampler, Unknown American girl, 1787 · Silk embroidery on linen · Cooper Hewitt, Smithsonian Design Museum, New York

Image: [Wikimedia Commons](#), public domain

This sampler was stitched in America in 1787, the same year the United States Constitution was written. The girl who made it worked row after row of letters and numbers in silk thread on linen, then added flowers, birds and trees, and stitched a line saying when the sampler was wrought (made). Look closely: every letter is made of tiny stitches.

Look closely

- Find the rows of alphabets. How many different kinds of letters can you see: capitals, small letters, fancy letters?
- Find the row with the year 1787. What else is written on that line?
- Find the two trees and the birds at the bottom. Why do you think she added pictures to her practice cloth?
- Look at the borders between the rows. How many different border patterns can you count?

Talk about it

1. Why might a girl want to practice the whole alphabet in thread?
2. This sampler is more than 230 years old. How do you think it was kept safe for so long?

3. If you made a sampler, what would you put on it: letters, a verse, a picture, your family's name?

Safety first. Count needles and pins out and back in. Push the needle away from your fingers when you blanket-stitch around the edge. Keep fiberfill, small felt pieces and buttons away from babies and pets. If you use a low-temperature glue gun to attach a hanging loop, an adult is beside you.

SEWING PROJECT

A Blanket-Stitched Felt Ornament or Pincushion

Felt ornaments are a lovely way to use every stitch you have learned. You will stitch a design on one side, then blanket-stitch two felt shapes together, stuffing them as you go. Make a star for the tree, a heart for a grandparent or a woolly sheep for the Christmas nativity, or make it a little larger and use it as a pincushion for your own sewing kit.

You will need

- An embroidery or chenille needle and a pincushion
- Fabric scissors and small thread scissors
- A paper pattern of your shape and a few pins or sewing clips
- A pencil or chopstick for stuffing

BLANKET-STITCHED FELT STAR, HEART OR SHEEP

Finished size: about 4 × 4 in (10 × 10 cm); a pincushion about 4½ in across · About 60 to 75 minutes

Fabric and notions

- 2 pieces of craft felt, each 5 × 5 in, in the same color (white or cream for a sheep, red for a heart, gold or white for a star)
- A small scrap of black or gray felt for the sheep's face and legs (optional)
- Six-strand embroidery floss in a contrasting color (use 3 strands) and a second color for details
- A small handful (about ¼ ounce) of polyester fiberfill
- 8 inches of narrow ribbon or floss for a hanging loop (for an ornament)

How to make it

1. Draw your shape on paper, about 4 inches across, and cut it out. Simple, rounded shapes are easiest to stitch around.
2. Pin the pattern to the two layers of felt and cut both pieces at once, with an adult nearby.
3. On the front piece only, stitch a design: stem-stitch a line (a smile, a stem, a border) and add French knots for eyes, dots or stars. For a sheep,

stitch on a small felt face with a few running stitches. Tie off on the back.

4. Lay the front on the back, wrong sides together, with the edges lined up. For an ornament, tuck the ends of the ribbon loop between the layers at the top.
5. Knot the floss and start between the layers so the knot is hidden. Blanket-stitch around the edge, stitches $\frac{1}{4}$ inch deep and $\frac{1}{4}$ inch apart, sewing through both layers and through the ribbon ends.
6. Stop when about $1\frac{1}{2}$ inches is left open. Do not cut the thread; let the needle rest in the pincushion.
7. Stuff the shape with small pieces of fiberfill, pushing them into the points with the pencil. Stuff firmly but not so much that the edges strain.
8. Pick up the needle and blanket-stitch the opening closed. Tie a finishing knot, push the needle into the stuffing and out the other side, and trim the thread so the tail hides inside.

Fabric check: Craft felt is easiest because it does not fray. For a wool-felt version, use 100% wool or wool-blend felt (softer and stronger) if no one is sensitive to wool. Polyester fiberfill is fine for an ornament or pincushion; do not use it in anything that will touch a hot pan. For a pincushion, a little crushed walnut shell or clean dry sand in a small inner bag adds weight; an adult fills it.

Steps

1. **Count out** your needle and pins.
2. **Practice first.** On a felt scrap, blanket-stitch along one edge for 3 inches. Then try a 2-inch stem-stitch line and five French knots. Circle your best stitch of each kind.
3. Make the ornament or pincushion from the pattern card.
4. **Measure.** Check five of your blanket stitches with a ruler. Are they all about $\frac{1}{4}$ inch tall and $\frac{1}{4}$ inch apart?
5. **Give it.** Decide who will receive your ornament and write them a small tag.
6. **Count in and clean up.** Count needles and pins back in, put fiberfill away in a closed bag, and sweep up felt scraps.

7. **Improve it.** Make a second ornament in a new shape, this time going around curves with shorter, closer stitches so the edge looks smooth.

Tips

- At a sharp point, like the tip of a star, take two blanket stitches into the same hole so the corner is covered.
- If your French knots pull through to the back, you put the needle down in the very same hole. Go down just beside it.
- Younger students: make a simple heart or circle and skip the French knots.

Check your work

- ☐ I can blanket-stitch around an edge with even stitches.
- ☐ I can sew a stem stitch and a French knot.
- ☐ I can tell why girls stitched alphabet samplers long ago.

SEWING NOTEBOOK

1. Draw the blanket stitch large, showing how the loop goes under the needle point.
2. Draw a small sampler plan on graph paper: the first five letters of the alphabet, your initials, the year, and a little border.
3. Write who you gave your ornament to and what they said.

From history. Samplers became so loved that museums such as the Smithsonian, the Metropolitan Museum of Art and Colonial Williamsburg collect them. Each one tells a little about the girl who made it: her name, her age, her school and sometimes the names of her parents and brothers and sisters.

COMMON MISTAKES

- Letting the loop slip over the needle instead of under it, so the blanket stitch does not catch the edge.
- Making the blanket stitches different heights, which makes the edge look wavy. Use the ruler on your practice scrap.
- Stuffing so hard that the stitches pull apart, or so little that the shape is floppy.
- Leaving knots showing on the front. Start and end between the layers.

Make it a game • Graph Paper Sampler. On graph paper, color squares to make your initials and a border, just as girls once stitched alphabet samplers. Set a three-minute timer. Your parent guesses your letters. Then name the blanket stitch, stem stitch and French knot, and tell what a sampler practiced. Switch designs.

Scripture. “And thou shalt embroider the coat of fine linen” (Exodus 28:39, KJV)

God asked for embroidery on the priest’s coat of fine linen. Careful, beautiful needlework was part of making the tabernacle a place of honor for God.

HAND STITCHING

A needle and thread are some of the oldest tools people have, and still some of the most useful. With a few hand stitches you can make a bookmark, a pouch or a Christmas ornament, sew a button back on, and mend a split seam so a favorite shirt can be worn for years more. In this unit you will learn to thread a needle, tie a knot and sew the five stitches every household needs: the **running stitch**, the **backstitch**, the **whipstitch**, the **slip stitch** and the **blanket stitch**, plus two pretty embroidery stitches.

You will meet the needle makers of Redditch, England; Dorcas of Joppa, whose coats and garments were so loved that the widows showed them to Peter with tears; and the girls of the 1700s and 1800s who stitched alphabet samplers to practice. You will also start a habit that every good sewer has: counting needles and pins out and back in, and keeping a mending basket. At the end you will make a stitch sampler of your own and do one real mending job for your family.

PREREQUISITES

- Can cut felt and paper along a line with scissors
- Can sit and work carefully on a small task for 20 minutes
- Knows the needle-and-pin count rule from the course introduction

MASTERY CHECKLIST

- ☐ I can thread a needle and tie a knot at the end of the thread.
- ☐ I can sew the running stitch, backstitch, whipstitch, slip stitch and blanket stitch, and tell what each one is for.
- ☐ I can sew on a flat button with a thread shank so it stays.
- ☐ I can mend a split seam and a loose hem.
- ☐ I can tie off my thread with a finishing knot and count my needles and pins back in every time.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A beginner hand-sewing kit:** Look for a kit with a pincushion, a needle threader, a thimble, small scissors and a pack of assorted needles that includes embroidery (crewel) and chenille needles, which have large eyes and are easy to thread. A small tin or box keeps it all together.
- **Felt, embroidery floss and a 6-inch embroidery hoop:** Craft felt in several colors, a pack of six-strand cotton embroidery floss and a wooden or plastic hoop are inexpensive at any craft store and are used all through this unit.
- **Pilgrim Hall Museum: the Loara Standish sampler:** Free. The museum in Plymouth, Massachusetts, that keeps the earliest known American sampler, stitched by Loara Standish, daughter of Myles Standish, in the 1640s. Search the site for “sampler.”

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

3.1 The Needle and the Knot	2 sessions of 45–60 minutes
3.2 Backstitch and Whipstitch	2 sessions of 45–60 minutes
3.3 Dorcas and the Loose Button	2 sessions of 60–90 minutes
3.4 Samplers and the Blanket Stitch	2 sessions of 45–60 minutes

UNIT 3 REVIEW

Answer each question in complete sentences unless it asks for a list. Questions marked “Show me” are answered by sewing for your parent. Count your needle out and back in. The review is worth 50 points.

1. **5 pts**

Name the three parts of a needle. How long should your thread be, and why?

2. **5 pts**

Show me: thread a needle, tie a quilter’s knot and sew five even running stitches.

3. **5 pts**
Why is a backstitch stronger than a running stitch?
4. **5 pts**
What is a whipstitch used for, and how does it work?
5. **5 pts**
Who was Dorcas, and what did the widows show Peter?
6. **5 pts**
Why do we make a thread shank under a button?
7. **5 pts**
Show me: sew three backstitches and three blanket stitches on a felt scrap, then tie a finishing knot.
8. **5 pts**
Predict what happens: a shirt has a seam that has split open 1 inch. If no one mends it, what will happen after a few more wears and washes?
9. **5 pts**
Why did girls in the 1700s and 1800s stitch samplers?
10. **5 pts**
Name the safety habits you use every time you hand-sew.

ANSWER KEY

1. The eye, the shaft and the point. About 18 inches (arm's length); longer thread tangles and knots.
2. The student threads the needle, wraps the thread around the needle and pulls it into a neat knot at the end, and sews five running stitches about the same length in a straight line.
3. Each backstitch goes back to touch the last one, so there are no gaps and each stitch is locked by the next. A running stitch has gaps and can pull out or stretch open.
4. To join two edges (as on a felt pouch or a stuffed toy). The needle goes through both layers from the same side each time, wrapping the thread over the edge in a spiral.
5. A disciple in Joppa, full of good works, who sewed for people in need. The widows showed Peter the coats and garments Dorcas had made.
6. The shank lifts the button above the fabric so the buttonhole fabric has room to sit underneath; the button is easier to button and lasts longer.
7. The student sews three touching backstitches and three even blanket stitches along an edge, and ties off on the back.
8. The split will grow longer, because the broken stitches next to it keep pulling out and the raw edges fray; it may become too big to mend easily. A small mend now saves the shirt.
9. To practice stitches and letters so they could mark the family's linens with initials and numbers, and to learn neatness and patience. They often signed and dated them.
10. Count needles and pins out and back in; keep them in the pincushion, never in your mouth or clothes; push the needle away from your body; cut with scissors with an adult nearby; keep small items away from babies and pets; find any dropped needle.

UNIT CHALLENGE: A STITCH SAMPLER AND A REAL MENDING JOB

Stitch a sampler on a piece of cotton, linen or burlap held in a 6- or 7-inch embroidery hoop. Show at least five stitches from this unit (running stitch, backstitch, whipstitch, blanket stitch, stem stitch, French knot or slip stitch), each in its own row and each labeled with its name in backstitch or stem stitch. Add your initials and the year, just as girls did long ago.

Then do one real mending job for your family from the mending basket: a button, a seam or a hem. Record it in your mending log with a before-and-after photo or drawing.

LOOK FOR	WHAT IT MEANS
Five or more stitches	At least five different stitches, each in its own row and correctly made.
Labels and signature	Each row labeled in stitching, with the student's initials and the year.
Neatness	Stitches are even in length and spacing, knots are hidden on the back, and the fabric is not puckered.
Real mending job	One real garment or linen mended so it can be used again, recorded with a before-and-after picture.
Safety and improvement	Needles and pins counted every session; at least one row was unpicked and redone better.

UNIT 4

MACHINE SEWING

A sewing machine can sew in one minute a seam that would take an hour by hand, and its stitches are small, even and strong. In this unit you will meet the inventors who made it possible: Walter Hunt, who built a machine and never patented it; Elias Howe, who put the eye of the needle at its point and patented his lockstitch machine in 1846; and Isaac Singer, whose 1851 machine, with its up-and-down needle and presser foot, became the machine families bought for their homes. You will learn how the top thread and the bobbin thread lock together in the middle of the fabric, and you will learn the parts of your own machine.

Then you will sew. You will start on paper with no thread at all, then sew straight seams on scrap fabric with a $\frac{5}{8}$ -inch seam allowance, backstitch at the ends, and pivot at a corner. You will learn to pin and to press. You will make a **drawstring bag** and a **pillowcase**, one for your family and one to give away. Every step is done at slow speed, with an adult beside you. If your family has no machine, you can borrow one from a relative or a friend at church, and every project also has a hand-sewn option.

PREREQUISITES

- Can sew a running stitch and a backstitch by hand (Unit 3)
- Can measure to the nearest $\frac{1}{8}$ inch with a ruler or seam gauge
- Has been shown the machine's on/off switch and foot pedal by an adult, and knows the finger rule

MASTERY CHECKLIST

- ☐ I can tell how Hunt, Howe and Singer each helped invent the sewing machine.
- ☐ I can name the main parts of a sewing machine and tell what each does.
- ☐ I can explain how the top thread and the bobbin thread make a lockstitch.
- ☐ I can sew a straight seam with a $\frac{5}{8}$ -inch seam allowance, backstitch at both ends, and pivot at a corner, at slow speed with an adult beside me.
- ☐ I follow the machine safety rules every time: fingers an inch from the needle, foot off the pedal when threading, no sewing over pins, hair tied back, unplug when done.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Your sewing machine's manual:** Free. Every machine is threaded a little differently. If you have lost the paper manual, search the maker's website for your machine's model number; most manuals can be downloaded at no cost.
- **Spare machine needles and bobbins that fit your machine:** Universal needles in size 80/12 for cotton, and four or five extra bobbins of the right type for your model. An adult changes the needle.
- **A seam gauge and a magnetic seam guide:** Inexpensive tools. A 6-inch seam gauge with a sliding marker measures hems and seam allowances; a magnetic seam guide set on the needle plate at $\frac{5}{8}$ inch helps beginners sew straight. (Do not use a magnetic guide on a computerized machine unless the manual says it is safe.)

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

4.1 Elias Howe's Needle	2 sessions of 45–60 minutes
4.2 Isaac Singer and the Lockstitch	2 sessions of 60–90 minutes
4.3 Pins, Pressing and the Drawstring Bag	2 sessions of 60–90 minutes
4.4 The Pillowcase	2 sessions of 60–90 minutes

UNIT 4 REVIEW

Answer each question in complete sentences unless it asks for a list or a number. Questions marked “Show me” are answered at the machine, with an adult beside you. The review is worth 50 points.

1. **5 pts**
What was special about Elias Howe's needle, and in what year did he get his patent?
2. **5 pts**
Name two things Isaac Singer's 1851 machine had that made it practical for homes.
3. **5 pts**
Explain how a lockstitch is made.
4. **5 pts**
Name five parts of a sewing machine and what each does.
5. **5 pts**
What is a seam allowance? What is the usual seam allowance for clothing, and for quilting?
6. **5 pts**
List the sewing-machine safety rules.

7. 5 pts

What is the difference between pressing and ironing, and why do sewers press seams?

8. 5 pts

Predict what happens: you sew a seam without backstitching at either end, and then you wash the item several times. What happens, and why?

9. 5 pts

A pillowcase body is cut 27 inches long and the cuff is cut 9 inches. How many inches of fabric is that in all, and how many yards?

10. 5 pts

Show me: with your adult beside you, sew a 6-inch seam on scrap fabric with a $\frac{5}{8}$ -inch seam allowance, backstitching at both ends, and pivot at one corner.

ANSWER KEY

1. The eye was at the point, so the needle could push a loop of thread through the cloth without passing all the way through; a shuttle under the cloth caught the loop to make a lockstitch. His patent was granted in 1846.
2. Any two: a straight needle that moved up and down; a presser foot; a flat table so the cloth could turn; a foot treadle that left both hands free. Singer also sold machines on monthly payments.
3. The needle takes the top thread down through the fabric and makes a loop; a hook or shuttle carries the loop around the bobbin; the take-up lever pulls it tight, so the top and bobbin threads lock together in the middle of the fabric.
4. Any five, such as: needle (carries the top thread); presser foot (holds the fabric down); feed dogs (move the fabric); bobbin (holds the bottom thread); tension discs (control how tight the thread is); take-up lever (pulls each stitch tight); handwheel (moves the needle by hand); reverse lever (sews backward); needle plate (has seam-allowance lines); foot pedal (starts and sets speed).
5. The distance between the stitching and the cut edge. Clothing usually uses $\frac{5}{8}$ inch (1.5 cm); quilting uses $\frac{1}{4}$ inch.
6. An adult beside you; hands flat and fingers at least an inch from the needle; foot off the pedal and machine off when threading or touching the needle area; never sew over pins; hair tied back, no dangling sleeves or necklaces; slow speed; unplug when done; an adult changes needles and clears jams.
7. Pressing lifts and sets the iron down in one spot; ironing slides it back and forth. Sewers press so seams and folds lie flat and crisp without stretching the fabric, which makes the next step easier and the finished piece neater.
8. The seam begins to unravel from the ends, because the last stitches are not locked and the thread pulls out a little at a time. Backstitching locks the ends.
9. $27 + 9 = 36$ inches, which is 1 yard ($\frac{3}{4}$ yard for the body and $\frac{1}{4}$ yard for the cuff).
10. The student sews at slow speed with fingers an inch away, keeps the edge on the $\frac{5}{8}$ -inch line, backstitches at both ends, stops with the needle down at the corner, lifts the foot, pivots and finishes the seam; pins are pulled before the foot.

UNIT CHALLENGE: A MACHINE-SEWN TOTE BAG

Sew a lined or unlined tote bag on the machine, at slow speed with an adult beside you. Cut two rectangles of sturdy cotton (canvas, denim or two layers of quilting cotton), each 15×16 inches, and two straps, each 4×24 inches, folded and topstitched into 1-inch straps. Sew the sides and bottom with a $\frac{5}{8}$ -inch seam allowance, finish the raw edges, hem the top, and sew on the straps with a box stitch so they hold. (Families without a machine may hand-sew the bag with a backstitch, or make a second pillowcase instead.)

Add a notebook page with your seam samples from this unit, the measurements of your bag, and one sentence about what you would change next time.

LOOK FOR	WHAT IT MEANS
Straight seams	Seams are straight and about $\frac{5}{8}$ inch from the edge, backstitched at both ends.
Finished edges	Every raw edge is finished (zigzag, serged, French seam or hemmed) so the bag will not fray.
Strong straps	Straps are sewn on securely and the bag can carry a few books without pulling loose.
Safety	The student followed the machine rules every time: adult beside, fingers an inch away, pins pulled, machine and iron unplugged.
Record and improvement	A notebook page with seam samples, measurements and one improvement made or planned.

4.1 ELIAS HOWE’S NEEDLE

OBJECTIVES

- Tell how Walter Hunt and Elias Howe each built early sewing machines, and why Howe’s needle with the eye at the point mattered.
- Name the main parts of a sewing machine and tell what each one does.
- With the machine unthreaded and an adult beside you, sew paper lines, curves and corners at slow speed.

Warm-up. Look closely at a hand-sewing needle and a sewing-machine needle side by side (an adult hands you the machine needle). Where is the eye on each one? Why do you think a machine needle has its eye near the point instead of at the top? Make a guess before you read the story.

WATCH

Parts of a Sewing Machine and What Do They Do

Professor Pincushion • 5:33

https://www.youtube.com/watch?v=J-lld_MNxY

WHEN TO WATCH

After the story of Elias Howe, sitting next to your own machine. Point to each part on your machine as it is named.

Note: Professor Pincushion is a long-running sewing-teaching channel. Machines differ; check your own manual too.

BACKUP VIDEO

How the Sewing Machine Changed Daily Life | The Henry Ford's Innovation Nation

The Henry Ford • 3:42

<https://www.youtube.com/watch?v=i3kh2CDAccU>

A museum curator shows early sewing machines and tells how they changed the way families got their clothes.

KEY TERMS

presser foot

The small metal foot that holds the fabric flat against the feed dogs while the machine sews.

needle plate

The metal plate under the needle, with a hole for the needle and lines that measure the seam allowance. Also called the throat plate.

foot pedal

The control on the floor that starts the machine and sets its speed. Press gently for slow speed.

feed dogs

The little toothed bars under the presser foot that move the fabric along, one stitch at a time.

handwheel

The wheel on the right side of the machine that raises and lowers the needle by hand. Always turn it toward you.

patent

A government paper that gives an inventor the right to be the only one to make and sell an invention for a number of years.

CORE IDEAS

The story. For thousands of years, every stitch was sewn by hand. Inventors in England, France and America tried to build sewing machines, and some worked a little. Around 1833 a New York inventor named **Walter Hunt**, who also invented the safety pin, built a machine that used a needle with its eye near the point and a second thread carried underneath, making a locked stitch. But Hunt decided not to patent it, and his machine was set aside. A few years later, in Massachusetts, a young machinist named **Elias Howe** began working on the same problem.

How they figured it out. Howe watched his wife sew by hand and tried to make a machine copy her hand, pushing a needle all the way through the cloth and back. It would not work. A machine could not let go of the needle and catch it again as fingers do. Howe realized that the machine needle should not pass through the cloth at all. He put the **eye at the point**. The needle pushed a loop of thread down through the cloth, and underneath, a **shuttle** carrying a second thread passed through the loop. When the needle rose, the two threads locked together inside the cloth. In 1845 Howe raced his machine against five seamstresses in Boston and finished first. He

received his patent on September 10, 1846. Other inventors soon used his idea, and after years in court, Howe was paid for it.

The fabric science. Every home machine today still uses Howe's idea. Follow the thread: from the **spool**, through the **thread guides** and the **tension discs** (which squeeze the thread just enough), up through the **take-up lever** (which pulls each stitch tight), down to the **needle**. Under the **needle plate**, the **bobbin** holds the bottom thread. The **presser foot** holds the fabric down, and the **feed dogs** move it along one stitch at a time. The **handwheel** turns the needle slowly by hand, the **stitch-length** dial sets how long each stitch is, and the **reverse lever** sews backward. The **foot pedal** is like a car's gas pedal: the harder you press, the faster you go.

Let's sew. Before you sew with thread, you will learn to control the machine. With the machine **unthreaded**, you will sew along printed lines on paper at slow speed, guiding the paper with flat hands. The tiny holes show exactly where you sewed. Your one skill: start, stop and steer slowly, keeping your fingers at least an inch from the needle.

PICTURE STUDY



Elias Howe's Sewing Machine Patent Model, Elias Howe Jr., 1846 · Patent model of metal and wood · National Museum of American History, Smithsonian Institution, Washington, D.C.

Image: [Wikimedia Commons](#), public domain

In Howe's day, an inventor sent a small working model of his invention to the U.S. Patent Office along with his drawings. This is the model Howe sent with his 1846 patent. It is about the size of a shoebox. The cloth was held on pins along a strip that moved past the needle, and the needle went sideways, not up and down as on your machine.

Look closely

- Find the big wheel with the handle. What do you think turning it did?
- Find the needle arm. Which way does it point: up and down, or sideways?
- Look for where the cloth would go. How is it different from the flat table on a modern machine?
- Look at the materials: brass, steel and wood. Why would an inventor build a model carefully and beautifully?

Talk about it

1. What is one thing on Howe's model that is still on your machine today, and one thing that is different?
2. Why might the Patent Office want a working model and not just a drawing?

3. How many hours of hand sewing do you think this little machine could save a family each week?

Safety first. A parent or responsible adult is beside you every time you use the sewing machine. Keep your hands flat on the fabric or paper and your fingers at least an inch from the needle. Take your foot off the pedal before you touch the needle area or the handwheel, tie back long hair, and keep sleeves and necklaces away from the machine. Unplug the machine when you finish, and never change a needle or clear a jam yourself.

SEWING PROJECT

Paper Sewing: Learning to Steer

Race-car drivers practice on a track before they race. You will practice on paper before you sew fabric. With no thread in the machine, the needle punches a line of holes, so you can see exactly how straight you sewed, where you turned and where you wandered. It is safe, cheap and very good practice.

You will need

- A sewing machine with an old needle (an adult puts it in; paper dulls needles, so save this needle for paper)
- Practice sheets printed or drawn by a parent on plain paper (see the pattern card)
- A pencil and a ruler
- A hair tie

PAPER SEWING PRACTICE SHEETS

Finished size: 5 practice sheets, 8½ × 11 in (22 × 28 cm) · About 40 minutes

Fabric and notions

- 5 sheets of plain printer paper
- A dark marker for drawing lines
- Sheet 1: five straight lines across the page, 1 inch apart
- Sheet 2: five straight lines with a dot ⅝ inch in from the right edge marked on each line (to practice the seam allowance)
- Sheet 3: a zigzag line with sharp corners (to practice pivoting)
- Sheet 4: gentle curves and a large spiral
- Sheet 5: a simple maze or the outline of a large square

How to make it

1. An adult takes the thread out of the machine (top and bobbin), puts in an old needle, and shows you the power switch, the pedal, the handwheel and the presser-foot lever.

2. Tie back your hair. Sit straight in front of the needle, with the pedal where your foot can reach it easily.
3. Lift the presser foot. Slide sheet 1 under it so the needle is right over the start of the first line. Lower the presser foot.
4. Put both hands flat on the paper, one on each side of the presser foot, fingers at least an inch from the needle.
5. Press the pedal very gently so the machine sews slowly. Guide the paper so the needle stays on the line. Let the feed dogs pull the paper; do not push or pull it yourself.
6. At the end of the line, take your foot off the pedal. Turn the handwheel toward you to lift the needle, lift the presser foot and slide the paper out.
7. Sheet 3 (pivoting): sew to the first corner and stop with the needle down in the paper (turn the handwheel toward you to lower it). Lift the presser foot, turn the paper on the needle, lower the foot and keep sewing.
8. Sew sheets 2, 4 and 5 the same way. On sheet 2, keep the edge of the paper on the $\frac{5}{8}$ -inch line of the needle plate.

Fabric check: Plain printer paper is best; card stock is too thick, and tissue paper tears. No fabric is used in this lesson. Hand-sewn option: if you have no machine yet, practice by hand with a large needle and no thread, poking holes along the lines on paper laid over a folded towel, and save the machine practice for when one is borrowed.

Steps

1. **Safety check.** Before you start, say the machine rules out loud to your adult: hands flat, fingers an inch away, foot off the pedal when touching the needle, hair back, never sew over pins, unplug when done.
2. **Find the parts.** With the machine off, point to and name ten parts: spool pin, thread guide, tension dial, take-up lever, needle, presser foot, presser-foot lever, feed dogs, needle plate and handwheel.
3. Sew the five practice sheets from the pattern card.
4. **Score yourself.** On sheet 1, count how many of the holes in each line are right on the line. Write a score for each line. Did you get better from the first line to the fifth?

5. **Unplug and clean up.** Turn off and unplug the machine, lower the presser foot, and put the paper scraps in the recycling.
6. **Improve it.** Sew sheet 3 (the corners) again and compare. Did you stop closer to each corner the second time?

Tips

- Look at the edge of the presser foot or the $\frac{5}{8}$ -inch line, not at the needle. Your eyes steer the paper.
- If the machine runs too fast, lift your foot. Some machines have a speed slider; an adult can set it to slow.
- Younger students: an adult may keep a hand near the pedal or press the pedal while the student steers.

Check your work

- ☐ I can name ten parts of the machine and tell what each does.
- ☐ I can tell why Howe's needle has the eye at the point.
- ☐ I sewed on the line at slow speed, pivoted at a corner with the needle down, and kept my fingers an inch away.

SEWING NOTEBOOK

1. Draw your sewing machine and label ten parts.
2. Tape in your best paper-sewing sheet and your score for each line.
3. Draw a hand-sewing needle and a machine needle side by side and circle the eyes.

From history. Walter Hunt also invented the safety pin in 1849, twisting a piece of wire into shape in a few hours; he sold the rights for a small sum. Howe's 1846 patent was number 4,750. In the 1850s, he and other makers agreed to share their patents, and the price of sewing machines began to drop so that ordinary families could buy them.

COMMON MISTAKES

- Pushing or pulling the paper. Let the feed dogs move it; your hands only steer.
- Pressing the pedal too hard. Slow and steady keeps you on the line and keeps fingers safe.
- Turning the handwheel away from you, which can tangle the thread. Always turn it toward you.

- Pivoting with the needle up, so the line jumps. Lower the needle into the paper, then lift the foot and turn.

Make it a game · Be the Sewing Machine. Act as a machine: tap your foot for the pedal, roll your arm for the handwheel, press your hand down for the presser foot, walk your fingers for the feed dogs and bob a finger for the needle. Your parent calls each part and you do the move. Then name what Howe and Walter Hunt each added.

4.2 ISAAC SINGER AND THE LOCKSTITCH

OBJECTIVES

- Tell what Isaac Singer's 1851 machine added and how it made sewing machines practical for homes.
- Explain how the top thread and the bobbin thread make a lockstitch, and how tension keeps it balanced.
- Wind a bobbin and thread the machine with an adult, then sew straight seams with a $\frac{5}{8}$ -inch seam allowance, backstitching at each end and pivoting at a corner.

Warm-up. Look at a machine-sewn seam on a pillowcase or a shirt. Look at the stitches on the front, then on the back. Do they look the same? Gently pull the two layers apart at the seam and look closely with a magnifier. Can you see where the two threads meet?

WATCH

How to Use a Sewing Machine | Sewing Machine for Beginners | Singer Tradition 2277 | How to Sew

Hailey Stitches · 13:05

<https://www.youtube.com/watch?v=k9NhA7q2zM8>

WHEN TO WATCH

Watch it once all the way through with your adult. Then watch again at your machine, pausing after each step of winding the bobbin and threading, while your adult does the threading with you.

Note: A clear beginner lesson on one common machine. Your machine may thread a little differently; follow your own manual.

BACKUP VIDEO

How a sewing machine works - Animagraffs

Animagraffs · 1:38

<https://www.youtube.com/watch?v=rUSecXVt-jU>

A short animation that shows the top thread looping around the bobbin. Watch it twice, slowly, after the fabric-science paragraph.

KEY TERMS

lockstitch

The stitch a home sewing machine makes: the top thread and the bobbin thread loop around each other and lock in the middle of the fabric.

tension

How tightly the machine holds the thread. Balanced tension makes the threads lock in the middle of the fabric.

backstitch (machine)

A few stitches sewn in reverse at the start and end of a seam to lock it so it cannot pull out.

bobbin

The small spool under the needle plate that holds the bottom thread.

seam allowance

The distance from the stitching to the cut edge. Most clothing patterns use $\frac{5}{8}$ inch (1.5 cm).

pivot

Turning the fabric at a corner with the needle down in the fabric, so the stitching turns a sharp corner.

CORE IDEAS

The story. In 1850, **Isaac Singer** was working in a machine shop in Boston when he was asked to repair a sewing machine that kept breaking. He studied it and decided he could make a better one. In about eleven days, the story goes, he built a new machine. It had a **straight needle that went up and down**, a **presser foot** to hold the cloth flat, and a flat table, so the cloth could be turned in any direction. He received his patent in 1851, and soon his machines were run by a **foot treadle**, leaving both hands free to guide the cloth.

How they figured it out. Singer's machine worked well, but it was costly. Singer and his business partner, Edward Clark, found ways to bring the price within reach of families. In 1856 they began letting customers pay in small monthly payments, and they sent agents to teach women how to use the machines at home. A shirt that took about 14 hours to sew by hand could be sewn on a machine in about an hour. Singer machines were soon used all over the world, in homes and in factories.

The fabric science. Here is the secret of the **lockstitch**. The needle carries the top thread down through the fabric. As it starts to rise, the thread makes a small loop under the needle plate. A hook or a shuttle catches that loop and carries it all the

way around the **bobbin**. When the take-up lever pulls the top thread tight, the top thread hugs the bobbin thread, and the two threads lock together **in the middle of the fabric**. For this to happen neatly, the **tension** must be balanced. If the top tension is too tight, the bobbin thread is pulled up to the top in little dots; if it is too loose, the top thread makes loops on the underside. A good seam looks the same on both sides.

Let's sew. With your adult, you will wind a bobbin, thread the machine and sew straight seams on scrap fabric with a **$\frac{5}{8}$ -inch seam allowance**, backstitching at each end and pivoting at a corner. Your one skill: keep the cut edge of the fabric on the $\frac{5}{8}$ -inch line of the needle plate.

PICTURE STUDY



Isaac Singer's Sewing Machine Patent Model, Isaac M. Singer, 1851 · Patent model of iron and wood · National Museum of American History, Smithsonian Institution, Washington, D.C.

Image: [Wikimedia Commons](#), public domain

This is the model Isaac Singer sent to the U.S. Patent Office in 1851 for patent number 8,294. Compare it with Howe's model from Lesson 4.1. Singer's machine has a flat table, an arm that reaches over it, and a needle that goes straight up and down, just like most machines today.

Look closely

- Find the needle arm. Which way does the needle move?
- Find the flat table. Why does a flat table make it easier to turn fabric at a corner?
- Look for the gear wheel. What do you think made it turn?
- Look at the gold decoration on the black iron. Why would a company decorate a machine that families would keep in the parlor?

Talk about it

1. What are two differences between Singer's model and Howe's model?
2. Which features of Singer's machine can you find on your own machine?
3. If a shirt took 14 hours by hand and 1 hour by machine, how many hours would a family save sewing 10 shirts?

Safety first. An adult is beside you at the machine. The machine is turned off, and your foot is off the pedal, while you thread it, wind the bobbin or put the bobbin in. Keep fingers an inch from the needle, sew at slow speed, and pull each pin out before it reaches the presser foot. Unplug the machine when you are done; an adult changes needles and clears jams.

SEWING PROJECT

Thread the Machine and Sew Straight Seams

Now the real thread goes in. You and your adult will wind a bobbin, thread the machine, and test the stitch. Then you will sew a practice sampler of straight seams, backstitched ends and a pivoted corner. Keep this sampler: it goes in your notebook and in your unit challenge.

You will need

- A sewing machine with a new universal needle, size 80/12 (an adult puts it in)
- An empty bobbin that fits your machine and the machine's manual
- Fabric scissors, pins and a pincushion
- A seam gauge or ruler and a fabric marker
- A hair tie

STRAIGHT-SEAM PRACTICE SAMPLER

Finished size: one sampler about 8 × 12 in (20 × 30 cm) · About 60 minutes

Fabric and notions

- 4 rectangles of plain woven cotton (quilting cotton or an old sheet), each 5 × 12 in (13 × 30 cm)
- 1 square of the same cotton, 8 × 8 in, for the corner practice
- All-purpose polyester or cotton thread in a color that shows on the fabric

How to make it

1. Wind the bobbin with your adult, following your manual: thread from the spool to the bobbin winder, push the winder over, and press the pedal gently until the bobbin is full. Put the winder back.
2. With the machine off, put the bobbin in its case so it unwinds the way your manual shows.
3. With the machine off, thread the top: spool, thread guide, down and up through the tension path, through the take-up lever, down through the

guides to the needle, and through the needle's eye front to back (or as your manual shows).

4. Hold the top thread and turn the handwheel toward you once so the needle goes down and comes up. Pull the top thread to bring up a loop of the bobbin thread. Pull both threads under the presser foot and to the back.
5. Set the stitch length to 2.5 mm (about 10 stitches per inch).
6. Pin two 5 × 12 in rectangles together, right sides facing, with pins at right angles to the edge.
7. Line up the cut edge with the $\frac{5}{8}$ -inch line on the needle plate. Lower the needle into the fabric $\frac{1}{2}$ inch from the top and lower the presser foot.
8. Sew forward 3 stitches, then hold the reverse lever and sew back 3 stitches, then sew forward to the end, pulling out each pin before it reaches the foot. Backstitch 3 stitches at the end.
9. Sew a second seam along the other long side the same way. Then sew the second pair of rectangles.
10. Corner practice: draw a line $\frac{5}{8}$ inch in from two sides of the 8-inch square. Sew down one line, stop with the needle down exactly where the lines cross, lift the presser foot, pivot, lower the foot and sew the second line.

Fabric check: Medium-weight woven cotton is easiest: it does not slip or stretch. Avoid knits, satin and thin polyester for first seams; they slide and pucker. An old cotton sheet cut into rectangles is perfect and free. Hand-sewn option: if no machine is available yet, sew the same seams by hand with a backstitch on the $\frac{5}{8}$ -inch line.

Steps

1. **Count out your pins.** Tie your hair back.
2. **Tension check.** Sew one seam and look at both sides. Is the stitch the same on top and bottom? If you see loops or dots, stop and ask your adult to check the threading (most problems are threading, not tension).
3. Sew the practice sampler from the pattern card.
4. **Measure.** Use the seam gauge to measure your seam allowance at five places on each seam. Write the measurements. Are they all $\frac{5}{8}$ inch?

5. **Pull test.** Pull the ends of a seam you backstitched and one you did not (sew one without backstitching for the test). Which one starts to unravel?
6. **Count in, unplug and clean up.** Count every pin back in, turn off and unplug the machine, and brush away lint and threads.
7. **Improve it.** Sew one more seam, aiming for the straightest line yet, and compare your measurements.

Tips

- Keep your eyes on the $\frac{5}{8}$ -inch line, not the needle.
- Start each seam with the needle down in the fabric so the first stitch does not tangle.
- Hold the thread tails gently for the first three stitches so they are not pulled into the bobbin area.

Check your work

- ☐ I can explain how the top and bobbin threads lock in the middle of the fabric.
- ☐ I wound a bobbin and threaded the machine with my adult.
- ☐ My seams are within $\frac{1}{8}$ inch of $\frac{5}{8}$ inch, backstitched at both ends, and my corner is sharp.

SEWING NOTEBOOK

1. Draw a lockstitch in a side view: two layers of fabric, the top thread above, the bobbin thread below, and the place where they lock in the middle.
2. Draw what the stitches look like when the top tension is too tight, too loose and just right.
3. Tape in your seam sampler and your seam-allowance measurements.

From history. Singer machines were so popular that the company built a giant factory at Elizabethport, New Jersey, in 1873, and another in Kilbowie, Scotland, in the 1880s. Many families today still own and sew on Singer treadle machines more than a hundred years old.

COMMON MISTAKES

- Threading with the presser foot down. Raise the presser foot first so the thread slips between the tension discs.

- Sewing over pins. A needle that hits a pin can break; pull each pin out as it reaches the foot.
- Forgetting to backstitch, so the seam pulls out at the ends.
- Pulling the fabric through. Let the feed dogs do the work; your hands only guide.

Make it a game • Lock the Thread. Poke a hole in a paper plate. Using red yarn for the top thread and blue for the bobbin, link them so they lock in the middle of the paper's thickness. Pull gently to see tension. Say how Isaac Singer's machine made a lockstitch. Try to center the lock. Best lock wins.

Scripture. “A time to rend, and a time to sew” (Ecclesiastes 3:7, KJV)

Solomon wrote that there is a time for everything, even a time to sew. A seam sewn carefully takes time, and it is time well spent.

4.3 PINS, PRESSING AND THE DRAWSTRING BAG

OBJECTIVES

- Explain the difference between pressing and ironing and why sewers press every seam.
- Pin fabric correctly with pins at right angles, pulled before they reach the presser foot.
- Sew a drawstring bag with two side seams and a casing, by machine or by hand.

Warm-up. With an adult, look at a store-bought cloth bag, a pillowcase or the hem of a pair of pants. Is the seam flat or puffy? Are the edges folded under? Now crumple a scrap of cotton and lay it flat. Ask your adult to press half of it with a warm iron while you watch from beside them. What changed?

WATCH

Easy Drawstring Bag | Quick and Easy Sewing Projects for Beginners!

Easy Sewing for Beginners · 6:21

<https://www.youtube.com/watch?v=zo2WJk9OwD4>

WHEN TO WATCH

Before you cut your fabric. Watch it once all the way through, then again one step at a time as you sew. Our bag is a little different: follow the pattern card for the measurements.

Note: Follow this course's rule of fingers at least an inch from the needle and slow speed.

BACKUP VIDEO

Pressing and Ironing Fabric for Sewing

Professor Pincushion · 4:15

<https://www.youtube.com/watch?v=7Q1OC0MrjEk>

Watch before you press your seams. Notice how she lifts and sets the iron down instead of sliding it.

KEY TERMS

pressing

Lifting the iron and setting it down on one spot at a time, to flatten a seam or a fold without stretching the fabric.

ironing

Sliding the iron back and forth to smooth wrinkles out of finished clothes.

casing

A tunnel of fabric, made by folding and stitching, that holds a drawstring or elastic.

right side

The front of the fabric, the side meant to show. The back is the wrong side.

drawstring

A cord or ribbon threaded through a casing and pulled to close a bag or waist.

CORE IDEAS

The story. In the early 1900s, many American schools began to teach sewing to girls in classes often called **domestic science** or **home economics**, and 4-H clubs taught sewing to farm children. Pupils sewed aprons, bags, pillowcases and dresses on rows of treadle and electric machines, like the class in today's picture. One of the first lessons their teachers taught was not about sewing at all: it was about **pinning** and **pressing**. A tailor's saying puts it plainly: press as you sew.

How they figured it out. Sewers noticed that a seam sewn and left alone looks puffy and lumpy, and a fold made with fingers springs open again. But a seam pressed with a hot iron lies flat and crisp, and a pressed fold stays put, which makes the next step easier. They also noticed that sliding a hot iron back and forth over a seam or a cut edge stretches the fabric out of shape, especially on the bias. So they learned to **press**: lift the iron, set it down, hold a moment, lift and move. Pins, they learned, work best placed at **right angles** to the edge, heads toward the sewer, so each one can be pulled out easily just before it reaches the presser foot.

The fabric science. Heat and a little moisture loosen the bonds that hold fibers in their bent, wrinkled shape. Pressure flattens them, and as the fabric cools and dries, the fibers set in their new, flat shape. Each fiber needs its own heat: cotton and linen take a hot iron, wool and silk need medium heat with a press cloth, and polyester

and nylon need low heat, because synthetics can melt. Always check the iron's setting against the fiber. A **casing** is just a fold pressed and stitched into a tunnel. Pressing the fold first makes the casing straight and easy to sew.

Let's sew. You will make a **drawstring bag** from one rectangle of cotton: two side seams, a pressed casing at the top, and a cord to close it. Your one skill: press each seam and fold before you sew the next step, with your adult beside you at the iron.

PICTURE STUDY



Girls' Sewing Class, Bain News Service, 1925 · Glass-plate negative photograph · Library of Congress, Washington, D.C.

Image: [Wikimedia Commons](#), public domain

This photograph from 1925 shows a school sewing class. Each girl has her own machine, and the wall at the back is covered with samples, patterns and finished work. Many children in the 1920s learned to sew this way, and some of what they made went home to their families.

Look closely

- Find the sewing machines. Are they set into the tables or sitting on top? Can you see a handwheel?
- Look at the girls' hands. Where are they holding the fabric while they sew?
- Find the teacher at the back. What do you think she is watching for?
- Look at the samples on the back wall. What might the class have been making?

Talk about it

1. How is this classroom like your sewing place at home? How is it different?
2. Why do you think the girls are all sewing white cloth?
3. What safety rule would a teacher in this room need to repeat most often?

Safety first. Use the iron only with an adult beside you. Set it upright on its heel, keep the cord where no one can trip on it or pull it, use the right heat for the fiber, and unplug it when you finish. Steam burns too, so keep fingers away from the steam holes. At the machine, pull each pin before it reaches the foot, and count pins back in when you finish.

SEWING PROJECT

A Drawstring Bag

A drawstring bag is useful for everything: shoes, marbles, a lunch, a library book, a gift. You will cut one rectangle, sew two side seams, press, make a casing and thread a cord. Make one to keep, and when you are good at it, make one for a gift: it is its own wrapping.

You will need

- A sewing machine threaded for cotton (or a hand-sewing needle for the hand-sewn option)
- Fabric scissors, pins and a pincushion
- A seam gauge or ruler and a fabric marker
- An iron and ironing board, used with an adult beside you
- A large safety pin or bodkin for threading the cord

DRAWSTRING BAG WITH A TOP CASING

Finished size: about 9 × 10 in (23 × 25 cm) · About 60 to 90 minutes

Fabric and notions

- 1 rectangle of medium-weight cotton, 10 × 24 in (25 × 61 cm): quilting cotton, a pillowcase or an old cotton shirt back
- All-purpose thread to match
- 1 cord, ribbon or twisted cord (from Lesson 2.1), 30 inches (76 cm) long

How to make it

1. Finish the two short ends: an adult zigzags them, or you pink them with pinking shears, or fold them under $\frac{1}{4}$ inch and stitch.
2. Make the casing first: on each short end, fold $\frac{1}{4}$ inch to the wrong side and press (with your adult beside you at the iron). Fold again 1 inch and press. Open the folds out again for now.
3. Fold the rectangle in half the short way, right sides together, so it measures 10 × 12 in with the fold at the bottom. Pin both sides with pins at right angles.

4. On each side, sew from the fold up toward the top with a $\frac{1}{2}$ -inch seam allowance, backstitching at the start. Stop at the first pressed fold line, $1\frac{1}{4}$ inches below the top edge, and backstitch. The top $1\frac{1}{4}$ inches stays open so the cord can go through.
5. Press the side seams open, all the way to the top, with your adult beside you. Above the stitching, fold the raw edges of the opening under $\frac{1}{4}$ inch and stitch them down with a little U shape, or hand-sew with a few stitches.
6. Refold the casing along the pressed lines ($\frac{1}{4}$ inch, then 1 inch) on each side of the bag and pin.
7. Sew the casing down close to the lower fold, $\frac{1}{8}$ inch from it, all the way around each side, backstitching at each end. Do not sew across the side openings.
8. Pin a safety pin to one end of the cord and thread it through the front casing and then back through the back casing, so both ends come out on the same side. Knot the ends together.
9. Turn the bag right side out, push out the corners gently with a pencil, and press.

Fabric check: Medium-weight cotton or a cotton blend is easiest to press and sew; quilting cotton is ideal. Old pillowcases and shirt backs make good bags. Avoid slippery satin, stretchy knits and very thick fabric for a first bag. Press cotton with a hot iron and polyester blends at a lower setting. Hand-sewn option: sew the side seams and the casing with a backstitch, about 8 stitches to the inch.

Steps

1. **Count out** your pins and needle. Tie your hair back. Your adult sets up the iron on its heel, away from the edge of the board.
2. **Practice first.** Press a $\frac{1}{4}$ -inch fold and then a 1-inch fold on a scrap, measuring with the seam gauge before each press. Then sew a casing on the scrap.
3. Make the drawstring bag from the pattern card.
4. **Press test.** Sew two short seams on scraps. Press one open and leave one unpressed. Lay them side by side and photograph or draw them.
5. **Count in, unplug and clean up.** Count pins back in. Your adult unplugs the iron and sets it to cool safely. Unplug the machine.

6. **Improve it.** Make a second bag for a gift, trying to make the casing stitching straighter. Tuck a note inside.

Tips

- Pressing is half of sewing. If a step looks crooked, press it before you decide to unpick it.
- Put pin heads toward you so they are easy to pull out as you sew.
- Older students: add a ¼-inch topstitch around the bag opening or use two cords from opposite sides for a bag that closes evenly.

Check your work

- ☐ I can explain the difference between pressing and ironing.
- ☐ I pinned at right angles and pulled every pin before it reached the foot.
- ☐ My bag has straight side seams, a casing that holds the cord, and nothing left unpressed.

SEWING NOTEBOOK

1. Draw the drawstring bag in four steps: the rectangle, the folded and sewn sides, the casing, the finished bag.
2. Make a chart of iron settings for cotton, linen, wool, silk, polyester and nylon.
3. Tape in your press-test scraps and write which one looks better and why.

From history. Many 4-H clubs began in the early 1900s, and sewing was one of the first projects for girls. Members made a simple item first, often a bag, an apron or a towel, before moving on to clothes, and showed their work at the county fair, just as you will show yours at the sewing fair at the end of this course.

COMMON MISTAKES

- Sewing the side seams all the way to the top, so there is no opening for the cord.
- Sliding the iron back and forth over a seam, which stretches it. Lift and press.
- Using a hot cotton setting on polyester, which can melt it. Check the fiber first.
- Sewing the casing too close to the top edge, so the cord has no room.

Make it a game • Press, Don't Slide. Move your hand to show pressing: lift and press down. Then ironing: slide. Your parent calls a task and you pick. Next, lay pencil 'pins' crosswise on two paper strips and pull each one out before it reaches a book edge, the presser foot. Explain why sewers press each seam.

4.4 THE PILLOWCASE

OBJECTIVES

- Make a pillowcase with the roll-up (“burrito” or “hot dog”) method so all the raw edges are hidden in the cuff.
- Finish the side and bottom seams so they will not fray.
- Sew a pillowcase as a gift for someone else, and tell why sewing for others is a good use of a skill.

Warm-up. Take a pillowcase off a pillow and turn it inside out. How many seams does it have? Where are they? Are the raw edges finished, folded, zigzagged or serged? Measure the pillowcase from side to side and from top to bottom. Write the measurements.

WATCH

Make an Easy Tube Pillow Case with Jenny Doan of Missouri Star (Instructional Video)

Missouri Star · 9:42

<https://www.youtube.com/watch?v=MrYWCma9wgM>

WHEN TO WATCH

Before you cut your fabric. Watch the rolling step twice: it looks like a trick, but it is just folding.

Note: Jenny Doan cuts with a rotary cutter; in this course an adult cuts, or you cut with fabric scissors along a drawn line. Our pattern card gives exact sizes.

BACKUP VIDEO

Children's Sewing Projects: Easy Pillowcase with Jenny and Talon

Missouri Star · 19:07

<https://www.youtube.com/watch?v=3mXaYrSMk8c>

A grandmother teaches her grandson to sew a pillowcase step by step at the machine. Watch the parts that show the rolling and the side seams.

KEY TERMS

cuff

The wide band of fabric at the open end of a pillowcase.

French seam

A seam sewn twice: first with wrong sides together, then trimmed and turned and sewn with right sides together, so the raw edges are enclosed.

raw edge

A cut edge of fabric that has not been finished and can fray.

yard

A length of fabric 36 inches (91 cm) long, sold off the bolt. A quarter yard is 9 inches.

width of fabric

The width of fabric from selvage to selvage, often about 42 to 44 inches for quilting cotton.

CORE IDEAS

The story. A pillowcase is one of the most loved first sewing projects, and one of the most loved gifts. In recent years, quilt shops, church groups and sewing clubs across the country have sewn pillowcases by the thousands for children in hospitals, for foster children who arrive at a new home with very little, and for families who have lost everything in a fire or a flood. A bright, new pillowcase sewn by a stranger is a small way of saying, “Someone thought of you.” Sewing for others is as old as Dorcas. Today you will sew a pillowcase for someone else.

How they figured it out. A plain pillowcase has a hem at the open end that can look bulky and fray inside. Quilters worked out a clever way to sew the cuff so that every raw edge ends up hidden inside it in a single seam. You lay the cuff, the trim and the body together, **roll the body up** like a burrito or a hot dog bun, wrap the cuff around the roll and pin it, sew one seam, and pull the body out through the tube. When you turn it, the cuff is finished on both sides with no raw edge showing. Then you sew the side and bottom, and you are done.

The craft. A standard pillowcase body is cut **27 inches** long and the **width of the fabric**, about 42 inches. The cuff is **9 inches** by the same width. That is $\frac{3}{4}$ yard for the

body and $\frac{1}{4}$ yard for the cuff: one yard in all. Folded and sewn, the finished case is about 20 by 30 inches, which fits a standard pillow. The side and bottom seams must be finished so they do not fray in the wash: sew them with a zigzag over the edge, have a parent serge them, or, for a very neat finish, sew a **French seam** that hides the raw edge inside a second seam.

Let's sew. You will make a **roll-up pillowcase** with a cuff and an optional narrow trim, by machine or by hand, and give it to someone. Your one skill: line up all the edges exactly before you roll, so that the cuff seam catches every layer.

PICTURE STUDY



Woman Sewing by Lamplight, Jean-François Millet, about 1870–1872 · Oil on canvas · The Frick Collection, New York

Image: [Wikimedia Commons](#), public domain

Millet painted a farm family's evening. The day's work in the fields is done, the baby is asleep, and by the light of a single small lamp the mother is still sewing, perhaps a shirt for her husband or clothes for the children. Her work is quiet and unseen, and it is a gift to her whole family.

Look closely

- Find the lamp. Where is the light brightest in the picture?
- Find her hands and the thread. Which hand pulls the needle, and which holds the cloth?
- Find the baby in the cradle behind her. Why is the room so quiet?
- Look at her face. Is she tired, calm or happy? What makes you think so?

Talk about it

1. Who do you think she is sewing for?
2. How is her work a kind of gift, even though no one thanks her for it in the picture?
3. Who will you give your pillowcase to, and what will you write on the card?

Safety first. An adult cuts the long strips if a rotary cutter is used; students cut with fabric scissors along a drawn line. Use the iron and the machine only with an adult beside you, fingers an inch from the needle, at slow speed, pulling every pin before it reaches the foot. Count pins back in and unplug the iron and the machine when you finish.

SEWING PROJECT

A Roll-Up Pillowcase to Give Away

This is your first big machine project, and it is meant to be given. Choose a cheerful cotton for the body and a matching one for the cuff. You will roll, sew, turn and finish, and in about two hours you will hold a pillowcase that looks like it came from a store, but better, because you made it.

You will need

- A sewing machine threaded for cotton (or a hand-sewing needle for the hand-sewn option)
- Fabric scissors, a long ruler or yardstick and a fabric marker
- Pins and a pincushion
- An iron and ironing board, used with an adult beside you
- A safety pin or two, and a chopstick for pushing out corners

ROLL-UP (BURRITO) PILLOWCASE

Finished size: about 20 × 30 in (51 × 76 cm), for a standard pillow · About 90 minutes to 2 hours

Fabric and notions

- Body: $\frac{3}{4}$ yard of quilting cotton, cut 27 in × the width of fabric (about 42 in)
- Cuff: $\frac{1}{4}$ yard of a coordinating quilting cotton, cut 9 in × the width of fabric
- Trim (optional): one strip 2 in × the width of fabric, folded in half lengthwise and pressed
- All-purpose thread to match
- Prewash all fabrics and press them before cutting

How to make it

1. Trim off the selvages so all three pieces are the same length (about 42 inches). Fold the trim strip in half lengthwise, wrong sides together, and press with your adult beside you.

2. Lay the cuff right side up. Lay the folded trim on top along one long edge, raw edges together. Lay the body right side up on top of that, its 42-inch edge lined up with the same edges. Pin through all layers at one end.
3. Roll the body up tightly from the far edge toward the pinned edge, like a burrito, until the roll is about 4 inches from the edge.
4. Bring the other long edge of the cuff up over the roll and line it up with the pinned edges, so the roll is wrapped inside the cuff like a tube. Now four layers of edges are together: cuff, trim, body, cuff. Pin every 3 inches, pins at right angles.
5. Sew along the pinned edge with a ½-inch seam allowance, backstitching at both ends and pulling out pins as you go. Be careful not to catch the roll.
6. Reach into one open end of the tube and pull the body out. Keep pulling until the whole thing turns right side out. The cuff is finished, with no raw edges showing. Press the cuff with your adult beside you.
7. Fold the pillowcase in half, wrong sides together for a French seam (or right sides together for a plain seam), lining up the cuff seams. Pin the side and bottom.
8. French seam: sew the side and bottom with a ¼-inch seam, pivoting at the corner. Trim to ⅛ inch, turn wrong side out, press, and sew again with a ⅜-inch seam, enclosing the raw edges. Plain seam: sew a ½-inch seam and have a parent zigzag or serge the raw edges.
9. Turn right side out, push out the corners with a chopstick, and press the whole pillowcase.

Fabric check: 100% cotton quilting fabric is best: it is easy to press and sew, washes well and does not slip. Choose a cuff fabric that looks good with the body. Prewash both fabrics so the cuff and body shrink the same amount before you sew. Avoid flannel for a first pillowcase (it stretches) and satin (it slides). For a gift to a hospital or a shelter, ask what fabrics and sizes they accept. Hand-sewn option: sew the cuff seam and side seams by hand with a backstitch, about 8 stitches to the inch; it takes longer but is just as strong.

Steps

1. Count out your pins. Tie your hair back.

2. **Practice the roll.** Before you cut real fabric, practice the roll-up with three strips of paper or old sheet, pinning and turning without sewing, so you see how it works.
3. Make the pillowcase from the pattern card.
4. **Measure.** Measure the finished pillowcase. Is it about 20 × 30 inches? Is the cuff even all the way around?
5. **Wash test.** Wash and dry your own sample scrap seams (a French seam and a plain seam with no finish). Which held up better?
6. **Give it.** Fold the pillowcase, tie it with a ribbon and write a card. Give it to a family member, a neighbor, or a children's hospital or church project that collects them.
7. **Count in, unplug and clean up.** Count pins back in, unplug the iron and machine, and save scraps for your scrap bag.
8. **Improve it.** Make a second pillowcase, this time for your own bed, and try a contrasting trim.

Tips

- If the cuff seam missed a layer, unpick just that part and sew it again. Check all four layers before you sew.
- A directional print (one with animals that stand up) should have the tops pointing toward the cuff on the body piece. Check before you roll.
- Younger students: an adult may do the rolling and pinning while the student does the sewing; or make a pillowcase for a small pillow with all the pieces 14 inches wide.

Check your work

- ☐ I can explain how the roll-up method hides all the raw edges in the cuff.
- ☐ My side and bottom seams are finished so they will not fray.
- ☐ I sewed a pillowcase and gave it to someone with a card.

SEWING NOTEBOOK

1. Draw the roll-up step: the cuff on the bottom, the trim, the body, the roll, and the cuff wrapped over it.

2. Draw a French seam in two steps from the side, showing where the raw edge ends up.
3. Write who received your pillowcase and one sentence about why you chose them.

From history. Before there were bed sheets made in factories, many American families sewed their own pillowcases from cotton or linen, often from flour and feed sacks in the 1920s and 1930s, when sack makers printed their cotton bags with pretty patterns so families could reuse them. A pillowcase was often embroidered with initials or flowers and given as a wedding gift.

COMMON MISTAKES

- Laying the body wrong side up, so the cuff ends up on the inside. Body and cuff both start right side up.
- Rolling so loosely that the roll gets caught in the seam.
- Forgetting to finish the side seams, so they fray in the first few washes.
- Skipping the prewash, so the cuff and body shrink differently and pucker.

Make it a game • Yard Guess. Cut a length of string that you think is one yard. Your parent does too. Measure both on a yardstick, then say what width of fabric means. Closest wins. Roll a towel inside a scarf to show the burrito pillowcase method, and tell where the raw edges hide.

Scripture. “It is more blessed to give than to receive.” (Acts 20:35, KJV)

Paul reminded the believers of these words of the Lord Jesus. When you give away the first pillowcase you have made, you will find out how true they are.

UNIT 4

MACHINE SEWING

A sewing machine can sew in one minute a seam that would take an hour by hand, and its stitches are small, even and strong. In this unit you will meet the inventors who made it possible: Walter Hunt, who built a machine and never patented it; Elias Howe, who put the eye of the needle at its point and patented his lockstitch machine in 1846; and Isaac Singer, whose 1851 machine, with its up-and-down needle and presser foot, became the machine families bought for their homes. You will learn how the top thread and the bobbin thread lock together in the middle of the fabric, and you will learn the parts of your own machine.

Then you will sew. You will start on paper with no thread at all, then sew straight seams on scrap fabric with a $\frac{5}{8}$ -inch seam allowance, backstitch at the ends, and pivot at a corner. You will learn to pin and to press. You will make a **drawstring bag** and a **pillowcase**, one for your family and one to give away. Every step is done at slow speed, with an adult beside you. If your family has no machine, you can borrow one from a relative or a friend at church, and every project also has a hand-sewn option.

PREREQUISITES

- Can sew a running stitch and a backstitch by hand (Unit 3)
- Can measure to the nearest $\frac{1}{8}$ inch with a ruler or seam gauge
- Has been shown the machine's on/off switch and foot pedal by an adult, and knows the finger rule

MASTERY CHECKLIST

- ☐ I can tell how Hunt, Howe and Singer each helped invent the sewing machine.
- ☐ I can name the main parts of a sewing machine and tell what each does.
- ☐ I can explain how the top thread and the bobbin thread make a lockstitch.
- ☐ I can sew a straight seam with a $\frac{5}{8}$ -inch seam allowance, backstitch at both ends, and pivot at a corner, at slow speed with an adult beside me.
- ☐ I follow the machine safety rules every time: fingers an inch from the needle, foot off the pedal when threading, no sewing over pins, hair tied back, unplug when done.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Your sewing machine's manual:** Free. Every machine is threaded a little differently. If you have lost the paper manual, search the maker's website for your machine's model number; most manuals can be downloaded at no cost.
- **Spare machine needles and bobbins that fit your machine:** Universal needles in size 80/12 for cotton, and four or five extra bobbins of the right type for your model. An adult changes the needle.
- **A seam gauge and a magnetic seam guide:** Inexpensive tools. A 6-inch seam gauge with a sliding marker measures hems and seam allowances; a magnetic seam guide set on the needle plate at $\frac{5}{8}$ inch helps beginners sew straight. (Do not use a magnetic guide on a computerized machine unless the manual says it is safe.)

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

4.1 Elias Howe's Needle	2 sessions of 45–60 minutes
4.2 Isaac Singer and the Lockstitch	2 sessions of 60–90 minutes
4.3 Pins, Pressing and the Drawstring Bag	2 sessions of 60–90 minutes
4.4 The Pillowcase	2 sessions of 60–90 minutes

UNIT 4 REVIEW

Answer each question in complete sentences unless it asks for a list or a number. Questions marked “Show me” are answered at the machine, with an adult beside you. The review is worth 50 points.

1. **5 pts**
What was special about Elias Howe's needle, and in what year did he get his patent?
2. **5 pts**
Name two things Isaac Singer's 1851 machine had that made it practical for homes.
3. **5 pts**
Explain how a lockstitch is made.
4. **5 pts**
Name five parts of a sewing machine and what each does.
5. **5 pts**
What is a seam allowance? What is the usual seam allowance for clothing, and for quilting?
6. **5 pts**
List the sewing-machine safety rules.

7. 5 pts

What is the difference between pressing and ironing, and why do sewers press seams?

8. 5 pts

Predict what happens: you sew a seam without backstitching at either end, and then you wash the item several times. What happens, and why?

9. 5 pts

A pillowcase body is cut 27 inches long and the cuff is cut 9 inches. How many inches of fabric is that in all, and how many yards?

10. 5 pts

Show me: with your adult beside you, sew a 6-inch seam on scrap fabric with a $\frac{5}{8}$ -inch seam allowance, backstitching at both ends, and pivot at one corner.

ANSWER KEY

1. The eye was at the point, so the needle could push a loop of thread through the cloth without passing all the way through; a shuttle under the cloth caught the loop to make a lockstitch. His patent was granted in 1846.
2. Any two: a straight needle that moved up and down; a presser foot; a flat table so the cloth could turn; a foot treadle that left both hands free. Singer also sold machines on monthly payments.
3. The needle takes the top thread down through the fabric and makes a loop; a hook or shuttle carries the loop around the bobbin; the take-up lever pulls it tight, so the top and bobbin threads lock together in the middle of the fabric.
4. Any five, such as: needle (carries the top thread); presser foot (holds the fabric down); feed dogs (move the fabric); bobbin (holds the bottom thread); tension discs (control how tight the thread is); take-up lever (pulls each stitch tight); handwheel (moves the needle by hand); reverse lever (sews backward); needle plate (has seam-allowance lines); foot pedal (starts and sets speed).
5. The distance between the stitching and the cut edge. Clothing usually uses $\frac{5}{8}$ inch (1.5 cm); quilting uses $\frac{1}{4}$ inch.
6. An adult beside you; hands flat and fingers at least an inch from the needle; foot off the pedal and machine off when threading or touching the needle area; never sew over pins; hair tied back, no dangling sleeves or necklaces; slow speed; unplug when done; an adult changes needles and clears jams.
7. Pressing lifts and sets the iron down in one spot; ironing slides it back and forth. Sewers press so seams and folds lie flat and crisp without stretching the fabric, which makes the next step easier and the finished piece neater.
8. The seam begins to unravel from the ends, because the last stitches are not locked and the thread pulls out a little at a time. Backstitching locks the ends.
9. $27 + 9 = 36$ inches, which is 1 yard ($\frac{3}{4}$ yard for the body and $\frac{1}{4}$ yard for the cuff).
10. The student sews at slow speed with fingers an inch away, keeps the edge on the $\frac{5}{8}$ -inch line, backstitches at both ends, stops with the needle down at the corner, lifts the foot, pivots and finishes the seam; pins are pulled before the foot.

UNIT CHALLENGE: A MACHINE-SEWN TOTE BAG

Sew a lined or unlined tote bag on the machine, at slow speed with an adult beside you. Cut two rectangles of sturdy cotton (canvas, denim or two layers of quilting cotton), each 15×16 inches, and two straps, each 4×24 inches, folded and topstitched into 1-inch straps. Sew the sides and bottom with a $\frac{5}{8}$ -inch seam allowance, finish the raw edges, hem the top, and sew on the straps with a box stitch so they hold. (Families without a machine may hand-sew the bag with a backstitch, or make a second pillowcase instead.)

Add a notebook page with your seam samples from this unit, the measurements of your bag, and one sentence about what you would change next time.

LOOK FOR	WHAT IT MEANS
Straight seams	Seams are straight and about $\frac{5}{8}$ inch from the edge, backstitched at both ends.
Finished edges	Every raw edge is finished (zigzag, serged, French seam or hemmed) so the bag will not fray.
Strong straps	Straps are sewn on securely and the bag can carry a few books without pulling loose.
Safety	The student followed the machine rules every time: adult beside, fingers an inch away, pins pulled, machine and iron unplugged.
Record and improvement	A notebook page with seam samples, measurements and one improvement made or planned.

UNIT 5

CROCHET

In this unit you trade your needle for a **hook**. Crochet makes cloth out of one long strand of yarn, one loop pulled through another, with no loom and no machine. You will learn to make a slip knot and a **chain**, then build the chain into rows of **single crochet** and **double crochet**, and finally work round and round from the center to make the famous **granny square**.

You will also learn to read the short code that crocheters have used for nearly two hundred years: *ch*, *sc*, *dc*, *sl st*. Along the way you will meet the Irish girls and women who crocheted lace to help their families through hard years, the little pattern books that first taught the craft, and the many people who have crocheted blankets to give away. By the end of the unit you will have a bracelet, a coaster, a dishcloth and a granny square, and you will be able to make something useful from a ball of yarn and a hook that fits in your pocket.

PREREQUISITES

- Can tie a knot and cut yarn safely with scissors carried points down (Unit 3)
- Knows the needle-and-pin count and keeps a tapestry needle in a pincushion (Unit 3)
- Can measure in inches with a ruler or tape measure (Units 3–4)
- Knows what a yarn is and how twist makes it strong (Unit 2)

MASTERY CHECKLIST

- ☐ I can make a slip knot, hold my hook and yarn, and crochet an even chain.
- ☐ I can work rows of single crochet with a turning chain and keep the same number of stitches in every row.
- ☐ I can read a simple crochet pattern written in standard abbreviations (*ch*, *sc*, *dc*, *sl st*, *st*, *rep*) and work double crochet.
- ☐ I can explain gauge and yarn weight, and choose a hook to match my yarn.
- ☐ I can crochet a granny square in rounds and join squares to begin a blanket for someone else.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Craft Yarn Council: Standard Yarn Weight System**: Free. A chart of yarn weights 0–7 with the hook sizes usually used for each. Our projects use weight 4, “medium” or worsted.
- **Craft Yarn Council: Crochet Abbreviations**: Free. The standard list of crochet abbreviations used in printed patterns. Helpful for Lesson 5.3 and the unit challenge.
- **Craft Yarn Council: Hooks and Needles**: Free. A table that matches U.S. letter-number hook sizes (such as H-8) to millimeters.
- **A 5 mm (H-8) crochet hook and a large-eye tapestry needle**: An aluminum or bamboo hook is inexpensive and lasts for years. The blunt tapestry needle is for weaving in yarn ends.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

5.1	The Hook and the Chain	2 sessions of 45–60 minutes
5.2	Single Crochet Rows	2 sessions of 45–60 minutes
5.3	Reading a Pattern	2 sessions of 45–60 minutes
5.4	The Granny Square	2 sessions of 45–60 minutes

UNIT 5 REVIEW

Answer each question in complete sentences unless it asks you to show. The two “show me” items are done with your hook and yarn while your parent watches. The review is worth 50 points.

1. **5 pts**

What does the word *crochet* mean, and what is the biggest difference between crochet and knitting?

2. (5 pts)

How did crochet help families in Ireland in the 1840s, and what clever idea did the lacemakers use?

3. (5 pts)

Show me. Make a slip knot and crochet a chain of 15 even stitches. Then work one row of single crochet across it.

4. (5 pts)

What does a turning chain do? How many chains are used for single crochet and for double crochet, and which one counts as a stitch?

5. (5 pts)

Predict. A beginner makes a square in single crochet but skips the last stitch of every row. What will the piece look like after 15 rows, and how can she prevent it?

6. (5 pts)

Write what each abbreviation means: ch, sc, dc, sl st, sk, rep. What does (31 sts) at the end of a row tell you?

7. (5 pts)

Read this and write it in full words: *Ch 3 (counts as dc), sk first st, dc in each st across. Turn.*

8. (5 pts)

What is gauge? Your square comes out bigger than your partner's with the same yarn. Give one reason and one fix.

9. (5 pts)

Show me. Show your parent one corner of your granny square. Point to a cluster, a chain space, and the corner space, and tell how many double crochets and chains go in a corner.

10. (5 pts)

Why should a dishcloth or coaster be made of cotton yarn instead of acrylic?

ANSWER KEY

1. It comes from a French word for a small hook. In crochet only one loop is live on the hook at a time and each stitch is finished before the next; in knitting many live stitches are held on the needles at once.
2. When the potato crop failed, nuns and teachers (for example at the Ursuline Convent in Blackrock, County Cork) taught girls and women to crochet lace that imitated costly Venetian lace. They sold it to earn money for their families. They made small motifs one at a time and joined them, so many people could work on one piece and mistakes were small.
3. Parent checks: the slip knot slides; the chains are even in size; the single crochet row starts in the 2nd chain from the hook and has 14 stitches.
4. It raises the yarn to the height of the next row. Single crochet uses 1 chain, which does not count as a stitch. Double crochet uses 3 chains, which usually count as the first stitch.
5. It will get narrower and narrower, like a triangle or a trapezoid, losing one stitch each row. She should count stitches at the end of every row and make sure she works into the last stitch.
6. ch chain; sc single crochet; dc double crochet; sl st slip stitch; sk skip; rep repeat. (31 sts) is the stitch count: you should have 31 stitches when the row is done.
7. Chain 3; this counts as the first double crochet. Skip the first stitch, then make a double crochet in each stitch to the end of the row. Turn the work.
8. Gauge is how many stitches and rows fit in a measured length, such as 4 inches. Your hook may be bigger, or your tension looser. Use a smaller hook (or crochet a little more tightly) to match.
9. Parent checks: the student points correctly; a corner is 3 dc, ch 2, 3 dc worked into the same corner space.
10. Cotton soaks up water and does not melt; it washes in hot water. Acrylic does not absorb drips well and can melt if it touches a hot pan or mug.

UNIT CHALLENGE: A CROCHETED DISHCLOTH SET WITH A WRITTEN PATTERN

Crochet a set of two or three cotton dishcloths (or a single-crochet or granny-square scarf about 5 inches wide and as long as you are tall). Make at least one in a different stitch, edging or color than Lesson 5.3.

In your notebook, write the pattern for your set in standard abbreviations, with stitch counts and gauge, so someone else could make it. Tie the set with a ribbon and give it to someone with a short handwritten note.

LOOK FOR	WHAT IT MEANS
Finished set	Two or three dishcloths (or a scarf) with even stitches, straight edges or sharp corners, and ends woven in.
Written pattern	Uses correct standard abbreviations, gives stitch counts and gauge, and could be followed by someone else.
Safe and tidy work	Tools counted and put away; yarn and scraps kept from babies and pets; scissors carried safely.
Record and improvement	Row logs kept honestly; names one thing improved from the first piece to the last. Uneven pieces that are honestly recorded and redone earn full credit.
Given away	At least one piece given with a note.

5.1 THE HOOK AND THE CHAIN

OBJECTIVES

- Tell how crochet spread in the 1800s and how Irish girls and women crocheted lace to help their families earn a living.
- Read a yarn label for its weight and suggested hook size, and match a 5 mm (H-8) hook to worsted-weight yarn.
- Make a slip knot, hold the hook and yarn, and crochet an even chain.

Warm-up. Find a crocheted or knitted thing in your house (a blanket, a hat, a dishcloth, a sweater edge). Look closely with a magnifying glass if you have one. Can you find one loop pulled through another? Then hold a crochet hook and a sewing needle side by side. What is different about the tip? Guess why.

WATCH

Crochet Slip Knot & Chain for Absolute Beginners (Easy Tutorial!)

Hooked by Robin · 7:07

<https://www.youtube.com/watch?v=MQlCBJ3or2o>

WHEN TO WATCH

After “The craft” paragraph. Watch once all the way through, then again with your yarn and hook in hand, pausing after the slip knot and again after every few chains.

Note: Robin shows both the slip knot and the chain slowly, with close-ups of both hands. She holds the hook like a pencil; holding it like a knife also works.

BACKUP VIDEO

Crochet basics: Chain stitch & Foundation chain | Bella Coco

Bella Coco · 4:21

<https://www.youtube.com/watch?v=acaq47Gwypg>

A short second look at the chain and the foundation chain, filmed close up.

KEY TERMS

crochet

Making fabric by pulling loops of yarn through other loops with a hook. Say it “kro-SHAY.” It comes from a French word for a little hook.

chain (ch)

The first and simplest crochet stitch: yarn over the hook and pull it through the loop already on the hook. A row of chains is the start of most projects.

yarn weight

How thick a yarn is. The Craft Yarn Council numbers weights from 0 (very fine lace) to 7 (jumbo). Worsted is weight 4, “medium.”

slip knot

A loop that tightens when you pull the short tail and slides when you pull the long end. It puts the first loop on your hook.

yarn over (yo)

Wrapping the yarn over the hook from back to front so the hook can catch it.

tension

How tightly the yarn runs through your fingers. Even tension makes even stitches.

CORE IDEAS

The story. No one knows who first made fabric with a hook. People looped thread with small hooks for hundreds of years, but crochet as we know it became popular in Europe in the early 1800s. The first printed crochet instructions we know of appeared in a Dutch magazine in 1823, with pictures of crocheted purses. Soon little crochet books were sold all over Britain, and an English writer of the 1840s said the craft had been practiced by Scottish shepherds with a “shepherd’s hook.” Then crochet helped many families in Ireland. In the 1840s the potato crop, the main food of poor Irish families, failed again and again. By 1845 the nuns at the Ursuline Convent in Blackrock, County Cork, were teaching girls to crochet lace, and within a few years it was taught all over the country. Irish crochet lace copied costly lace from Venice in Italy, but it could be made at home with cotton thread and a fine steel hook. Collars and trims were sold to shops, and the money helped buy food. Within a few years thousands of Irish women were earning a living with a crochet hook.

How they figured it out. The Irish lacemakers found that they did not have to make a whole collar at once. Each woman crocheted small flowers, leaves and shamrocks,

called motifs, one at a time. Later the motifs were laid on a paper or cloth pattern and joined with chains. A whole family could work on one piece, and a mistake meant redoing one small flower, not a whole collar. That clever idea, building something big from small pieces, is the same idea you will use for the granny square at the end of this unit.

The craft. A crochet hook is a smooth rod with a little hook at one end, not a point. In crochet there is only **one live loop** on your hook at a time. Every stitch is finished before you start the next one. That is why crochet is easy to fix: if you make a mistake, you slide the hook out and gently pull the yarn, and the stitches come undone back to the mistake. A **chain** is the simplest stitch: you **yarn over** and pull the yarn through the loop on your hook. Each chain looks like a little V on the front and a bump on the back. Look at a yarn label: it shows the **yarn weight** (a number in a little ball of yarn) and the suggested hook size. Our projects use worsted yarn, weight 4, “medium.” Many worsted labels suggest a 5 mm hook, called H-8 in the United States. A thicker hook makes bigger, looser loops; a thinner one makes smaller, tighter loops.

Let’s crochet. You will make a chain-stitch bracelet, a bookmark with a tassel, and then a long chain that stretches across a room. The skill to do well is **even tension**: let the yarn slide through the fingers of your left hand (your right hand if you are left-handed) at the same speed every time, so every chain is the same size. Chains that are too tight are hard to work into later; chains that are too loose look sloppy. Practice until your chains look like a row of matching beads.

PICTURE STUDY



A Girl Crocheting, Edmund C. Tarbell, 1904 · Oil on canvas

Image: [Wikimedia Commons](#), public domain

Edmund Tarbell was an American painter from Boston who loved to paint quiet rooms full of soft light, with someone busy at a task. Here a young woman sits at a polished table, bent close over her crochet. Nothing in the room is in a hurry. Crochet takes patience, and Tarbell painted that patience.

Look closely

- Find her hands. How close does she hold her work to her eyes? Why might she need to look so closely?
- Find the light. Where is the window? Why would a crocheter want to sit near the light?
- Look at how she sits: elbows close, shoulders bent. How are you sitting when you crochet?
- Find the china and the pictures on the wall. Is this a busy room or a quiet one?

Talk about it

1. A crocheter makes one loop at a time. What other jobs are done one small step at a time?
2. If you could ask her what she is making, what do you think she would say?

3. Why do you think Tarbell made the room so dim and her hands so bright?

Safety first. A parent or responsible adult supervises all sewing-tool use. Crochet hooks are blunt but are never poked toward faces or eyes; carry scissors points down and closed. Keep loose yarn and long chains away from babies, toddlers and pets, and roll up your room chain when you finish so no one trips or gets tangled.

SEWING PROJECT

Chain It: A Bracelet, a Tasseled Bookmark and a Room Chain

You will practice the slip knot and chain until your chains are even, then turn them into two small useful things: a bracelet and a bookmark with a tassel. Finally you will chain one long cord to measure your room in chains. By the end you will know how many of your chains make one inch.

You will need

- A 5 mm (H-8) crochet hook
- Small scissors
- A tape measure or ruler
- A 3 × 5 inch index card or a piece of cardboard the same size
- A large-eye tapestry needle in a pincushion (optional, for weaving in ends)

CHAIN-STITCH BRACELET AND BOOKMARK TASSEL

Finished size: Bracelet about 7 in (18 cm) around; bookmark about 8 in (20 cm) long plus a 3-in tassel • About 45 minutes

Fabric and notions

- Worsted-weight (weight 4) yarn, about 15 yards (14 m), cotton or acrylic, in a light, smooth color
- A second color of worsted yarn, about 5 yards, for the tassel (optional)
- No other notions needed

How to make it

1. Leave a 6-inch tail and make a slip knot. Put it on the hook and pull the long end gently until the loop is snug but still slides.
2. Hold the hook in your right hand like a pencil (or like a knife). Wrap the yarn over your left index finger and hold the slip knot just under the hook with your left thumb and middle finger.
3. Yarn over from back to front, catch the yarn in the hook and pull it through the loop. That is one chain. Move your thumb and finger up to

hold the newest chain each time.

4. **Practice chain.** Chain 30. Look at your chains. If they are tight, relax your left hand; if they are loose, wrap the yarn once more around your little finger. Pull it out and try again until all 30 are about the same size.
5. **Bracelet.** Measure around your wrist and add 1 inch. Chain until your chain is that long. Cut the yarn, leaving a 6-inch tail, and pull the tail through the last loop to fasten off. Tie the two tails together in a square knot around your wrist (or ask a helper to), and trim the ends to $\frac{1}{2}$ inch.
6. **Bookmark.** Chain about 8 inches (count your chains and write the number down). Fasten off with a 6-inch tail.
7. **Tassel.** Wrap yarn around the 3-inch side of the index card 20 times. Slide a 10-inch piece of yarn under the wraps at the top and tie it tight. Cut the wraps open along the bottom edge of the card.
8. Wrap another 8-inch piece of yarn around the tassel about $\frac{1}{2}$ inch below the top 5 times and tie it. Trim the bottom of the tassel even.
9. Tie the tassel's top tie to one end of your bookmark chain. Tie a small knot or a second little tassel at the other end so it will not slip out of a book.

Fabric check: Use a smooth worsted-weight yarn in a light color so you can see each chain. Cotton is firm and does not stretch; acrylic is soft, inexpensive and comes in every color. Avoid fuzzy, bumpy or very dark yarns for your first chains: they hide the stitches. If wool itches you, any cotton or acrylic yarn works just as well.

Steps

1. **Read the label.** Find the yarn weight number, the fiber, and the suggested hook size on your yarn label. Write them in your notebook.
2. **Practice first.** Make three practice chains of 30 before you make the bracelet. Circle the best one and say what made it best.
3. Make the bracelet and the bookmark from the pattern card.
4. **Measure your gauge.** Lay your bookmark chain flat beside a ruler. Count how many chains fit in 2 inches and divide by 2. That is how many of your chains make one inch.

5. **Room chain.** Over the next few days, keep chaining one long chain. Each day, stretch it along a wall and mark how far it reaches. When it crosses your room, count or estimate its length in feet.
6. **Improve it.** Make one more bracelet as a gift. Is it more even than the first? Write what you changed.
7. Clean up: count your tapestry needle back into the pincushion, roll up loose yarn, and roll your room chain into a ball.

Tips

- Hold the work close to the hook. Move your left thumb and finger up every two or three chains so you are always holding the newest stitches.
- If the hook keeps slipping out of the loop, turn the hook so its throat faces down as you pull through.
- Left-handed crocheters do everything as a mirror image. A left-handed video, or sitting across from a right-handed helper, makes it easy to follow.

Check your work

- ☐ I can make a slip knot and a chain without help.
- ☐ My bracelet chain is even, with no loops much bigger or smaller than the others.
- ☐ I measured how many of my chains make one inch.

SEWING NOTEBOOK

1. Tape in a 3-inch piece of your best chain. Draw a close-up of three chains, labeling the V on the front and the bump on the back.
2. Copy the information from your yarn label: weight, fiber, yards, and hook size. Draw the yarn-weight symbol.
3. Write your gauge (“My chains: ___ per inch”) and how long your room chain grew each day.

From history. Irish crochet lace was so admired that it was worn by fine ladies in London and Paris. Some towns, such as Clones in County Monaghan, became known for their own styles, and Clones lace is still made there today. A summer school in Clones teaches the old patterns to new crocheters every year.

COMMON MISTAKES

- Pulling the slip knot so tight that the hook cannot move. The loop should slide easily on the shank of the hook.
- Holding the yarn so loosely that chains come out all different sizes. Wrap the yarn around your fingers to give it a little steady drag.
- Leaving long chains and yarn on the floor where a baby, a pet or a sleepy parent can get tangled. Roll them up.

Make it a game • Chain Challenge. Using a 5 mm hook and worsted yarn, make a slip knot, then chain as many stitches as you can in two minutes. Your parent counts them. Beat your count in the next round. Say what yarn label tells you: weight and hook size. Tell how Irish girls once crocheted lace to help their families.

5.2 SINGLE CROCHET ROWS

OBJECTIVES

- Tell how children about your age learned crochet from little pattern books in the early 1900s.
- Work single crochet into a foundation chain, make a turning chain, and turn the work at the end of each row.
- Count stitches in every row and keep the edges straight to make a square coaster in cotton yarn.

Warm-up. Take your chain from Lesson 5.1 and look at one chain closely. How many strands of yarn can you see in each one? (Look at the front and the back.) Then guess: if you want to turn a chain into a flat piece of cloth, where would the hook need to go next?

WATCH

HOW TO CROCHET FOR ABSOLUTE BEGINNERS | UK DOUBLE/US SINGLE | EPISODE TWO | Bella Coco Crochet

Bella Coco · 11:47

<https://www.youtube.com/watch?v=80YENyW1lw>

WHEN TO WATCH

After “The craft” paragraph. Watch the part on the first row, then pause and work it yourself. Watch the turning chain and second row, then pause again.

Note: Bella Coco is British. The stitch she calls a “UK double crochet” is the U.S. *single crochet*; the stitch is the same, only the name differs. We use U.S. names in this course.

BACKUP VIDEO

Single Crochet Stitch - Beginner Course: Lesson #6

Crochet Guru · 7:22

<https://www.youtube.com/watch?v=wgVOkQcf5qw>

If the first row is confusing, watch this one: it shows exactly where the hook goes into the chain.

KEY TERMS

single crochet (sc)

A short, firm stitch: insert the hook, yarn over and pull up a loop (two loops on the hook), then yarn over and pull through both loops.

turning chain

One or more chains made at the start of a row to lift the yarn up to the height of the new stitches. Single crochet uses one.

stitch count

The number of stitches in a row. In a square or rectangle it stays the same in every row.

foundation chain

The first row of chains that all the other rows are built on.

row

One line of stitches worked from one side of the piece to the other. You turn the work at the end of each row.

fasten off

Cutting the yarn and pulling the tail through the last loop so the work cannot unravel.

CORE IDEAS

The story. A little more than a hundred years ago, many American and British girls learned to crochet from small, inexpensive books written just for them. One, the *Priscilla Juniors' Crochet Book*, was published in Boston for girls “from 8 to 12 years.” Another, *The Mary Frances Knitting and Crocheting Book* by Jane Eayre Fryer (1918), told a story about a girl who learns one stitch at a time and makes clothes for her doll. These books did not start with fancy lace. They started with the chain, then rows of the plainest stitch, and asked the reader to practice until her rows were straight and even before she went on.

How they figured it out. Teachers had learned that the hardest part of crochet for a beginner is not the stitch itself but the **edges**. A beginner's square often grows wider and wider, or narrower and narrower, until it looks like a fan or a triangle. The reason is almost always the same: a stitch was added or skipped at the end of a row. So the old books, and good teachers today, say: count your stitches at the end of every row. If the number changes, find the mistake before you go on.

The craft. To make a **single crochet**, put the hook into a stitch, yarn over, and pull up a loop. Now you have two loops on your hook. Yarn over again and pull through both

loops. One loop is left, and one stitch is done. On the first row, you work into the chains: skip the chain next to the hook and put your first single crochet into the second chain from the hook. At the end of the row you make one **turning chain**, turn the work over like a page in a book, and start again. The turning chain lifts your yarn up to the height of the next row. On every row after the first, put the hook under **both** loops of the V at the top of each stitch. Single crochet makes a thick, firm fabric with stitches almost as tall as they are wide, so it is perfect for coasters, potholders and bags that must not stretch.

Let's crochet. You will crochet a square coaster from cotton yarn. Cotton soaks up drips from a cold glass, and it is fine with a warm mug. The skill to do well is **counting**: count your stitches at the end of every row, and make sure the first and last stitch of each row go into the very first and very last stitches of the row before.

PICTURE STUDY



Young Girl Crocheting, William-Adolphe Bouguereau, 1889 · Oil on canvas

Image: [Wikimedia Commons](#), public domain

Bouguereau was a French painter famous for his lifelike faces and hands. This country girl looks up from her crochet as if someone has just come into the room, but her fingers keep working. She has done this so many times that her hands know the stitches by heart.

Look closely

- Find her hands. Which hand holds the hook, and which holds the thread and the work?
- Look at her left fingers. How is she holding the thread to keep it tight?
- Find the white work in her hands. Is it thick yarn or fine thread? What might it become?
- Look at her shawl. Is it woven or crocheted? How can you tell?

Talk about it

1. She is not even looking at her hands. How many rows do you think it takes before your hands can work like that?
2. Why is it helpful to learn one stitch very well before learning a new one?
3. How does her face tell you how she feels about her work?

Safety first. A parent or responsible adult supervises all sewing-tool use. Point your hook away from your face and other people. Count the tapestry needle out and back into the pincushion, and keep yarn ends and cut snippets away from babies and pets.

SEWING PROJECT

A Single-Crochet Cotton Coaster

You will turn a short chain into a flat, square coaster, row by row. The skill inside it, counting stitches and keeping edges straight, is the most important habit in all of crochet. When it is done, it will sit under a cup on your family's table.

You will need

- A 5 mm (H-8) crochet hook
- Small scissors
- A large-eye tapestry needle in a pincushion
- A ruler and a stitch marker or a small safety pin

SQUARE SINGLE-CROCHET COASTER

Finished size: About 4 × 4 in (10 × 10 cm) · About 1 to 1½ hours

Fabric and notions

- Worsted-weight (weight 4) 100% cotton yarn, about 25 yards (23 m) per coaster
- A contrasting color of cotton yarn for an edging, about 5 yards (optional)

How to make it

1. Make a slip knot and chain 16.
2. **Row 1:** Single crochet in the 2nd chain from the hook and in each chain across. You should have 15 stitches. Count them.
3. Chain 1 (the turning chain). Turn the work over from right to left, like turning a page.
4. **Row 2:** Single crochet in the first stitch (the one right at the base of the turning chain) and in each stitch across, putting the hook under both loops of each V. Count: 15 stitches.
5. Clip a stitch marker or safety pin into the last stitch of Row 2 so you can find the edge.

6. Repeat Row 2 (chain 1, turn, 15 single crochet) until the piece is as tall as it is wide, about 16 to 18 rows. Measure: it should be about 4 inches each way.
7. Fasten off: cut the yarn, leaving a 6-inch tail, and pull it through the last loop.
8. Thread each tail on the tapestry needle and weave it in and out through the backs of 5 or 6 stitches, then trim it close.
9. **Optional edging:** Join a second color in any corner and work one round of single crochet around all four sides, putting 3 stitches in each corner. Join with a slip stitch and fasten off.

Fabric check: Choose 100% cotton worsted yarn: it soaks up water from a cold glass and does not melt under a warm mug. Acrylic yarn is not a good choice for coasters or potholders, because it does not soak up drips and can melt from a hot pan. Use a light, smooth color so you can see each V. Cotton has no stretch, so it can feel stiff at first; that is normal.

Steps

1. **Practice first.** On a short chain of 11, work three rows of 10 single crochet. Count after every row. Pull it out and start the real coaster when your count stays the same.
2. **Predict.** Before you start, guess how many rows it will take to make a square. Write your guess.
3. Make the coaster from the pattern card. At the end of every row, write the row number and your stitch count in your notebook (Row 1: 15, Row 2: 15 ...).
4. **Test the edges.** Lay the coaster on graph paper or beside a ruler. Are both side edges straight? If one side wiggles, find the row where the count changed.
5. **Test it.** Set a glass of ice water on your coaster for 15 minutes. Is the table dry under it?
6. **Improve it.** Make a second coaster so you have a pair. Did your edges improve? Write one thing you did differently.
7. **Clean up:** count the tapestry needle back into the pincushion, put scraps of yarn in a bag (they are good for stuffing or tassels), and put away your hook.

Tips

- The top of a single crochet looks like a sideways V. Always go under both strands of the V unless a pattern says otherwise.
- The last stitch of a row likes to hide. Before you turn, look for it at the very edge and make sure you worked into it.
- Younger students: make a smaller coaster (chain 11, 10 stitches) or a long, narrow strip for a bookmark. Older students: add a picot or a two-color striped edging.

Check your work

- ☐ I can make a single crochet and a turning chain without help.
- ☐ My coaster has the same number of stitches in every row and straight sides.
- ☐ I kept a row log and wove in my ends neatly.

SEWING NOTEBOOK

1. Draw a single crochet in three steps: hook in, two loops on the hook, one loop left. Label each step.
2. Keep your row log: row number and stitch count. Circle any row where the count changed and write what you found.
3. Tape in a snip of your cotton yarn and write the yarn weight, fiber, and how many rows made 4 inches.

From history. Most stitch names differ between the United States and Britain. The U.S. single crochet is called a double crochet in Britain, and the U.S. double crochet is called a treble. The stitches are exactly the same. Always check which terms a pattern uses before you begin.

COMMON MISTAKES

- Skipping the last stitch of a row. The piece gets narrower and narrower. Count every row.
- Working into the turning chain as if it were a stitch in single crochet. The piece gets wider. In single crochet the turning chain does not count as a stitch.
- Using acrylic yarn for a hot-pad or potholder. Acrylic can melt; use 100% cotton for anything that touches heat.

Make it a game • Count Every Row. Crochet three rows of single crochet, with ten stitches in each, counting aloud as you work. Your parent checks each row for the right count, turning chain and clean edges. A row with the right count scores a point. Before each row, tell one fact about little pattern books. Fasten off at the end.

5.3 READING A PATTERN

OBJECTIVES

- Tell how printed pattern books made it possible to learn crochet without a teacher beside you.
- Read and use the standard crochet abbreviations ch, sc, dc, sl st, st, sk and rep, and follow symbols such as * and ().
- Work double crochet with a 3-chain turning chain and crochet a cotton dishcloth from a written pattern.

Warm-up. Copy this onto a card and try to figure out what it says before you read the lesson: *Ch 12. Row 1: Sc in 2nd ch from hook and in each ch across. (11 sts).* What do you think “ch” and “sc” stand for? What does the number in parentheses tell you?

WATCH

HOW TO CROCHET FOR ABSOLUTE BEGINNERS | UK TREBLE/US DOUBLE | EPISODE THREE | Bella Coco Crochet

Bella Coco · 12:36

https://www.youtube.com/watch?v=rSUqMV_7GdU

WHEN TO WATCH

After you have learned the abbreviations in “The craft” paragraph. Watch the double crochet once, then again with your hook, pausing after each “yarn over, pull through two.”

Note: The stitch Bella Coco calls a “UK treble” is the U.S. *double crochet*. The stitch is the same; only the name differs.

BACKUP VIDEO

Crochet Abbreviations Quick Guide - US and UK terms

Bella Coco · 3:04

<https://www.youtube.com/watch?v=jOdPCill7OE>

A quick three-minute guide to the common abbreviations, showing each stitch as its letters appear. Keep your abbreviation card beside you as you watch.

KEY TERMS

pattern

Written step-by-step directions for making a crocheted or knitted item.

double crochet (dc)

A taller stitch: yarn over, insert the hook, yarn over and pull up a loop (3 loops), yarn over and pull through 2, yarn over and pull through the last 2.

repeat (rep) and *

Work the steps between the asterisks (or in the brackets) again, as many times as the pattern says.

abbreviation

A short way of writing a word, such as *ch* for chain, *sc* for single crochet and *dc* for double crochet.

slip stitch (sl st)

The shortest stitch: insert the hook, yarn over and pull through the stitch and the loop on the hook in one motion. Used to join and to move along without adding height.

gauge

How many stitches and rows fit in an inch (or in 4 inches) with your yarn and hook. Patterns list a gauge so your piece comes out the right size.

CORE IDEAS

The story. In the 1840s and 1850s, a London needlework teacher named Eléonore Riego de la Branchardière began publishing small, inexpensive books of crochet, knitting and tatting patterns. She wrote dozens of them over her life. Before books like hers, most people learned a stitch only by watching someone else make it. With a printed pattern, a girl in a farmhouse far from any teacher could make the same collar or purse as a lady in London. Writers soon found that spelling out “single crochet” and “double crochet” over and over took too much room, so they began to use short codes. Today the Craft Yarn Council publishes a standard list of abbreviations so that patterns from different designers use the same letters.

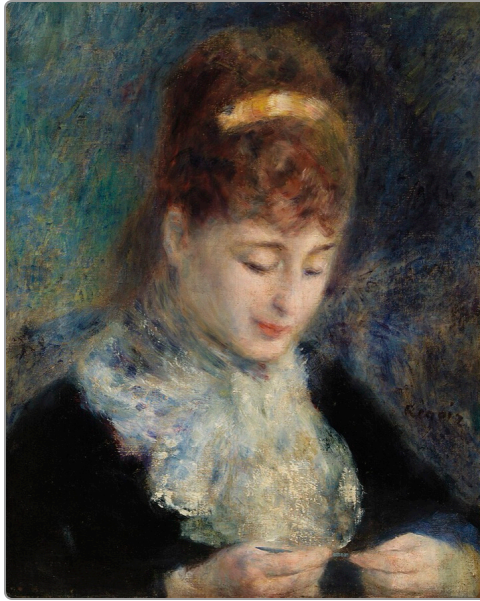
How they figured it out. Pattern writers had to solve a puzzle: how do you describe a stitch so clearly that someone you have never met can make it? They learned to give three things: the abbreviation of each stitch, the place to put it (“in 4th ch from hook,” “in each st across”), and the **stitch count** at the end of the row, in parentheses, so you can check yourself. They also printed a **gauge**, the number of stitches in 4

inches, so that a crocheter with a different hand could change hooks and still get the right size.

The craft. Here are the most common U.S. abbreviations: **ch** chain; **sl st** slip stitch; **sc** single crochet; **hdc** half double crochet; **dc** double crochet; **st(s)** stitch(es); **sk** skip; **sp** space; **rep** repeat; **yo** yarn over. An asterisk * means “repeat from here.” A number in parentheses at the end of a row, like (31 sts), is your stitch count. The **double crochet** is about as tall as three chains, so its turning chain is 3 chains, and that turning chain usually *counts* as the first stitch of the row. That is different from single crochet. Because double crochet is tall, it grows fast and makes a softer, more open fabric, which is just right for a dishcloth that must dry quickly.

Let’s crochet. You will crochet a cotton dishcloth by reading a real written pattern, line by line, without anyone telling you what to do next. The skill to do well is **following the pattern exactly**: read one line, do it, check the stitch count, and only then read the next line. Keep a pencil handy and make a tally mark beside each row as you finish it.

PICTURE STUDY



Woman Crocheting, Pierre-Auguste Renoir, about 1875 · Oil on canvas · The Barnes Foundation, Philadelphia

Image: [Wikimedia Commons](#), public domain

Renoir was a French painter who used quick, soft brushstrokes and bright color. He painted this young woman so close that we can hardly see her work, only her lowered eyes and the white lace at her collar. She is concentrating hard, the way you do when you are following a pattern and counting stitches.

Look closely

- Find her eyes. What is she looking at?
- Look at her white collar. It is a ruffle of lace or fine fabric. Could a collar like this be crocheted? How?
- Look at the brushstrokes. Are they smooth or quick and feathery? How is a painting made of many small strokes like a crocheted piece made of many small stitches?
- Find the blue in the background. Where else does Renoir use the same blue?

Talk about it

1. Her face is calm and serious. What does concentrating feel like when you crochet?
2. If you had to write a pattern for her collar so a stranger could make it, what would you need to tell them?

Safety first. A parent or responsible adult supervises all sewing-tool use. Keep your hook pointed away from faces, and carry scissors points down and closed. Count the tapestry needle back into the pincushion when you weave in your ends.

SEWING PROJECT

A Cotton Dishcloth from a Written Pattern

You will crochet a square dishcloth in double crochet, reading every step from a real pattern written in standard abbreviations. When it is done, it will scrub dishes in your kitchen for years, and you will be able to read the next pattern you find on your own.

You will need

- A 5 mm (H-8) crochet hook
- Small scissors
- A large-eye tapestry needle in a pincushion
- A ruler, a pencil, and an index card for your abbreviation key

DOUBLE-CROCHET COTTON DISHCLOTH (WRITTEN PATTERN)

Finished size: About 8 × 8 in (20 × 20 cm) · About 2 hours

Fabric and notions

- Worsted-weight (weight 4) 100% cotton yarn, about 80 yards (73 m): one small ball
- **Gauge:** about 14 dc = 4 in (10 cm) with a 5 mm hook. Gauge is not critical for a dishcloth.
- **Abbreviations (U.S.):** ch chain · dc double crochet · sc single crochet · sl st slip stitch · st(s) stitch(es) · rep repeat

How to make it

1. Ch 33.
2. **Row 1:** Dc in 4th ch from hook and in each ch across. Turn. (31 sts; the 3 skipped ch count as the first dc.)
3. **Row 2:** Ch 3 (counts as first dc), sk first st, dc in each st across, ending with dc in top of the turning ch. Turn. (31 sts)
4. Rep Row 2 until the piece measures about 7½ in from the beginning (about 13 to 15 rows). Do not fasten off.

5. **Edging round:** Ch 1, turn the piece so you can work down the side. Work sc evenly around all four sides, about 2 sc in the side of each dc row and 1 sc in each st or ch along the top and bottom, with 3 sc in each corner.
6. Join with a sl st to the first sc. Fasten off.
7. Weave in both ends with the tapestry needle, going back and forth through 6 or more stitches, and trim.

Fabric check: Use 100% cotton worsted yarn. Cotton is absorbent, scrubs well, and can be washed in hot water again and again. Acrylic does not soak up water and can melt if it touches a hot pan, so it is not a good dishcloth yarn. Any color works; a bright one is easy to find in the sink.

Steps

1. **Make an abbreviation key.** Copy the abbreviations onto an index card and keep it beside you as you work.
2. **Practice first.** On a chain of 13, work 3 rows of double crochet (11 sts each row, counting the turning chain). Check your count. Then pull it out.
3. **Measure gauge.** Before you go on, lay your practice piece on a ruler and count the double crochets in 2 inches. Multiply by 2 to get stitches in 4 inches. Compare with the pattern's gauge.
4. Crochet the dishcloth from the pattern card. Make a tally mark beside each row as you finish it, and write the stitch count.
5. **Rewrite it.** In your notebook, write the whole pattern again in full words ("Chain 33. Row 1: double crochet in the fourth chain from the hook ..."). Then write one row of it in abbreviations again from memory.
6. **Improve it.** Check your edges and corners. If you made a second dishcloth, what would you change: a different edging, a stripe of a second color, or a smaller size?
7. **Clean up:** count the tapestry needle back into the pincushion and put away your yarn and hook.

Tips

- In double crochet the turning chain counts as a stitch, so the last stitch of each row goes into the top of the turning chain from the row before. Skipping it makes the piece narrower.

- If your rows grow wider, you probably put a stitch into the first stitch right beside the turning chain. The pattern says to skip it.
- Older students: try the pattern again with rows of sc and dc alternating, and write out the new pattern yourself.

Check your work

- ☐ I can read ch, sc, dc, sl st, st and rep in a pattern without looking them up.
- ☐ I can make a double crochet and count my turning chain as a stitch.
- ☐ I followed a written pattern from start to finish and kept a row tally.

SEWING NOTEBOOK

1. Make an abbreviation chart: the letters, the full name, and a tiny drawing of each stitch's height.
2. Write your dishcloth pattern in full words, then in abbreviations.
3. Record your gauge: stitches in 4 inches with your hook and yarn. Tape in a 3-inch snip of the yarn.

From history. Crochet patterns can also be drawn as charts with little symbols: a dot or oval for a chain, a plus sign or X for single crochet, and a tall T with a slash for double crochet. Charts are used all over the world, so a crocheter can follow a chart from Japan or Brazil without reading the language.

COMMON MISTAKES

- Reading the whole pattern once and then working from memory. Read one line, do it, check the count, and then read the next line.
- Using U.S. and U.K. patterns as if the names were the same. A U.K. "double crochet" is a U.S. single crochet. Check which terms a pattern uses.
- Forgetting to count the turning chain as a stitch in double crochet, so each row loses one stitch at the end.

Make it a game • Pattern Decoder. Your parent writes a short pattern line such as 'ch 6, sk 1, sc in next 2 st, rep from * twice.' Read it aloud in plain words. Then write a line of your own for your parent to decode. Use ch, sc, dc, sl st, st, sk and rep. A line decoded without mistakes wins a point.

5.4 THE GRANNY SQUARE

OBJECTIVES

- Tell how crocheters have joined small squares into blankets since the 1800s, and how crocheted blankets are made and given to others.
- Work in rounds from a center ring, making clusters of double crochet with chain spaces and corners.
- Crochet one granny square and join it with a partner's square to begin a small blanket to give away.

Warm-up. Look at a patchwork quilt, a tiled floor or a checkerboard. How is a big thing made from many small squares? Why might it be easier to make 30 small squares than one huge blanket? Write two reasons.

WATCH

How to Crochet a Granny Square for Beginners *updated tutorial*

Maddy Marie · 10:51

<https://www.youtube.com/watch?v=euqnRKNJaXo>

WHEN TO WATCH

Watch Round 1 and stop. Make your Round 1. Then watch Round 2 and stop again. Work one round at a time with the video.

Note: Maddy uses a slip-stitch ring to start, not an adjustable ring, which is easier for beginners. The video shows only her hands and the work.

KEY TERMS

round (rnd)

One circle of stitches worked around the center instead of back and forth in a row. You do not turn at the end of a round; you join with a slip stitch.

ring

A short chain joined into a circle with a slip stitch. The first round is worked into the hole in the middle.

cluster

A group of stitches worked into the same place. A granny square uses clusters of 3 double crochet.

chain space (ch-sp)

The gap made by one or more chains. In the next round, you work into the space, not into the chains themselves.

corner

Where two clusters are worked into the same chain space with chains between them, making the square turn 90 degrees.

CORE IDEAS

The story. By the late 1800s, crocheters in Britain and America were making small squares worked from the center out and sewing them together into coverlets and blankets. Later the plain, sturdy version got its friendly name: the **granny square**. It was perfect for families who had little money. Any leftover scraps of yarn could become a square, and squares could be carried anywhere and made in spare minutes. Church groups, neighbors and grandmothers have made granny-square blankets for babies, for the sick, for soldiers, and for older people living alone. Many groups still do. Some crochet blankets for nursing homes, children's hospitals, or centers that help mothers with new babies.

How they figured it out. Crocheters discovered that if you crochet around and around, adding the same number of stitches at four places in each round, the circle becomes a square. In a granny square, each corner gets two clusters with a chain space between them, and the sides get one cluster in each space. Each round, the square grows by one cluster on every side, and the corners stay sharp. And because every square is the same size, squares from many different people can be joined into one blanket.

The craft. Instead of rows, you work in **rounds**. You begin with a little **ring** of chains and work your first round into the hole in the middle. At the end of each round you do not turn; you join to the top of the first stitch with a **slip stitch**, then slip stitch over into the next chain space to start the new round. The granny square uses only things you already know: chain, double crochet and slip stitch. The new idea is working into a **chain space**, the gap under a chain, instead of into the top of a

stitch. That is why the clusters sit so neatly in a granny square, with little holes between them.

Let's crochet. You will make one granny square, then join your square with a square made by a family member or friend. Together you are starting a small blanket to give away. The skill to do well is **keeping the corners sharp**: every corner gets 3 dc, ch 2, 3 dc in the same chain space, every round.

PICTURE STUDY



Le Crochet, Myron Barlow, about 1913 · Oil on canvas (shown in a 1913 magazine photograph)

Image: [Wikimedia Commons](#), public domain

Myron Barlow was an American painter who lived and worked in a fishing village in France. In this painting, shown at a Paris exhibition in 1913, two young women sit together at a tea table. One crochets. The other leans on her hand and watches closely. Perhaps she is learning. Crochet has always been passed from one person to another this way: one shows, and the other watches and tries.

Look closely

- Find the crocheter's hands. How is she holding her work so her friend can see it?
- Look at the friend's face and hand. Is she bored, or paying close attention?
- Find the teapot and cups. What does that tell you about the time of day and how long they have been sitting together?
- Look at the long tablecloth. Is it plain or decorated?

Talk about it

1. Who taught you your first crochet stitch? Whom could you teach?
2. A granny-square blanket is often made by several people together. Why might working together make the work better, not just faster?

3. What do you think the two women are talking about?

Safety first. A parent or responsible adult supervises all sewing-tool use. Carry scissors points down and closed, and count the tapestry needle out and back in. Keep yarn balls, scraps and finished squares out of reach of babies and pets.

SEWING PROJECT

One Granny Square, Then Join to Begin a Blanket

You will crochet a classic four-round granny square, then sew or crochet it to a partner's square. Squares from your family can grow into a lap blanket to give to someone in need, such as an older neighbor or a nursing home.

You will need

- A 5 mm (H-8) crochet hook
- Small scissors
- A large-eye tapestry needle in a pincushion
- A ruler
- A partner (a parent, brother, sister or friend) who makes a square too

CLASSIC FOUR-ROUND GRANNY SQUARE

Finished size: About 5 × 5 in (13 × 13 cm) after 4 rounds · About 1 to 1½ hours

Fabric and notions

- Worsted-weight (weight 4) acrylic or wool-blend yarn, about 25 yards (23 m) for one square; one color, or a different color for each round
- About 36 inches of matching yarn for joining
- **Abbreviations:** ch chain · dc double crochet · sl st slip stitch · sp space · rep repeat

How to make it

1. Ch 4, sl st to the first ch to make a ring.
2. **Rnd 1:** Ch 3 (counts as dc), 2 dc in ring, ch 2, *3 dc in ring, ch 2; rep from * 2 more times. Sl st to top of the beginning ch-3. (4 clusters, 4 corner spaces)
3. Sl st in the next 2 dc and into the first ch-2 corner space.
4. **Rnd 2:** Ch 3, (2 dc, ch 2, 3 dc) in the same corner sp. *Ch 1, (3 dc, ch 2, 3 dc) in the next corner sp; rep from * 2 more times. Ch 1, sl st to top of beginning ch-3. (8 clusters)
5. Sl st in the next 2 dc and into the corner space.

6. **Rnd 3:** Ch 3, (2 dc, ch 2, 3 dc) in the corner sp. *Ch 1, 3 dc in the next ch-1 sp, ch 1, (3 dc, ch 2, 3 dc) in the next corner sp; rep from * 2 more times. Ch 1, 3 dc in the last ch-1 sp, ch 1, sl st to top of beginning ch-3. (12 clusters)
7. **Rnd 4:** Work as Rnd 3, but with two side clusters (each with ch 1 before and after) on every side. (16 clusters)
8. Fasten off and weave in all ends. Lay the square flat and gently pat it into shape.
9. **Join:** Hold your square and your partner's square with the right sides together. With the tapestry needle and matching yarn, whipstitch through the back loops of the edge stitches from corner to corner. Knot and weave in the ends.

Fabric check: Acrylic worsted yarn is soft, washes in a machine, and is inexpensive, so it is a good choice for a blanket that will be washed often. A wool blend is warmer; if wool makes your skin itch, use acrylic or cotton. All squares in one blanket should use the same yarn weight so they come out the same size. Use up scraps: each round can be a different color.

Steps

1. **Practice first.** Make Round 1 two times for practice before your real square. Check: 4 clusters and 4 corner spaces.
2. Crochet the square from the pattern card, one round at a time. After each round, count the clusters and write the number down.
3. **Measure.** After 4 rounds, measure your square. Compare it with your partner's. If one is bigger, compare your hooks and yarns. (That difference is gauge!)
4. Join your square with your partner's square using a whipstitch.
5. **Plan the blanket.** In your notebook, figure out how many 5-inch squares you would need for a lap blanket about 30 × 40 inches (6 squares across, 8 squares down). Who in your family can help?
6. **Improve it.** Make a second square. Are its corners sharper and its size closer to your first? Write what you fixed.
7. **Clean up:** count the tapestry needle back in, put away scraps in a bag for the next squares, and store finished squares flat.

Tips

- If your square looks like a circle, check that you put 3 dc, ch 2, 3 dc into every corner.
- If the square ruffles or cups, your chains between clusters may be too long or too tight. Keep the ch-1 small and even.
- Younger students: stop after 3 rounds; a 3-round square is about 4 inches and still joins into a blanket. Older students: add a fifth and sixth round to make a 7- to 8-inch square.

Check your work

- ☐ I can work in rounds, join with a slip stitch, and move to the next corner space.
- ☐ My granny square has 4 sharp corners and the right number of clusters in each round.
- ☐ I joined my square with a partner's to begin a blanket to give away.

SEWING NOTEBOOK

1. Draw your granny square from above, round by round in different colors, and label the corners, a cluster and a chain space.
2. Write how many clusters are in Rounds 1, 2, 3 and 4. What pattern do you see? Predict Round 5 and Round 6.
3. Plan the blanket: draw a grid of squares, choose colors, and write the name of the person or place it will go to.

From history. Blankets made of crocheted squares are often called afghans in America. During both World Wars, Red Cross volunteers and schoolchildren in Britain and America knitted squares and joined them into blankets for soldiers, hospitals and families in need.

COMMON MISTAKES

- Turning the work at the end of a round as you would at the end of a row. In a granny square you keep the same side facing you every round.
- Working the clusters into the tops of the stitches instead of into the chain spaces. The holes between clusters disappear and the square grows lumpy.
- Forgetting the ch 2 in a corner, so the corner rounds off. Check every corner before you join the round.

Make it a game • Granny Square on Paper. Draw a granny square map: a center ring, then round one with clusters of three double crochet, chain spaces and four corners. Your parent calls 'corner' and you add a chain space. Then say why crocheters made squares into blankets to give to others. Draw round two.

Scripture. “As we have therefore opportunity, let us do good unto all men” (Galatians 6:10, KJV)

A granny square is a small thing, made in spare minutes. Joined with others, it becomes a warm blanket: one good way to use our opportunities to do good.

CROCHET

In this unit you trade your needle for a **hook**. Crochet makes cloth out of one long strand of yarn, one loop pulled through another, with no loom and no machine. You will learn to make a slip knot and a **chain**, then build the chain into rows of **single crochet** and **double crochet**, and finally work round and round from the center to make the famous **granny square**.

You will also learn to read the short code that crocheters have used for nearly two hundred years: *ch*, *sc*, *dc*, *sl st*. Along the way you will meet the Irish girls and women who crocheted lace to help their families through hard years, the little pattern books that first taught the craft, and the many people who have crocheted blankets to give away. By the end of the unit you will have a bracelet, a coaster, a dishcloth and a granny square, and you will be able to make something useful from a ball of yarn and a hook that fits in your pocket.

PREREQUISITES

- Can tie a knot and cut yarn safely with scissors carried points down (Unit 3)
- Knows the needle-and-pin count and keeps a tapestry needle in a pincushion (Unit 3)
- Can measure in inches with a ruler or tape measure (Units 3–4)
- Knows what a yarn is and how twist makes it strong (Unit 2)

MASTERY CHECKLIST

- ☐ I can make a slip knot, hold my hook and yarn, and crochet an even chain.
- ☐ I can work rows of single crochet with a turning chain and keep the same number of stitches in every row.
- ☐ I can read a simple crochet pattern written in standard abbreviations (*ch*, *sc*, *dc*, *sl st*, *st*, *rep*) and work double crochet.
- ☐ I can explain gauge and yarn weight, and choose a hook to match my yarn.
- ☐ I can crochet a granny square in rounds and join squares to begin a blanket for someone else.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Craft Yarn Council: Standard Yarn Weight System**: Free. A chart of yarn weights 0–7 with the hook sizes usually used for each. Our projects use weight 4, “medium” or worsted.
- **Craft Yarn Council: Crochet Abbreviations**: Free. The standard list of crochet abbreviations used in printed patterns. Helpful for Lesson 5.3 and the unit challenge.
- **Craft Yarn Council: Hooks and Needles**: Free. A table that matches U.S. letter-number hook sizes (such as H-8) to millimeters.
- **A 5 mm (H-8) crochet hook and a large-eye tapestry needle**: An aluminum or bamboo hook is inexpensive and lasts for years. The blunt tapestry needle is for weaving in yarn ends.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

5.1	The Hook and the Chain	2 sessions of 45–60 minutes
5.2	Single Crochet Rows	2 sessions of 45–60 minutes
5.3	Reading a Pattern	2 sessions of 45–60 minutes
5.4	The Granny Square	2 sessions of 45–60 minutes

UNIT 5 REVIEW

Answer each question in complete sentences unless it asks you to show. The two “show me” items are done with your hook and yarn while your parent watches. The review is worth 50 points.

1. **5 pts**

What does the word *crochet* mean, and what is the biggest difference between crochet and knitting?

2. (5 pts)

How did crochet help families in Ireland in the 1840s, and what clever idea did the lacemakers use?

3. (5 pts)

Show me. Make a slip knot and crochet a chain of 15 even stitches. Then work one row of single crochet across it.

4. (5 pts)

What does a turning chain do? How many chains are used for single crochet and for double crochet, and which one counts as a stitch?

5. (5 pts)

Predict. A beginner makes a square in single crochet but skips the last stitch of every row. What will the piece look like after 15 rows, and how can she prevent it?

6. (5 pts)

Write what each abbreviation means: ch, sc, dc, sl st, sk, rep. What does (31 sts) at the end of a row tell you?

7. (5 pts)

Read this and write it in full words: *Ch 3 (counts as dc), sk first st, dc in each st across. Turn.*

8. (5 pts)

What is gauge? Your square comes out bigger than your partner's with the same yarn. Give one reason and one fix.

9. (5 pts)

Show me. Show your parent one corner of your granny square. Point to a cluster, a chain space, and the corner space, and tell how many double crochets and chains go in a corner.

10. (5 pts)

Why should a dishcloth or coaster be made of cotton yarn instead of acrylic?

ANSWER KEY

1. It comes from a French word for a small hook. In crochet only one loop is live on the hook at a time and each stitch is finished before the next; in knitting many live stitches are held on the needles at once.
2. When the potato crop failed, nuns and teachers (for example at the Ursuline Convent in Blackrock, County Cork) taught girls and women to crochet lace that imitated costly Venetian lace. They sold it to earn money for their families. They made small motifs one at a time and joined them, so many people could work on one piece and mistakes were small.
3. Parent checks: the slip knot slides; the chains are even in size; the single crochet row starts in the 2nd chain from the hook and has 14 stitches.
4. It raises the yarn to the height of the next row. Single crochet uses 1 chain, which does not count as a stitch. Double crochet uses 3 chains, which usually count as the first stitch.
5. It will get narrower and narrower, like a triangle or a trapezoid, losing one stitch each row. She should count stitches at the end of every row and make sure she works into the last stitch.
6. ch chain; sc single crochet; dc double crochet; sl st slip stitch; sk skip; rep repeat. (31 sts) is the stitch count: you should have 31 stitches when the row is done.
7. Chain 3; this counts as the first double crochet. Skip the first stitch, then make a double crochet in each stitch to the end of the row. Turn the work.
8. Gauge is how many stitches and rows fit in a measured length, such as 4 inches. Your hook may be bigger, or your tension looser. Use a smaller hook (or crochet a little more tightly) to match.
9. Parent checks: the student points correctly; a corner is 3 dc, ch 2, 3 dc worked into the same corner space.
10. Cotton soaks up water and does not melt; it washes in hot water. Acrylic does not absorb drips well and can melt if it touches a hot pan or mug.

UNIT CHALLENGE: A CROCHETED DISHCLOTH SET WITH A WRITTEN PATTERN

Crochet a set of two or three cotton dishcloths (or a single-crochet or granny-square scarf about 5 inches wide and as long as you are tall). Make at least one in a different stitch, edging or color than Lesson 5.3.

In your notebook, write the pattern for your set in standard abbreviations, with stitch counts and gauge, so someone else could make it. Tie the set with a ribbon and give it to someone with a short handwritten note.

LOOK FOR	WHAT IT MEANS
Finished set	Two or three dishcloths (or a scarf) with even stitches, straight edges or sharp corners, and ends woven in.
Written pattern	Uses correct standard abbreviations, gives stitch counts and gauge, and could be followed by someone else.
Safe and tidy work	Tools counted and put away; yarn and scraps kept from babies and pets; scissors carried safely.
Record and improvement	Row logs kept honestly; names one thing improved from the first piece to the last. Uneven pieces that are honestly recorded and redone earn full credit.
Given away	At least one piece given with a note.

UNIT 6

KNITTING

Crochet holds one loop at a time. Knitting holds a whole row of loops at once, waiting on a needle, and pulls a new row of loops through them. In this unit you will learn to **cast on**, work the **knit stitch** until it is smooth and even, fix a dropped stitch, learn the **purl stitch**, and **bind off**. With only those few skills, people have knitted warm socks, caps, mittens and scarves for hundreds of years.

You will meet a French grandmother teaching a little girl in Millet’s *The Knitting Lesson*, the American schoolchildren who knitted for soldiers in 1917 and 1918, and William Lee, the Englishman who in 1589 built the first knitting machine. You will make a garter-stitch washcloth, begin a scarf to give to someone who needs warmth, and finish a headband in stockinette and garter. As Proverbs 31:21 says of the capable woman, she “is not afraid of the snow for her household.” A knitter can help make that true.

PREREQUISITES

- Can make a slip knot and hold yarn with even tension (Unit 5)
- Knows yarn weights and gauge, and reads simple abbreviations (Unit 5)
- Can weave in yarn ends with a tapestry needle and keep the needle count (Units 3 and 5)
- Can measure in inches and keep a row log (Unit 5)

MASTERY CHECKLIST

- ☐ I can cast on 20 or more stitches with an even long-tail or knitted cast-on.
- ☐ I can knit garter stitch, count rows by the ridges, and fix a dropped stitch with a crochet hook.
- ☐ I can purl, tell knit from purl by looking, and explain why stockinette curls and garter stitch lies flat.
- ☐ I can bind off, weave in my ends, and seam a headband.
- ☐ I can tell the history of hand knitting, the Red Cross knitters of 1917–1918, and William Lee’s stocking frame of 1589.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Craft Yarn Council: Knitting Abbreviations:** Free. The standard list of knitting abbreviations (k, p, CO, BO, st st, RS, WS) used in printed patterns.
- **Craft Yarn Council: Hooks and Needles:** Free. A table that matches U.S. knitting needle sizes (such as US 8) to millimeters (5 mm).
- **A pair of US 8 (5 mm) knitting needles, 10 inches long:** Bamboo or wooden needles are less slippery than metal for beginners. Rounded tips, not sharp points, are best at this age.
- **A 5 mm (H-8) crochet hook and stitch markers:** You already have the hook from Unit 5. It is the best tool for picking up a dropped stitch. Small safety pins work as stitch markers.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

6.1 Hand Knitters and the Knitting Lesson	2 sessions of 45–60 minutes
6.2 The Knit Stitch and the Garter Square	2 sessions of 45–60 minutes
6.3 Knitting for Others: The Red Cross Knitters	2 sessions of 45–60 minutes
6.4 William Lee’s Stocking Frame and the Purl Stitch	2 sessions of 45–60 minutes

UNIT 6 REVIEW

Answer each question in complete sentences unless it asks you to show. The two “show me” items are done with your needles and yarn while your parent watches. The review is worth 50 points.

1. **5 pts**

How is knitting different from crochet? Why does a dropped stitch matter more in knitting?

2. (5 pts)

Show me. Cast on 12 stitches and knit two rows. Say the four steps of the knit stitch as you work.

3. (5 pts)

How many rows are in one garter-stitch ridge? Your square has 24 ridges. How many rows did you knit?

4. (5 pts)

Predict. You knit a 10-inch strip in stockinette stitch with no garter edges. What will it look like when you lay it on the table, and why?

5. (5 pts)

Show me. Purl 5 stitches. Then point to a knit stitch and a purl stitch in your headband or swatch.

6. (5 pts)

How do you fix a dropped stitch in garter or stockinette stitch?

7. (5 pts)

Why did the American Red Cross ask people to knit in 1917–1918, and why did it print standard patterns?

8. (5 pts)

Your gauge is 5 stitches per inch. How many stitches do you cast on for a scarf 6 inches wide?

9. (5 pts)

What did William Lee invent in 1589? How was it different from hand knitting?

10. (5 pts)

Why did Queen Elizabeth I refuse William Lee a patent, and what happened to his invention?

ANSWER KEY

1. Knitting holds many live loops on a needle and pulls a new row through them; crochet has only one live loop at a time. A dropped live stitch in knitting can run down the fabric like a ladder.
2. Parent checks: an even cast on of 12 stitches; two complete rows of 12; the student says in, around, through, off.
3. Each ridge is 2 rows, so 24 ridges is 48 rows.
4. The edges will curl: the sides roll toward the back and the ends roll toward the front, almost into a tube. The knit Vs and the purl bumps pull differently, so the fabric does not balance. Garter edges or ribbing would keep it flat.
5. Parent checks: yarn in front, needle in from the back, five neat purl stitches; the student points to a smooth V (knit) and a bump (purl).
6. Catch the loose loop with a crochet hook from the front, pull the lowest ladder strand through it, and repeat strand by strand until you reach the top; then put the stitch back on the needle. (In garter stitch, turn the work as needed so you pull through from the front.)
7. Soldiers in cold, wet trenches and at sea needed many warm socks, sweaters and mufflers, more than factories could quickly make. Standard patterns made sure every piece was the right size and well made, so it would help and not rub or fall apart.
8. $5 \times 6 = 30$ stitches.
9. The stocking frame, the first knitting machine. It had a row of hooked (bearded) needles, one for each stitch, and knitted a whole row at once instead of one stitch at a time.
10. She worried it would take work from poor hand knitters, and its first stockings were coarse wool rather than fine silk. Lee took his frames to France; later framework knitting became a big trade around Nottingham and Leicester, and modern knitting machines still use hooked needles like his.

UNIT CHALLENGE: A FINISHED KNITTED PIECE WITH A ROW LOG

Finish one knitted piece to wear or give: the scarf from Lesson 6.3, the headband from Lesson 6.4, or a set of two garter-stitch washcloths. Bind off, weave in every end, and give it (or one piece of the set) to the person you planned it for.

In your notebook, include a gauge swatch (at least 15 stitches and 20 rows) with its measurement, your row or scarf log, and a short note on one mistake you made and how you fixed it.

LOOK FOR	WHAT IT MEANS
Finished piece	Bound off, ends woven in, even stitches, and the same width from start to finish.
Gauge swatch	A labeled swatch with stitches and rows per inch measured correctly.
Row log	Dates, rows or length, and time recorded honestly through the project.
Fixing and improving	Explains one mistake and the fix (a dropped stitch picked up, a row pulled out). A lumpy piece that is honestly recorded and improved earns full credit.
Safety and giving	Needles counted and stored safely each session; the piece given with a short note.

6.1 HAND KNITTERS AND THE KNITTING LESSON

OBJECTIVES

- Explain how knitting differs from crochet: many live loops held on a needle, with each new row pulled through the row before.
- Tell how long people have knitted by hand and why knitting was so important in homes before machines.
- Choose worsted yarn and US 8 (5 mm) needles, cast on 20 stitches, and knit the first rows of a garter-stitch square.

Warm-up. Find a sock, a sweater or a knit hat. Stretch it gently sideways, then lengthwise. Now stretch a woven handkerchief or dish towel the same way. Which stretches more? Look closely at the knit: can you see rows of little Vs? Guess how those Vs are made.

WATCH

How to CAST ON Knitting for Total Beginners

Sheep & Stitch · 8:17

<https://www.youtube.com/watch?v=1vm6oaYzHyA>

WHEN TO WATCH

After “The craft” paragraph. Watch the whole video once, then cast on with her, pausing after every few stitches.

Note: Sheep & Stitch films her hands closely and slowly. She uses a 10 mm needle and chunky yarn to make the loops easy to see; we use worsted yarn and US 8 (5 mm) needles.

BACKUP VIDEO

Long Tail Cast On: Thumb Method | Purl Soho

Purl Soho · 3:20

<https://www.youtube.com/watch?v=c-fKB9G1ZQc>

A short second look at the long-tail cast on from Purl Soho, with light-colored yarn.

KEY TERMS

knitting

Making fabric by pulling loops of yarn through a row of loops held on a needle, row after row.

long-tail cast on

A cast on that uses a long tail of yarn over the thumb and the working yarn over the finger to make neat, stretchy first stitches.

working yarn

The yarn coming from the ball, used to make new stitches. The other end is the tail.

cast on (CO)

Putting the first row of loops onto the needle.

live stitch

A loop still on the needle that has not been finished. If it slips off, it can run down the fabric.

needle size

The thickness of a knitting needle, given in U.S. numbers and millimeters. A US 8 needle is 5 mm thick.

CORE IDEAS

The story. No one knows who knitted the first stitch. Some of the oldest true knitting ever found is a set of cotton socks from Egypt, made roughly eight hundred to a thousand years ago, with patterns in blue and white. By the 1500s, people all over Britain and Europe knitted caps and stockings by hand, often while they walked, watched sheep or rocked a baby. In many villages almost everyone knitted, men and boys too. Children learned by sitting beside a mother or grandmother, just like the little girl in the painting for this lesson. Socks wear out quickly, so a family needed a steady supply of them, and every pair was made one stitch at a time.

How they figured it out. Hand knitters discovered that a fabric made of loops is very different from a woven one. Because each loop can stretch and spring back, knitted cloth hugs a foot, a hand or a head and still moves. They also learned that wool knitting stays warm even when it is damp, which mattered to shepherds and fishermen out in the rain. Knitters learned that the first row, the **cast on**, had to be firm but stretchy, or the edge of a sock or cap would be too tight or too loose. Different families and regions worked out their own ways of casting on, and many are still used today.

The craft. In crochet there is only one live loop. In knitting, a whole row of **live stitches** waits on one needle. With the other needle you pull a new loop through each one and slip the old loop off. When the row is done, all the new loops are on the other needle, and you switch hands and begin again. That is why a dropped stitch matters in knitting: a live loop that slips off can run down the fabric like a ladder. We use worsted yarn (weight 4) and **US 8 (5 mm)** needles. For the **long-tail cast on**, you leave a tail about three times as long as the width of your piece (about 1 inch of tail for each stitch with worsted yarn). The tail goes over your thumb and the working yarn over your finger, and each cast-on stitch is really a small knot that sits snugly on the needle.

Let's knit. You will cast on 20 stitches and knit your first rows. The skill to do well is **casting on evenly**: snug but not tight, so each stitch slides easily along the needle. If the stitches are too tight to move, cast on again over two needles held together, then pull one out.

PICTURE STUDY



The Knitting Lesson, Jean-François Millet, 1869 · Oil on canvas · Saint Louis Art Museum, St. Louis, Missouri

Image: [Wikimedia Commons](#), public domain

Jean-François Millet grew up on a farm in Normandy, France, and painted the hard-working country people he knew. He painted the knitting lesson more than once. Here a mother bends over her little daughter, her arms around her, guiding the small hands on the needles. Millet's wife and daughters knitted, and he must have watched this lesson many times.

Look closely

- Find the girl's hands and the mother's hands. Whose hands are doing the knitting? How is the mother helping?
- Look at the needles. How many can you count? What is hanging below them?
- Find the ball of yarn. Where is it, and why is it close to the knitter?
- Look at the girl's face. Is she worried, bored, or concentrating?

Talk about it

1. Who in your family or church could give you a knitting lesson like this one? What could you teach someone younger?
2. Why do you think the mother stands behind the girl instead of in front of her?

3. Millet painted ordinary work with great respect. What ordinary work in your home would make a good painting?

Safety first. A parent or responsible adult supervises all sewing-tool use, and needles and pins are counted at the end of every session. Knitting needles are for knitting only: never poke, sword-fight, or leave them pointing up in a chair or on the floor. Keep yarn and needles away from babies, toddlers and pets.

SEWING PROJECT

Cast On 20 and Begin a Garter-Stitch Square

You will learn the long-tail cast on and practice it until your cast-on edge is even. Then you will knit your first few rows and begin a garter-stitch square that you will finish in the next lesson.

You will need

- A pair of US 8 (5 mm) straight needles, about 10 inches long (bamboo or wood is easiest)
- Small scissors
- A tape measure or ruler
- A large-eye tapestry needle in a pincushion

THE START OF A GARTER-STITCH SQUARE

Finished size: About 6 in (15 cm) wide when finished · About 45 minutes

Fabric and notions

- Worsted-weight (weight 4) 100% cotton yarn, about 50 yards (46 m) for the finished square (a washcloth); or acrylic if the square will go into a blanket
- A smooth, light color so you can see each loop

How to make it

1. Measure a tail of about 24 inches (60 cm), roughly 1 inch for each stitch plus a little extra. Make a slip knot there and put it on one needle. It counts as your first stitch.
2. Hold the needle in your right hand. Put the tail over your left thumb and the working yarn over your left index finger, and hold both ends with your other fingers (the “slingshot”).
3. Go up through the loop on your thumb, over and around the yarn on your finger, and back down through the thumb loop. Drop the thumb loop and snug the new stitch gently. That is one cast-on stitch.

4. Repeat until you have 20 stitches. Count them. Slide them along the needle: they should move easily.
5. **First knit row:** Hold the needle with the stitches in your left hand. Put the right needle into the first stitch from front to back, under the left needle. Wrap the working yarn around the right needle counterclockwise.
6. Pull the new loop through toward you with the right needle, then slip the old stitch off the left needle. One knit stitch is done. Repeat across all 20 stitches.
7. Switch hands so the full needle is in your left hand again. Knit 5 more rows the same way. Count 20 stitches at the end of each row.
8. When you stop, slide the stitches to the middle of the needle and push a rubber band or point protector onto each tip so no stitches fall off.

Fabric check: Choose a smooth worsted-weight yarn in a light color. Cotton is perfect for a washcloth because it soaks up water, but it does not stretch, so it can feel stiff on the needles. Acrylic is softer and stretchier and is good for practice and for blanket squares. Avoid fuzzy, dark or bumpy novelty yarns while you learn. If wool makes you itch, use cotton or acrylic.

Steps

1. **Practice first.** Cast on 10 stitches three times, pulling them out each time. Lay them side by side in your mind: which was most even?
2. Cast on 20 stitches for your square and knit 6 rows from the pattern card.
3. **Measure the tail.** How much tail was left after casting on 20? Was 24 inches too much or too little? Write how much tail you would use for 30 stitches.
4. **Count rows.** After 6 rows, look at the fabric. How many bumpy ridges do you see? (Each ridge is 2 rows.)
5. **Teach it.** Show a parent or sibling how to cast on 5 stitches. Explaining a skill helps you remember it.
6. **Clean up:** put point protectors on your needles and store your knitting in a bag or basket. Count the tapestry needle back into the pincushion.

Tips

- If your cast-on is tight, cast on over two needles held together, then slide one out. The stitches will be looser and more even.

- Keep the stitches near the tips of the needles when you knit and slide them back along the needle as you go. Knitting at the very tip makes stitches fall off.
- Younger students: if the long-tail cast on is hard, use the knitted cast on (knit a stitch and put it back on the left needle) or have a parent cast on for you while you watch, then try it next week.

Check your work

- ☐ I can cast on 20 stitches with even, snug loops.
- ☐ I knitted 6 rows and counted 20 stitches at the end of each one.
- ☐ I can explain how knitting is different from crochet.

SEWING NOTEBOOK

1. Draw your cast-on edge close up and label the slip knot, a cast-on stitch, the tail and the working yarn.
2. Draw a crochet chain and a row of knit stitches on a needle side by side. Label “one live loop” and “many live loops.”
3. Tape in a snip of your yarn and write: yarn weight, fiber, needle size, and tail length for 20 stitches.

From history. In the 1500s and 1600s, hand-knitted wool caps were so important in England that a law of 1571 ordered most people to wear a wool cap on Sundays and holy days, to keep the cap-knitters in work. The famous Monmouth cap, a round knitted wool cap, was worn by sailors and soldiers for many years.

COMMON MISTAKES

- Casting on so tightly that the needle will not go into the stitches. Loosen up, or cast on over two needles.
- Wrapping the yarn the wrong way (clockwise). The stitches end up twisted. Wrap it under and around from back to front, counterclockwise.
- Leaving knitting on the needles with no point protectors. Stitches slide off the tips and can run.

Make it a game • One Loop or Many?. Hold up one finger for crochet and a handful of fingers for knitting. Your parent reads descriptions such as 'many live loops on a needle.' Show the answer. Then pass yarn over a pencil to practice a long-tail cast on. Tell how long people have knitted and why homes needed it before machines.

Scripture. “She is not afraid of the snow for her household: for all her household are clothed with scarlet.” (Proverbs 31:21, KJV)

Warm clothes for a whole household take planning and many hours of patient work. A knitter who starts before winter comes is ready for the snow.

6.2 THE KNIT STITCH AND THE GARTER SQUARE

OBJECTIVES

- Knit garter stitch smoothly, using the four steps: in, around, through, off.
- Count rows by the ridges of garter stitch and keep the same number of stitches in every row.
- Pick up a dropped stitch with a crochet hook, bind off, and finish a garter-stitch washcloth or blanket square.

Warm-up. Say this rhyme out loud four times, moving your hands as if you were knitting: “In through the front door, run around the back, out through the window, and off jumps Jack.” Which part of the rhyme is the needle going in? Which part is wrapping the yarn? Which part is slipping the stitch off?

WATCH

The KNIT STITCH for Total Beginners

Sheep & Stitch · 8:04

<https://www.youtube.com/watch?v=Egp4NRhIMDg>

WHEN TO WATCH

After “The craft” paragraph. Watch the knit stitch section, then knit a row of your square with her, pausing after each step.

Note: She uses chunky yarn on big needles so the loops are easy to see. The motions are the same with your worsted yarn and US 8 needles.

BACKUP VIDEO

Garter Stitch for Beginners (worked slowly)

The Blue Mouse Knits · 6:09

<https://www.youtube.com/watch?v=UoDKx9g0EFw>

A slow, full demonstration of garter stitch, row after row. Good to knit along with if you need more practice.

KEY TERMS

knit stitch (k)

The basic stitch: needle in from front to back, wrap the yarn, pull the loop through, slip the old stitch off.

garter stitch

Knitting every row. It makes a squishy, bumpy fabric that lies flat and looks the same on both sides.

ridge

One bumpy line across garter stitch. Each ridge is 2 rows.

dropped stitch

A live stitch that has slipped off the needle and may run down the fabric, leaving a ladder of loose strands.

bind off (BO)

Finishing the last row by lifting each stitch over the next so the loops are locked and cannot unravel.

CORE IDEAS

The story. For hundreds of years, children learned the knit stitch with a rhyme. English children said, “In through the front door, around the back, out through the window, and off jumps Jack.” In Shetland and in Wales, in the Alps and on the farms of New England, a first project was often a plain square, a garter-stitch washcloth or a strip for a blanket, worked until the stitches were even and smooth. In the painting for this lesson, by the Swiss painter Albert Anker, a schoolgirl knits as she stands, her yarn in a basket on her arm. Anker’s village girls knitted on the way to school, at home and in the evenings, and they would have learned with plain garter stitch, too.

How they figured it out. Knitters long ago found that the same four motions done over and over make a perfect fabric, but that one missed motion can spoil it. So they learned to check. They counted stitches at the end of a row, and they learned to count rows by the ridges, two rows to a ridge. They also learned that a dropped stitch is not a disaster. With a fine hook, a knitter can catch the loose loop and pull each “ladder” strand through it, one by one, until the stitch is back on the needle. Knitters have fixed their mistakes this way for centuries.

The craft. Every knit stitch has four steps: **in** (right needle into the front of the stitch, front to back), **around** (wrap the yarn counterclockwise around the right needle), **through** (pull the new loop through toward you), **off** (slip the old stitch off the left

needle). When you knit every row, you get **garter stitch**. Why is it bumpy? Each knit stitch has a smooth V on the side facing you and a bump on the back. When you turn the work and knit again, the bumps from the last row are now facing you. So bumps show on both sides, in ridges, and the fabric lies flat. To **bind off**, you knit two stitches, then lift the first one over the second and off the needle, again and again, until one stitch is left; then you cut the yarn and pull it through.

Let's knit. You will finish your garter-stitch square: a cotton washcloth for your family, or an acrylic square for a charity blanket. The skill to do well is **even stitches**: knit near the tips, let the yarn flow through your fingers at the same tension, and count your stitches at the end of every row.

PICTURE STUDY



Girl Knitting (Strickendes Mädchen), Albert Anker, 1888 · Oil on canvas · Private collection

Image: [Wikimedia Commons](#), public domain

Albert Anker was a Swiss painter who lived in the village of Ins and painted its children, schoolrooms and grandparents. He painted girls knitting many times. Here a girl stands by a table, knitting as she goes, with a basket of yarn on her arm. The books and the apple on the table tell us she may be on her way to or from school.

Look closely

- Find her needles. How many can you see? Which needle holds the stitches?
- Look at her right hand and the yarn. How is she holding the working yarn?
- Find the basket. What is inside it? Why would a knitter carry her yarn in a basket on her arm?
- Look at the books and the apple. What do they tell you about her day?

Talk about it

1. She can knit while standing. Why would knitting have been handy work for a busy girl long ago?
2. Anker painted ordinary children doing ordinary work. What does he want us to notice about her?
3. What would you knit if you had a basket of white yarn?

Safety first. A parent or responsible adult supervises all sewing-tool use; count needles and the crochet hook out and back in. Never point knitting needles at anyone, and never leave them stuck upright in a chair cushion or lying on the floor. Keep snipped yarn and cut ends out of reach of babies and pets.

SEWING PROJECT

A Garter-Stitch Washcloth (or a Square for a Charity Blanket)

You will knit a square in garter stitch from start to finish: cast on, knit every row, fix any dropped stitch, and bind off. A cotton square becomes a washcloth for your family; an acrylic square can become part of a blanket given to someone who needs warmth.

You will need

- A pair of US 8 (5 mm) straight needles
- A 5 mm (H-8) crochet hook (for fixing dropped stitches)
- Small scissors
- A large-eye tapestry needle in a pincushion
- A ruler and a stitch marker or small safety pin

GARTER-STITCH SQUARE

Finished size: About $6\frac{1}{2} \times 6\frac{1}{2}$ in (16 × 16 cm) · About 2 to 3 hours over several days

Fabric and notions

- Worsted-weight (weight 4) yarn, about 60 yards (55 m): 100% cotton for a washcloth, or acrylic for a blanket square
- **Abbreviations:** CO cast on · k knit · BO bind off · st(s) stitch(es)

How to make it

1. CO 30 sts using the long-tail cast on (leave a 32-inch tail). If you began with 20 stitches in Lesson 6.1, you may finish that piece as a narrower cloth instead.
2. **Every row:** K across. Count 30 sts at the end of the row.
3. Clip a stitch marker into the fabric on the front side (the side where your cast-on tail hangs on the left) so you always know which side is which.
4. Continue knitting every row. Every 10 ridges, measure the height.
5. When the piece is as tall as it is wide (about 30 ridges, 60 rows), stop at the end of a row.

6. **Bind off:** K2. With the left needle, lift the first stitch on the right needle over the second and off. K1 more, and lift again. Repeat until 1 stitch is left.
7. Cut the yarn, leaving a 6-inch tail, and pull it all the way through the last stitch.
8. Weave in both tails with the tapestry needle along the edge for about 2 inches, then trim.

Fabric check: For a washcloth, use 100% cotton: it absorbs water, scrubs well, and washes hot. For a blanket square, use acrylic or a wool blend: it is soft, warm and easy to machine-wash. Every square for a shared blanket should use the same weight yarn and needles so the squares match. If wool makes you itch, choose cotton or acrylic.

Steps

1. **Practice the rescue.** On purpose, slip one stitch off the needle in the middle of a row and let it run down 3 rows. With the crochet hook in the front of the loop, catch the lowest ladder strand and pull it through the loop. Repeat until you reach the top, then put the stitch back on the left needle. (In garter stitch, turn the work as needed so you are always pulling the strand through from the front.)
2. Knit the square from the pattern card. Keep a row log: every 10 ridges, write the date and the height.
3. **Predict.** Halfway through, measure your square and predict how many more ridges you need to make it square.
4. **Measure gauge.** When you finish, count how many stitches are in 2 inches across and how many ridges are in 2 inches up. Write your gauge.
5. **Improve it.** Look at both side edges. Are they straight? If you knit a second square, what would you do to make the edges neater?
6. Clean up: count the needles, crochet hook and tapestry needle back in, and put point protectors on the needles.

Tips

- For neat edges, pull the yarn snug on the first two stitches of each row.
- If you have more than 30 stitches, you probably knit into a bump below the needle or made an extra loop by bringing the yarn over the needle. Count often so you catch it within a row.

- Younger students: cast on 20 and make a small cloth; it is just as useful. Older students: try a seed-stitch border or a striped square using two colors.

Check your work

- ☐ I can knit in, around, through and off without saying the rhyme out loud.
- ☐ I can count garter rows by the ridges and fixed a dropped stitch with a crochet hook.
- ☐ I bound off and wove in my ends neatly.

SEWING NOTEBOOK

1. Draw the four steps of the knit stitch in four boxes: in, around, through, off.
2. Keep your row log: date, ridges, and height. Make a simple bar graph of how many ridges you knitted each day.
3. Draw a dropped stitch with its ladder of strands, and show with arrows how the hook pulls each strand through.

From history. Shetland, the islands far to the north of Scotland, is famous for its knitters. Shetland women knitted shawls so fine that a large one could be pulled through a wedding ring. Each one began, like your square, with the plain knit stitch.

COMMON MISTAKES

- Knitting into the bump below the needle or making an extra loop. The square grows wider. Count stitches every row.
- Pulling the bind off very tight. The top edge puckers. Keep bind-off stitches as loose as your other stitches, or bind off with a needle one size larger.
- Leaving a dropped stitch to “fix later.” It keeps running. Put a safety pin through it right away.

Make it a game · In, Around, Through, Off. Chant the four steps of the knit stitch with a beat and clap along. Your parent claps and you recite the steps ten times without a mistake. Then look at a garter swatch and count the ridges. Each ridge is two rows. Guess the rows first, then count. Closest wins.

6.3 KNITTING FOR OTHERS: THE RED CROSS KNITTERS

OBJECTIVES

- Tell how the American Red Cross asked Americans, including schoolchildren, to knit socks, scarves and sweaters for soldiers in 1917 and 1918.
- Plan a scarf by measuring a person and figuring how many stitches and rows it needs.
- Begin a garter-stitch scarf to give to someone in need or a family member, joining a new ball of yarn neatly.

Warm-up. Look at the poster in the picture study. Read the words aloud. What is the poster asking people to do? Who do you think the poster was made for: grown-ups, children, or both? How can you tell?

WATCH

Knit a Garter Stitch Scarf

[iknitwithcatfur](#) · 12:18

<https://www.youtube.com/watch?v=p-WK7VveyqQ>

WHEN TO WATCH

Watch after “Let’s knit.” She knits a whole garter-stitch scarf from start to finish. Watch the beginning and the part where she counts rows; save the end for when your scarf is long enough to bind off.

Note: The video shows only hands, needles and the scarf. She uses a chunky yarn and size 10½ needles; our pattern uses worsted yarn and US 8 needles.

BACKUP VIDEO

How to BIND OFF Knitting for Total Beginners

[Sheep & Stitch](#) · 5:13

<https://www.youtube.com/watch?v=VSwjIUiQZIM>

Watch when your scarf is long enough to bind off. A slow, close look at the basic bind off and at weaving in the end.

KEY TERMS

Red Cross

A society that helps people in wars and disasters. The American Red Cross was founded by Clara Barton in 1881.

Junior Red Cross

The part of the American Red Cross for schoolchildren, begun in 1917. Its members knitted, sewed and collected supplies to help others.

muffler

An old word for a long, warm scarf.

joining yarn

Starting a new ball of yarn at the beginning of a row and weaving both tails in later.

standard pattern

One set of instructions that everyone follows so that every finished piece is the same size and quality.

CORE IDEAS

The story. In April 1917 the United States entered World War I. The American Red Cross knew that soldiers in cold, wet trenches and on ships at sea needed warm, dry socks, sweaters, mufflers and wristlets, far more than factories could make quickly. So it asked Americans to knit. Posters said, “Our Boys Need Sox: Knit Your Bit.” Women knitted on trains and in waiting rooms. Men and boys knitted too. Schoolchildren in the new **Junior Red Cross** knitted at school and at home, and many children your age learned to knit just so they could help. Knitting clubs met in towns all over the country, and a great knitting bee was even held in New York’s Central Park in 1918.

How they figured it out. The Red Cross faced a problem: millions of knitters, all knitting a little differently. A sock that was too small or a lumpy seam that rubbed a soldier’s foot could do more harm than good. So the Red Cross printed **standard patterns** with exact yarn, needle sizes, numbers of stitches and lengths, and local chapters checked the finished pieces before they were packed and shipped. Beginners were often given scarves and simple squares first; the best knitters made socks. Everyone could help at the level of their skill.

The craft. A scarf is just a long, narrow rectangle, so it is the perfect first gift. To **plan** a scarf, measure the person: a good length is about as long as the person is tall, minus a foot or so, or long enough to wrap around the neck once with ends hanging down. Use your gauge from Lesson 6.2 to find the number of stitches: if 5 stitches make 1 inch and you want a 5-inch-wide scarf, cast on 25. When one ball runs out, **join** the new ball at the start of a row: leave 6-inch tails of both, knit with the new yarn, and weave both tails in later. Never tie a knot in the middle of a row; it makes a lump and can come undone.

Let's knit. You will begin a garter-stitch scarf for someone who needs warmth: a family member, an older neighbor, a shelter or a church coat drive. Garter stitch is perfect for a scarf because it lies flat and looks the same on both sides. The skill to do well is **keeping the width the same** from one end of a long scarf to the other, by counting stitches every few rows.

PICTURE STUDY



Our Boys Need Sox: Knit Your Bit, American Red Cross, 1918 · Color lithograph poster · Library of Congress, Washington, D.C.

Image: [Wikimedia Commons](#), public domain

During World War I, the American Red Cross printed posters to ask people to knit. This poster from 1918 is now in the Library of Congress. A poster has only a moment to catch your eye as you walk by, so every word and picture must count.

Look closely

- Read every word on the poster. What does “Knit Your Bit” mean?
- Find the knitting in the picture. What is being knitted, and why that item?
- Find the Red Cross emblem. Why would people trust a request that carried it?
- Look at the colors and lettering. Which words are biggest? Why?

Talk about it

1. Why would socks be so important to a soldier standing in cold, wet mud?
2. Who in your town or church today needs warm things? How could you “knit your bit” for them?
3. If you made a poster asking your family to help with a blanket or scarf drive, what would it say?

Safety first. A parent or responsible adult supervises all sewing-tool use, and needles are counted at the end of each session. Store your scarf with point protectors on the needles so stitches cannot slip off, and keep long tails of yarn and finished scarves away from babies and pets.

SEWING PROJECT

A Garter-Stitch Scarf to Give

You will plan a scarf for a real person, cast it on, and knit the first part of it, joining a new ball when the first one runs out. You will keep knitting it at home through Lesson 6.4 and the unit challenge, and then give it away.

You will need

- A pair of US 8 (5 mm) straight needles
- A tape measure
- Small scissors
- A large-eye tapestry needle in a pincushion
- A stitch marker or small safety pin
- Point protectors or rubber bands for the needle tips

GARTER-STITCH SCARF

Finished size: About 5 in (13 cm) wide and 48–54 in (122–137 cm) long (child or small-adult size) · Many hours, over 2 to 4 weeks

Fabric and notions

- Worsted-weight (weight 4) acrylic or wool-blend yarn, about 250 yards (230 m), usually one large skein or two to three small ones
- **Gauge:** about 5 sts = 1 in in garter stitch on US 8 needles (yours may differ; use your Lesson 6.2 gauge)

How to make it

1. Measure the person who will wear the scarf (or use 48 inches for a child, 54 for a small adult). Write the length you want.
2. Use your gauge to choose the stitch count: stitches per inch $\times$ 5 inches. For 5 stitches per inch, CO 25 sts.
3. **Every row:** K across. Count stitches at the end of every 4th row.
4. Clip a marker to the front side so you know which end is the beginning of a row.
5. Every week, measure the length and write it in your scarf log.

6. **Joining a new ball:** When about 24 inches of yarn are left, stop at the end of a row. Leave a 6-inch tail. Begin the next row with the new ball, leaving another 6-inch tail. After a few rows, tie the two tails loosely together so the edge stays snug; you will untie and weave them in at the end.
7. When the scarf reaches the length you planned, bind off loosely (Lesson 6.2), then weave in all the tails along the edge.
8. **Optional fringe:** Cut 20 pieces of yarn 10 inches long. Fold 2 pieces in half, pull the fold through an edge stitch with the crochet hook, and pull the ends through the fold. Make 5 fringes at each end and trim them even.

Fabric check: Choose a soft yarn that feels good against a neck. Acrylic is warm, inexpensive and washable, and it is a good choice for a gift to a shelter or coat drive because it can go into a washing machine. Wool and wool blends are warmer, especially when damp, but some people find wool itchy; if the scarf is for someone you do not know, acrylic is the safer choice. Avoid cotton for scarves: it is heavy and not very warm.

Steps

1. **Plan it.** Decide who will receive the scarf. Write the name (or the place, such as a shelter), the length you need, and your stitch count from your gauge.
2. **Practice first.** Knit a small swatch of 25 stitches for 10 rows with your scarf yarn to check that the width is right. Then pull it out and cast on the real scarf.
3. Knit the scarf from the pattern card. Count stitches every 4 rows and fix any change right away.
4. **Scarf log.** Each week, write the date, the length, and how many hours you knitted. Make a line graph of length over time.
5. **Predict.** After two weeks, use your graph to predict the date your scarf will be finished.
6. Clean up after every session: point protectors on the needles, scarf rolled into a bag, tools counted back in.

Tips

- Knitting goes faster if you keep it handy. Put your scarf bag by the chair where your family reads aloud.

- If your scarf is getting wider, you are adding stitches. Count, and if you have too many, knit two together once at the start of the next row.
- Younger students: make a shorter scarf for a younger child or a doll, or knit squares for a family blanket instead. Older students: add a two-color stripe every 10 ridges.

Check your work

- ☐ I planned a scarf by measuring a person and using my gauge to choose the stitch count.
- ☐ I can join a new ball of yarn at the start of a row and leave tails to weave in.
- ☐ My scarf stays the same width as it grows.

SEWING NOTEBOOK

1. Write your scarf plan: who it is for, length, width, gauge and stitch count, with the math shown.
2. Keep your scarf log and line graph of length by week.
3. Write a short history paragraph: who knitted for the Red Cross in 1917 and 1918, and why the Red Cross used standard patterns.

From history. Clara Barton, a former schoolteacher and government clerk who had nursed soldiers during the Civil War, founded the American Red Cross in 1881. Since then its volunteers have knitted and sewn for soldiers, for hospitals, and for families who have lost their homes in floods and fires.

COMMON MISTAKES

- Tying a knot in the middle of a row to join new yarn. It makes a lump and can work loose. Join at the start of a row.
- Guessing the stitch count instead of using your gauge. The scarf comes out much wider or narrower than planned.
- Binding off too tightly so the end of the scarf pulls in. Bind off loosely.

Make it a game • Red Cross Order Desk. You run the Red Cross order desk in 1917. Your parent orders a muffler six inches wide and forty-eight inches long. With four stitches and five rows per inch, figure out the cast on and the rows. Check on paper. Answers: twenty-four stitches, two hundred forty rows. Try another size.

Scripture. “She stretcheth out her hand to the poor; yea, she reacheth forth her hands to the needy.” (Proverbs 31:20, KJV)

The same hands that work the spindle in Proverbs 31 reach out to the needy. A scarf made for someone else is skill put to the service of love.

6.4 WILLIAM LEE'S STOCKING FRAME AND THE PURL STITCH

OBJECTIVES

- Tell how William Lee built the first knitting machine, the stocking frame, in 1589, and how it knitted a whole row at once.
- Work the purl stitch and recognize knit and purl stitches by sight.
- Explain why stockinette curls and garter stitch lies flat, and knit, bind off and seam a headband with garter edges.

Warm-up. Take your garter-stitch square and a store-bought sweater or T-shirt. Look at the front of the shirt: you will see columns of little Vs. Look inside: you will see rows of little bumps. Now look at your square. Which side of the shirt looks like your garter stitch? Which looks different?

WATCH

HOW TO PURL STITCH Step by Step Slowly with Studio Knit

Studio Knit • 4:35

<https://www.youtube.com/watch?v=tc9KxWjtu94>

WHEN TO WATCH

After “The craft” paragraph. Watch the purl stitch slowly, then purl a row of practice stitches along with the video, pausing after each step.

Note: Studio Knit counts the steps out loud on screen, close up. She holds the yarn in her right hand, as our lesson does.

BACKUP VIDEO

Operating a Lee Type Frame - Handframe Knitting

Leicester Museums • 1:08

<https://www.youtube.com/watch?v=4xioQm-5wMM>

Watch after “The story.” A one-minute museum film of a man operating a hand-frame knitting machine of the kind William Lee invented. Watch the long row of needles move together.

KEY TERMS

purl stitch (p)

The knit stitch made from the back: yarn in front, needle into the stitch from back to front, wrap, pull through, slip off. Its bump faces you.

right side (RS) and wrong side (WS)

The side meant to show, and the side meant to be inside.

seam

A line where two edges are sewn together. A headband's ends are seamed to make a ring.

stockinette stitch (st st)

Knit one row, purl one row. It makes smooth Vs on the front (the right side) and bumps on the back. It curls at the edges.

stocking frame

The first knitting machine, built by William Lee in 1589. It used a row of hooked needles to knit a whole row of stitches at once.

CORE IDEAS

The story. In 1589, in the village of Calverton near Nottingham, England, a man named **William Lee** (old accounts say he was a clergyman) built a wooden-and-iron machine that could knit. An old story, told as a legend, says he got the idea while watching a young woman knitting by hand, and wanted to spare her the long hours. Whether or not that is true, Lee's **stocking frame** worked: it had a long row of tiny hooked needles, one for every stitch, and it knitted a whole row at once with the knitter's hands and feet working levers and pedals. Lee asked Queen Elizabeth I for a patent, the right to be the only maker. She refused. She is said to have worried that the machine would take work from the many poor hand knitters, and the first frame made only coarse wool stockings, while the Queen preferred fine silk ones. Lee improved his frame to knit fine silk, but still no patent came. He took his frames to France, where he died around 1614. Yet his idea lived on. Framework knitting became a great industry around Nottingham and Leicester, and today's knitting machines that make your socks and T-shirts still use hooked needles much like his.

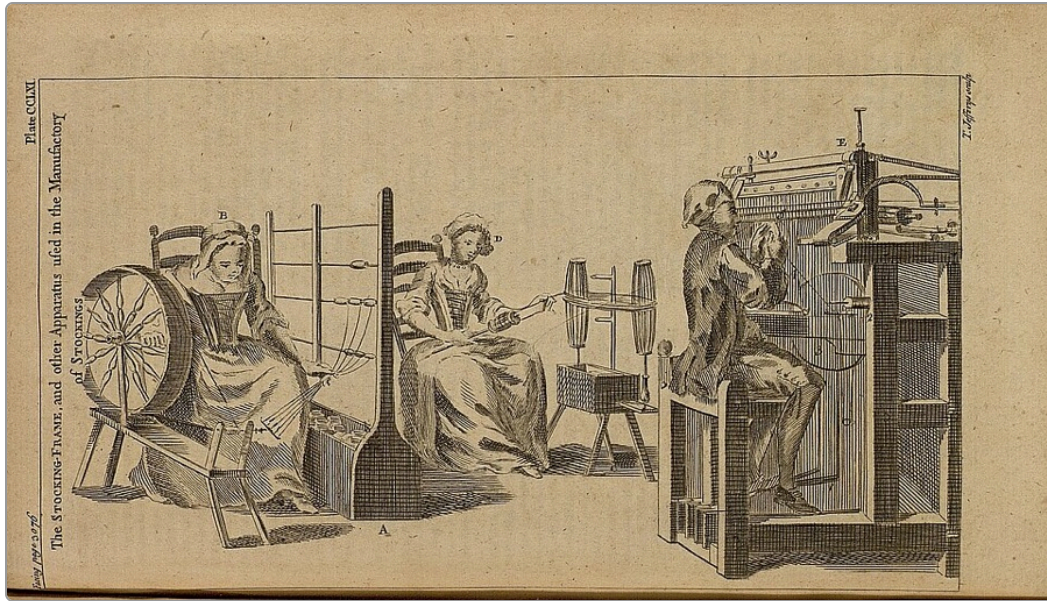
How they figured it out. Lee studied what a hand knitter's needles actually do: hold a row of loops, pull a new loop through each, and drop the old one. He realized a

machine could give each loop its own small hooked needle, called a bearded needle, and move them all together. A metal bar pushed the new yarn down between the needles, and another bar pressed the hooks closed so the old loops could slide over them and off. Instead of one stitch at a time, the frame made a whole row in a few motions.

The craft. Look at a knit stitch from the back and you see a bump. The **purl stitch** is simply the knit stitch made from the back, so its bump faces you. To purl: bring the yarn to the **front**, put the right needle into the stitch from **back to front** (right to left), wrap the yarn counterclockwise, push the new loop through to the back, and slip the old stitch off. If you knit one row and purl the next, you get **stockinette**: smooth Vs on the front and bumps on the back, just like a T-shirt. Stockinette curls at the edges because the Vs and the bumps pull differently. Garter stitch has bumps on both sides, so it balances and lies flat. That is why many patterns put a few garter stitches at the edges of stockinette to keep it from curling.

Let's knit. You will make a headband (or ear warmer) with a smooth stockinette middle and garter edges that keep it flat. The skill to do well is **reading your knitting**: before each row, look at the stitches and tell whether you are on the knit side or the purl side, without looking at the pattern.

PICTURE STUDY



The Stocking-Frame and Other Apparatus Used in the Manufactory, Engraver for *A New and Complete Dictionary of Arts and Sciences*, 1763 · Copper engraving (book illustration) · Library of the University of Seville, Spain (a copy of the book)

Image: [Wikimedia Commons](#), public domain

This picture was printed in London in 1763 in a dictionary that explained the useful arts to its readers. It shows a stocking workshop about 175 years after William Lee built the first frame: women spin and wind the thread, and a framework knitter sits at the machine. The frame looks much like Lee's, because his design worked so well that it changed very little for two hundred years.

Look closely

- Find the framework knitter. Where are his hands and his feet? What do you think each one does?
- Find the long row across the front of the frame. That is where the row of needles sits. Why would the needles need to be in a straight row?
- Find the spinning wheel and the winding wheel. Why does the knitter need these workers?
- Compare the frame with the one in the museum film. What looks the same?

Talk about it

1. How many people does it take to make a pair of stockings in this workshop?
Who does each job?
2. A hand knitter makes one stitch at a time. How does this frame change that?
3. William Lee kept working on his frame even after the Queen said no. What does this picture tell you about whether his idea was a good one?

Safety first. A parent or responsible adult supervises all sewing-tool use; count needles and the tapestry needle out and back in. Point needles down and away from faces, and keep knitting off the floor and out of reach of babies and pets.

SEWING PROJECT

A Stockinette-and-Garter Headband

You will knit a headband or ear warmer with a smooth stockinette middle and garter-stitch edges, bind it off, and seam the ends to make a ring. You will learn the purl stitch and see for yourself why stockinette curls and garter lies flat.

You will need

- A pair of US 8 (5 mm) straight needles
- A tape measure
- Small scissors
- A large-eye tapestry needle in a pincushion
- A stitch marker or small safety pin

STOCKINETTE HEADBAND WITH GARTER EDGES

Finished size: About 3½ in (9 cm) wide; length to fit the wearer's head (about 18–20 in around for a child) ·
About 3 to 4 hours

Fabric and notions

- Worsted-weight (weight 4) acrylic or wool-blend yarn, about 70 yards (64 m)
- **Abbreviations:** CO cast on · k knit · p purl · BO bind off · RS right side · WS wrong side · st(s) stitch(es)

How to make it

1. Measure around the wearer's head over the ears. Subtract 1 inch so the band stays snug. Write the length.
2. CO 18 sts.
3. **Rows 1–4:** K every row (a garter border).
4. **Row 5 (RS):** K across.
5. **Row 6 (WS):** K3, p to the last 3 sts, k3.
6. Repeat Rows 5 and 6 until the band measures your length minus ½ inch.
7. K 4 more rows (garage border). BO loosely, leaving a 15-inch tail.

8. Fold the band into a ring with the right side out and the ends meeting. Thread the long tail on the tapestry needle and whipstitch the cast-on edge to the bound-off edge, catching one stitch from each side each time.
9. Knot the tail inside and weave in all ends. Turn the seam to the back of the head.

Fabric check: Choose a soft yarn that does not scratch the forehead: acrylic is soft and washable, and a wool blend is warmest. If wool makes your skin itch, use acrylic. A yarn with a little stretch (acrylic or wool, not cotton) helps the headband hug the head without slipping.

Steps

1. **Curl test.** First knit a small swatch: CO 15, k 4 rows, then 12 rows of stockinette with no garter edges, then BO. Lay it on the table and your garter square beside it. Which one curls? Which edges curl, and which way?
2. **Practice the purl.** On your swatch, say the steps out loud: yarn in front, in from the back, wrap, through, off.
3. Knit the headband from the pattern card. Before each row, “read” your knitting: Vs facing you means a right-side (knit) row; bumps facing you means a wrong-side row.
4. **Try it on** before you bind off. Wrap it around the head. Is it snug but comfortable? Add or remove rows if needed.
5. **Improve it.** Did your garter edges keep the headband flat? If it still curls, what would you change next time (more garter stitches at each edge, or a garter border all around)?
6. Clean up: count the needles and tapestry needle back in, and save your curl-test swatch for your notebook.

Tips

- The most common purl mistake is forgetting to bring the yarn to the front. If you see an extra loop over the needle, the yarn went the wrong way.
- If you lose your place, look at the stitches just below the needle: smooth Vs mean the row you just finished was a knit row from the front.
- Younger students may knit the whole headband in garter stitch (no purling) and save the purl stitch for the curl-test swatch. Older students: try a 2-by-2

rib (k2, p2) for the whole band.

Check your work

- ☐ I can purl and tell a knit stitch from a purl stitch by sight.
- ☐ I can explain why stockinette curls and garter lies flat.
- ☐ I bound off, seamed and finished a headband that fits.

SEWING NOTEBOOK

1. Tape in your curl-test swatch (or draw it) next to a piece of garter stitch, and write one sentence explaining the difference.
2. Draw the purl stitch in four boxes, and compare it with your drawing of the knit stitch from Lesson 6.2.
3. Draw William Lee's stocking frame as you imagine it from the museum film: a long row of needles, the yarn, and the knitter at the levers.

From history. Framework knitting grew into a great trade around Nottingham, Leicester and Derby. By the 1700s thousands of frames clattered in cottages there, and some were later adapted to knit ribbing and even lace. The Framework Knitters Museum in the village of Ruddington, near Nottingham, still runs old frames today.

COMMON MISTAKES

- Purling with the yarn in back. You get extra loops and holes. Bring the yarn to the front before each purl.
- Knitting a stockinette scarf with no border and wondering why it curls into a tube. Use garter edges or ribbing.
- Binding off so tightly the headband will not stretch over the head. Bind off loosely or with a larger needle.

Make it a game • Frame Versus Hand. Line up ten buttons in a row. Time yourself moving them one at a time like a hand knitter. Then your parent slides a ruler across all ten at once, like William Lee's frame in 1589. Compare times. Then draw a row of knit stitches as Vs and purl stitches as bumps. Name each one.

UNIT 6

KNITTING

Crochet holds one loop at a time. Knitting holds a whole row of loops at once, waiting on a needle, and pulls a new row of loops through them. In this unit you will learn to **cast on**, work the **knit stitch** until it is smooth and even, fix a dropped stitch, learn the **purl stitch**, and **bind off**. With only those few skills, people have knitted warm socks, caps, mittens and scarves for hundreds of years.

You will meet a French grandmother teaching a little girl in Millet’s *The Knitting Lesson*, the American schoolchildren who knitted for soldiers in 1917 and 1918, and William Lee, the Englishman who in 1589 built the first knitting machine. You will make a garter-stitch washcloth, begin a scarf to give to someone who needs warmth, and finish a headband in stockinette and garter. As Proverbs 31:21 says of the capable woman, she “is not afraid of the snow for her household.” A knitter can help make that true.

PREREQUISITES

- Can make a slip knot and hold yarn with even tension (Unit 5)
- Knows yarn weights and gauge, and reads simple abbreviations (Unit 5)
- Can weave in yarn ends with a tapestry needle and keep the needle count (Units 3 and 5)
- Can measure in inches and keep a row log (Unit 5)

MASTERY CHECKLIST

- ☐ I can cast on 20 or more stitches with an even long-tail or knitted cast-on.
- ☐ I can knit garter stitch, count rows by the ridges, and fix a dropped stitch with a crochet hook.
- ☐ I can purl, tell knit from purl by looking, and explain why stockinette curls and garter stitch lies flat.
- ☐ I can bind off, weave in my ends, and seam a headband.
- ☐ I can tell the history of hand knitting, the Red Cross knitters of 1917–1918, and William Lee’s stocking frame of 1589.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **Craft Yarn Council: Knitting Abbreviations:** Free. The standard list of knitting abbreviations (k, p, CO, BO, st st, RS, WS) used in printed patterns.
- **Craft Yarn Council: Hooks and Needles:** Free. A table that matches U.S. knitting needle sizes (such as US 8) to millimeters (5 mm).
- **A pair of US 8 (5 mm) knitting needles, 10 inches long:** Bamboo or wooden needles are less slippery than metal for beginners. Rounded tips, not sharp points, are best at this age.
- **A 5 mm (H-8) crochet hook and stitch markers:** You already have the hook from Unit 5. It is the best tool for picking up a dropped stitch. Small safety pins work as stitch markers.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

6.1 Hand Knitters and the Knitting Lesson	2 sessions of 45–60 minutes
6.2 The Knit Stitch and the Garter Square	2 sessions of 45–60 minutes
6.3 Knitting for Others: The Red Cross Knitters	2 sessions of 45–60 minutes
6.4 William Lee’s Stocking Frame and the Purl Stitch	2 sessions of 45–60 minutes

UNIT 6 REVIEW

Answer each question in complete sentences unless it asks you to show. The two “show me” items are done with your needles and yarn while your parent watches. The review is worth 50 points.

1. **5 pts**

How is knitting different from crochet? Why does a dropped stitch matter more in knitting?

2. (5 pts)

Show me. Cast on 12 stitches and knit two rows. Say the four steps of the knit stitch as you work.

3. (5 pts)

How many rows are in one garter-stitch ridge? Your square has 24 ridges. How many rows did you knit?

4. (5 pts)

Predict. You knit a 10-inch strip in stockinette stitch with no garter edges. What will it look like when you lay it on the table, and why?

5. (5 pts)

Show me. Purl 5 stitches. Then point to a knit stitch and a purl stitch in your headband or swatch.

6. (5 pts)

How do you fix a dropped stitch in garter or stockinette stitch?

7. (5 pts)

Why did the American Red Cross ask people to knit in 1917–1918, and why did it print standard patterns?

8. (5 pts)

Your gauge is 5 stitches per inch. How many stitches do you cast on for a scarf 6 inches wide?

9. (5 pts)

What did William Lee invent in 1589? How was it different from hand knitting?

10. (5 pts)

Why did Queen Elizabeth I refuse William Lee a patent, and what happened to his invention?

ANSWER KEY

1. Knitting holds many live loops on a needle and pulls a new row through them; crochet has only one live loop at a time. A dropped live stitch in knitting can run down the fabric like a ladder.
2. Parent checks: an even cast on of 12 stitches; two complete rows of 12; the student says in, around, through, off.
3. Each ridge is 2 rows, so 24 ridges is 48 rows.
4. The edges will curl: the sides roll toward the back and the ends roll toward the front, almost into a tube. The knit Vs and the purl bumps pull differently, so the fabric does not balance. Garter edges or ribbing would keep it flat.
5. Parent checks: yarn in front, needle in from the back, five neat purl stitches; the student points to a smooth V (knit) and a bump (purl).
6. Catch the loose loop with a crochet hook from the front, pull the lowest ladder strand through it, and repeat strand by strand until you reach the top; then put the stitch back on the needle. (In garter stitch, turn the work as needed so you pull through from the front.)
7. Soldiers in cold, wet trenches and at sea needed many warm socks, sweaters and mufflers, more than factories could quickly make. Standard patterns made sure every piece was the right size and well made, so it would help and not rub or fall apart.
8. $5 \times 6 = 30$ stitches.
9. The stocking frame, the first knitting machine. It had a row of hooked (bearded) needles, one for each stitch, and knitted a whole row at once instead of one stitch at a time.
10. She worried it would take work from poor hand knitters, and its first stockings were coarse wool rather than fine silk. Lee took his frames to France; later framework knitting became a big trade around Nottingham and Leicester, and modern knitting machines still use hooked needles like his.

UNIT CHALLENGE: A FINISHED KNITTED PIECE WITH A ROW LOG

Finish one knitted piece to wear or give: the scarf from Lesson 6.3, the headband from Lesson 6.4, or a set of two garter-stitch washcloths. Bind off, weave in every end, and give it (or one piece of the set) to the person you planned it for.

In your notebook, include a gauge swatch (at least 15 stitches and 20 rows) with its measurement, your row or scarf log, and a short note on one mistake you made and how you fixed it.

LOOK FOR	WHAT IT MEANS
Finished piece	Bound off, ends woven in, even stitches, and the same width from start to finish.
Gauge swatch	A labeled swatch with stitches and rows per inch measured correctly.
Row log	Dates, rows or length, and time recorded honestly through the project.
Fixing and improving	Explains one mistake and the fix (a dropped stitch picked up, a row pulled out). A lumpy piece that is honestly recorded and improved earns full credit.
Safety and giving	Needles counted and stored safely each session; the piece given with a short note.

UNIT 7

HOME SEWING: PILLOWS, DRAPES & FURNITURE COVERS

Now your sewing comes home. In this unit you will make real things for real rooms: an **envelope pillow cover**, a **curtain** for a window, a **nine-patch quilt** top tied with yarn, and a **new cover for a chair or stool seat**. Each project starts with a tape measure: you will measure a pillow, a window, a quilt block and a seat, add the right seam allowances and hems, and figure out how much fabric to buy.

You will read how God told Moses to make the tabernacle's curtains of fine twined linen, visit a quilting family in a New Mexico homestead town in 1940, and meet William Morris, the English designer whose printed fabrics covered chairs and cushions in the 1880s. A sewing machine makes these projects faster, but every one can also be sewn by hand with a backstitch. If your family does not own a machine, one can often be borrowed from a relative or a friend at church.

PREREQUISITES

- Can sew a straight seam with a $\frac{5}{8}$ -inch or $\frac{1}{2}$ -inch seam allowance, by machine or with a hand backstitch (Units 3–4)
- Uses the sewing machine only at slow speed with an adult beside, fingers an inch from the needle, and pulls pins before they reach the presser foot (Unit 4)
- Presses seams with an adult beside, iron set upright when not in use (Unit 4)
- Can measure in inches and fractions of an inch to the nearest $\frac{1}{4}$ inch (Units 3–6)

MASTERY CHECKLIST

- ☐ I can measure a pillow form, a window and a chair seat, and add seam allowances, hems and overlap to find the size to cut.
- ☐ I can sew an envelope pillow cover with hemmed flaps and finished seams.
- ☐ I can explain fullness and a rod pocket, and make a curtain that fits a real window.
- ☐ I can piece a nine-patch block with $\frac{1}{4}$ -inch seams and tie a small quilt.
- ☐ I can explain what upholstery is (frame, webbing, padding, fabric) and re-cover a seat or make a tie-on cushion cover, with an adult using the staple gun.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A 60-inch tape measure and a clear 6 × 24 inch ruler:** The tape measure is for windows, pillows and seats. A clear ruler marked in $\frac{1}{8}$ inches makes cutting quilt squares accurate.
- **V&A: William Morris, “Strawberry Thief” furnishing fabric:** Free. The Victoria and Albert Museum’s page for a real piece of Morris’s printed cotton from 1883, with photographs you can zoom in on. Good for Lesson 7.4.
- **A pillow form (14 or 16 inches square):** Inexpensive at fabric and craft stores. An old pillow that needs a fresh cover works just as well.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

7.1 The Envelope Pillow	2 sessions of 45–60 minutes
7.2 The Curtains of the Tabernacle	2 sessions of 60–90 minutes
7.3 Patchwork and the Quilting Bee	2 sessions of 60–90 minutes
7.4 Covering Furniture: Cushions and Seats	2 sessions of 60–90 minutes

UNIT 7 REVIEW

Answer each question in complete sentences unless it asks you to show or to calculate. Show your math. The review is worth 50 points.

1. **5 pts**

Your pillow form is 14 inches square and the seam allowance is $\frac{1}{2}$ inch. What size do you cut the front piece? Show your math.

2. **5 pts**

How does an envelope closure work, and why do the two back flaps need a hem?

3. (5 pts)

What were the curtains of the tabernacle made of, and how were they joined (Exodus 26)?

4. (5 pts)

A curtain rod is 36 inches long. You want a fullness of 2 and two panels. How wide do you cut each panel if each needs 2 inches for side hems?

5. (5 pts)

Predict. You hang a curtain with a fullness of 1 (exactly as wide as the rod). What will it look like closed, compared with a fullness of 2?

6. (5 pts)

Why do quilters use a $\frac{1}{4}$ -inch seam, and why must it be accurate? If a $4\frac{1}{2}$ -inch square is sewn with $\frac{1}{4}$ -inch seams on both sides, how big does it look in the finished block?

7. (5 pts)

Show me. Tie a square knot through a quilt or two layers of scrap fabric, and press one seam toward the darker fabric with an adult beside you.

8. (5 pts)

What was a quilting bee, and why did neighbors hold them?

9. (5 pts)

Name the layers of an upholstered dining-chair seat, from the bottom up. Who uses the staple gun at your age?

10. (5 pts)

Who was William Morris, and what did Strawberry Thief show? Why is a firmly woven fabric best for a chair seat?

ANSWER KEY

1. $14 + \frac{1}{2} + \frac{1}{2} = 15$ inches, so 15×15 inches.
2. Two back pieces overlap; the pillow inside pushes them together so they stay closed, with no zipper or buttons. The overlapping edges show, so they are hemmed to hide the raw edges and keep them from fraying.
3. Fine twined linen in blue, purple and scarlet, embroidered with cherubim. The ten curtains were joined five and five with loops of blue and clasps (taches) of gold.
4. $36 \times 2 = 72$ inches total; $72 \div 2 = 36$ inches per panel; $36 + 2 = 38$ inches wide for each panel.
5. It will hang flat with no folds and may leave gaps at the sides; it looks skimpy. With a fullness of 2 it hangs in soft, even folds and covers the window fully.
6. A narrow seam saves fabric and keeps blocks flat; if seams vary, squares come out different sizes and the corners do not meet. A $4\frac{1}{2}$ -inch square loses $\frac{1}{4}$ inch on each side, so it finishes at 4 inches.
7. Parent checks: the knot is right over left, then left over right, lying flat; the seam allowance is pressed to the dark side; the iron was set upright between uses.
8. A gathering where neighbors sat around a quilting frame and stitched a quilt together, often finishing it in a day. Quilting a whole quilt by hand was a huge job, and working together made it faster and turned it into a friendly time.
9. The seat board (or frame with webbing), foam or padding, batting, and the cover fabric (with a plain cloth underneath). An adult does all stapling.
10. An English designer and craftsman (1834–1896) whose company made printed fabrics, wallpapers and furnishings; Strawberry Thief (1883) shows thrushes stealing strawberries in his garden. Firm, tight weaves resist the rubbing of sitting and do not sag or wear through quickly.

UNIT CHALLENGE: A FINISHED PIECE FOR A REAL ROOM

Finish one piece for a real room in your home: a pillow cover, a curtain, a doll quilt or table topper, a tie-on cushion cover, or a re-covered seat. It should be measured to fit the real pillow, window, table or chair.

In your notebook, include your measurements and math, a fabric swatch with a short note on why you chose that fabric, and a photo or drawing of the finished piece in place. Write one sentence about who uses it.

LOOK FOR	WHAT IT MEANS
Measured to fit	Measurements and cutting math are written out, and the piece fits the real pillow, window, table or chair.
Workmanship	Straight seams and even hems, sharp corners, raw edges finished or hidden.
Fabric choice	Fabric suits the job (firm for seats and pillows, the right weight for a curtain, cotton for anything near heat), with the reason written down.
Safety	Machine and iron used with an adult beside; adult did all stapling; pins and needles counted every session.
Record and improvement	Photo or drawing in place and one honest change for next time. A crooked first try that is honestly recorded and redone earns full credit.

7.1 THE ENVELOPE PILLOW

OBJECTIVES

- Tell how families long ago made and cared for pillows, and why a removable, washable cover is a good idea.
- Measure a pillow form and figure the size to cut for the front and the two overlapping back flaps, including seam allowances and hems.
- Sew an envelope pillow cover by machine at slow speed with an adult beside, or by hand with a backstitch.

Warm-up. Find three pillows or cushions in your house. Look for how each cover opens: a zipper, buttons, a flap, or no opening at all? Which one could you wash most easily? Measure one pillow from seam to seam and write down its size.

WATCH

Envelope Pillow Cover Tutorial- Quick & Simple

The Broken Needle • 3:24

https://www.youtube.com/watch?v=Tc6wQ_y9j-Y

WHEN TO WATCH

After “Let’s sew.” Watch it all the way through once. Then watch the cutting part again with your own pillow measurements beside you.

Note: She uses a rotary cutter; in this course an adult or the student with scissors does the cutting instead. She sews a 16-inch cover, the same size as our pattern.

KEY TERMS

pillow form

The stuffed inner pillow that goes inside a cover. Forms are sold by size, such as 14 or 16 inches square.

envelope closure

Two back pieces that overlap like the flap of an envelope, so the pillow slides in and out with no zipper or buttons.

seam allowance

The fabric between the stitching line and the cut edge. Our pillow uses $\frac{1}{2}$ inch (1.3 cm).

double-fold hem

An edge folded under twice, then stitched, so no raw edge shows.

clip the corners

Cutting across the seam allowance at a corner, close to (not through) the stitching, so the corner turns out sharp.

ticking

A tightly woven cotton fabric, often striped, used for the inner case of feather pillows so the quills cannot poke through.

CORE IDEAS

The story. In early American homes, a good pillow took years to make. Families kept geese and ducks and saved the soft feathers a little at a time until there were enough to stuff a pillow or a feather bed. The feathers went inside a case of **ticking**, a tightly woven cotton so firm the sharp quills could not poke through. Over the ticking went a washable cover, sometimes called a *pillowbere*, which could be taken off and boiled clean on wash day. Women and girls embroidered initials or a date on the cover so it would not be mixed up with a neighbor's. Look at the linen cupboard in the picture for this lesson: stacks of pillow covers, sheets and towels were a family's treasure.

How they figured it out. A cover has to be big enough to slide over the pillow, but snug enough to look neat. Seamstresses learned to measure the pillow and add just enough for the seams. Buttons and ties were fiddly, and buttonholes took time, so sewers found a simpler closure: two back pieces that **overlap**. When the pillow is inside, it pushes the flaps together and they stay closed. You can still see this "envelope" back on pillows in stores today.

The fabric science. A cushion cover is pulled, sat on and washed again and again, so the fabric must be strong and firmly woven. A medium-weight cotton or cotton-blend, such as quilting cotton, canvas, twill or home-décor fabric, works best. Cotton can **shrink** the first time it is washed, as its fibers relax, so we **prewash** it before cutting. Then the math: for a 16-inch form, the front is cut 17×17 inches (16 plus two $\frac{1}{2}$ -inch seam allowances). Each back flap is 17 inches tall and 12 inches wide. Two flaps of 12 inches, each with 1 inch used up by its hem, make 22 inches, which is 6 inches more than the pillow is wide; that leaves enough for the seams and an overlap of about 5 inches.

Let's sew. You will make an envelope cover for a 16-inch (or 14-inch) pillow form for a real room in your home. The skill to do well is a **straight ½-inch seam** all the way around, pivoting at each corner with the needle down, and clipping the corners so they turn out sharp. Sew on the machine at slow speed with an adult beside you, or sew it by hand with a small backstitch.

PICTURE STUDY



Sewing Girl (Syende flicka), Carl Larsson, 1911 · Watercolor · Lillehammer Kunstmuseum, Lillehammer, Norway

Image: [Wikimedia Commons](#), public domain

Carl Larsson was a Swedish painter who filled his books and paintings with scenes of his own family's home in the village of Sundborn. His wife, Karin, wove and sewed many of the house's curtains, cushions and linens herself. Here a girl sits at the big table sewing a pile of white household linens, with a weaving loom behind her. Everything in this room was made to be both useful and lovely.

Look closely

- Find the pile of white cloth on the table. What household things might she be sewing: pillow covers, sheets, napkins, curtains?
- Find the loom in the background. What does it tell you about where this family's cloth came from?
- Look at the colors of the walls, the table and the flowers. How do they make the room feel?
- Look at how the girl sits. Where is the light coming from?

Talk about it

1. Larsson's family made many of the cloth things in their home. What cloth things in your home could you make?

2. Why might a family choose to sew its own pillow covers instead of buying them?
3. If you painted a room in your home with something you made in it, what would you show?

Safety first. A parent or responsible adult supervises all sewing-tool use. Use the machine at slow speed with an adult beside you, keep your fingers an inch from the needle, and pull each pin before it reaches the presser foot; the adult threads the machine and fixes any jam with the foot off the pedal. Press with an adult beside you, set the iron upright, and count pins and needles back in at the end.

An Envelope Pillow Cover for a Real Room

You will measure a pillow form, cut a front and two back flaps, hem the flaps, and sew the cover around all four sides. It slips on and off for washing, with no zipper and no buttons.

You will need

- A sewing machine with a universal needle, or a hand-sewing needle and thimble
- Fabric scissors (cut with an adult nearby) and small thread snips
- Pins and a pincushion (or sewing clips)
- A tape measure, a ruler, and chalk or a washable marking pen
- An iron and ironing board (used with an adult beside you)
- A point turner, a chopstick, or the blunt end of a pencil for pushing out corners

ENVELOPE PILLOW COVER

Finished size: Fits a 16 × 16 in (40 × 40 cm) pillow form (14-inch sizes below) • About 1½ to 2 hours

Fabric and notions

- ½ yard (46 cm) of 44-inch-wide medium-weight cotton or cotton blend (quilting cotton, twill, canvas or home-décor cotton), prewashed and pressed
- Pattern pieces for a 16-inch form: **Front** 17 × 17 in (43 × 43 cm), cut 1; **Back flaps** 17 in tall × 12 in wide (43 × 30 cm), cut 2
- For a 14-inch form: Front 15 × 15 in, cut 1; Back flaps 15 × 11 in, cut 2
- All-purpose polyester or cotton thread to match
- One 16-inch (or 14-inch) pillow form

How to make it

1. Prewash and dry the fabric. With an adult beside you, press it smooth.
2. Measure and mark the front and the two back flaps with chalk and a ruler, keeping the edges square to the fabric's straight grain. Cut them

out with an adult nearby.

3. **Hem the flaps.** On one 17-inch side of each back flap, fold the edge $\frac{1}{2}$ inch to the wrong side and press (adult beside you). Fold another $\frac{1}{2}$ inch and press again. Pin.
4. Stitch each hem close to the inner fold, at slow speed, backstitching at both ends. Or sew it by hand with a small backstitch or slip stitch.
5. Lay the front right side up. Place one flap on top, right side down, with its raw edges matching the left side and its hem toward the middle. Place the second flap right side down on the right side; the hemmed edges overlap in the middle. Pin all around, pins at right angles to the edge.
6. Sew around all four sides with a $\frac{1}{2}$ -inch seam allowance. Backstitch at the start. At each corner, stop with the needle down, lift the presser foot, turn the fabric, lower the foot and keep sewing. Pull each pin before it reaches the foot. Backstitch where you finish.
7. Clip each corner across the seam allowance, about $\frac{1}{8}$ inch from the stitching. If your fabric frays easily, zigzag or hand-overcast the raw edges.
8. Turn the cover right side out through the envelope opening. Gently push out the corners with a point turner or chopstick.
9. Press the cover with an adult beside you. Fold the pillow form in half, slide it in through the opening, and plump it into the corners.

Fabric check: Choose a firmly woven, medium-weight cotton or cotton blend, such as quilting cotton, twill, canvas, or home-décor fabric; a clean old tablecloth or curtain works well too. Prewash it, because cotton shrinks the first time. Avoid stretchy knits, slippery satins and very thin fabrics: they shift while you sew and wear out quickly on a cushion. If your fabric has a big print or stripe, center it on the front piece before you cut.

Steps

1. **Measure.** Measure your pillow form from seam to seam in both directions. Write the size you will cut for the front and the flaps, showing the math (pillow + 1 inch for seams).
2. **Practice first.** On two scraps, sew a 6-inch seam with a $\frac{1}{2}$ -inch allowance and pivot at one corner with the needle down. Clip the corner and turn it. Is the

corner sharp?

3. Make the pillow cover from the pattern card.
4. **Test it.** Put the pillow in and take it out three times. Does the envelope stay closed? Is the overlap enough? Measure the overlap.
5. Place the pillow in a real room and take a photo or make a drawing of it in place.
6. **Improve it.** Write one change for next time: a bigger overlap, a contrasting flap, piping, or a cover for a different pillow.
7. Clean up: count pins and needles back into the pincushion, unplug the iron and the machine, and sweep the floor with a magnet if a pin dropped.

Tips

- Cut the front 1 inch bigger than the form for a plump pillow. If you like a looser, softer look, cut it 1½ inches bigger.
- If your fabric has a one-way print (like trees or animals), make sure both flaps and the front point the same way before you cut.
- Younger students: an adult may cut the pieces while the student pins, sews at slow speed with the adult beside, and turns and stuffs. Older students: add piping or a 2-inch flange border.

Check your work

- ☐ I measured my pillow form and figured the cutting sizes with seam allowances.
- ☐ My cover has straight ½-inch seams, sharp corners and hemmed flaps that overlap.
- ☐ I followed the machine and iron safety rules with an adult beside me.

SEWING NOTEBOOK

1. Draw the three pattern pieces with their measurements, and show where the hems and seams go.
2. Tape in a swatch of your fabric and write its fiber, why you chose it, and whether it shrank when you prewashed it.
3. Draw or paste a photo of your pillow in its room. Write one sentence about who will use it.

From history. Some people still own pillow covers and feather beds made by their great-great-grandmothers. Well-made covers of linen and cotton, carefully mended, can last more than a hundred years.

COMMON MISTAKES

- Cutting the front exactly the size of the pillow form. With seams taken out, the cover is too small. Add 1 inch.
- Sewing over pins. The needle can hit a pin and break. Pull each pin as it reaches the presser foot.
- Clipping through the stitching at a corner. The corner opens. Clip close to the stitching, not through it.

Make it a game • Paper Pillow Pattern. Use a book as the pillow form. Cut newspaper to the front size with a seam allowance, plus two overlapping back flaps. Fit them around the book and check that the flaps overlap. Your parent times you. Say why a washable cover is a good idea. Fewer cuts wins.

7.2 THE CURTAINS OF THE TABERNACLE

OBJECTIVES

- Tell what God commanded about the curtains of fine twined linen and the veil of the tabernacle, and who made them.
- Measure a real window, choose a fullness, and figure the cutting size of a curtain panel with side hems, a rod pocket and a bottom hem.
- Sew a café or rod-pocket curtain for a real window, by machine with an adult beside you or by hand.

Warm-up. Go to a window with curtains. Pull the curtains closed and count the folds. Now pull them flat. How much wider is the fabric than the window? Look at the top: is the rod slid through a tube of fabric, or are there rings, tabs or hooks?

WATCH

Easy DIY Curtains - How to Make a Rod Pocket Curtain

[OnlineFabricStore](#) · 3:46

<https://www.youtube.com/watch?v=0eMButvPi04>

WHEN TO WATCH

After “The fabric science” paragraph. Watch the measuring part twice, pausing to copy her formula, then watch the sewing.

Note: She uses a rotary cutter and mat; in this course an adult cuts, or the student cuts with fabric scissors with an adult nearby.

BACKUP VIDEO

Create quick rod pocket curtains

[Nancy's Notions](#) · 3:52

<https://www.youtube.com/watch?v=PgTYqKQGL-s>

A teacher from Nancy’s Notions, a long-running sewing program, shows how to measure the rod and the window, add for fullness and hems, and sew a rod pocket.

KEY TERMS

tabernacle

The holy tent God commanded Israel to build in the wilderness, made of curtains of fine linen and coverings of goats' hair and skins (Exodus 26).

fullness

How much wider the curtain fabric is than the rod or window. A fullness of 2 means the fabric is twice as wide, so it hangs in soft folds.

café curtain

A short curtain that covers only the lower half of a window, letting light in at the top.

fine twined linen

Linen thread spun very fine and twisted (twined) from several strands, then woven into strong, smooth cloth.

rod pocket

A tube of fabric sewn across the top of a curtain for the rod to slide through.

drapes

Heavier, often lined curtains that hang to the floor and can be drawn closed to block light and drafts.

CORE IDEAS

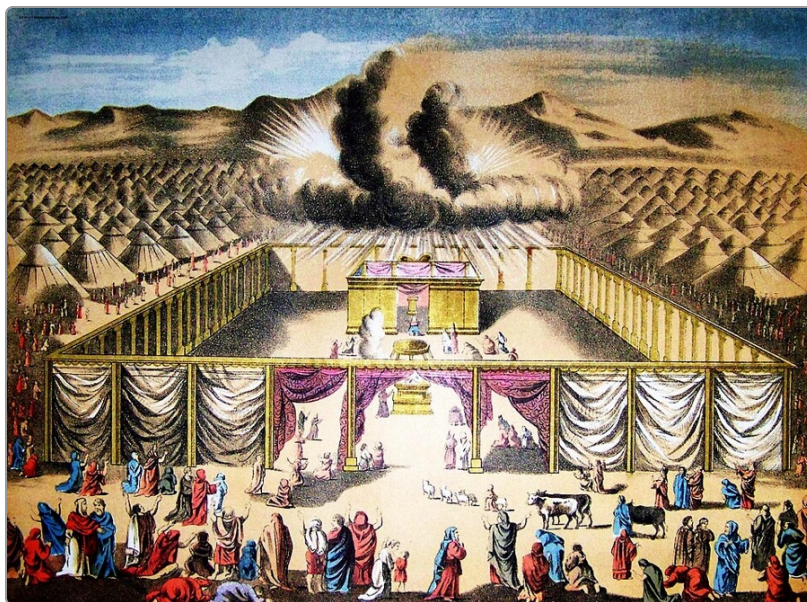
The story. When Israel camped in the wilderness, God gave Moses exact instructions for His dwelling place, the **tabernacle**. Its walls were made of ten great curtains “of fine twined linen, and blue, and purple, and scarlet,” embroidered with cherubim (Exodus 26:1). Each curtain was 28 cubits long and 4 cubits wide, about 42 by 6 feet, and the curtains were joined five and five with loops of blue thread and clasps of gold (Exodus 26:2-6). A thick, beautiful **veil** hung on pillars to divide the holy place from the most holy place (Exodus 26:31-33). The work was done by Bezaleel and Aholiab and every “wise hearted” person; the women “that were wise hearted did spin with their hands” the blue, purple, scarlet and fine linen (Exodus 35:25).

How they figured it out. The tabernacle had to be taken down and carried every time Israel moved. So its walls were made of separate curtains, all the same size, joined with loops and clasps that could be undone. Every curtain had to match the others exactly, or the loops would not line up. That took careful measuring, cutting and hemming, the same skills you will use for your window. Making something exactly to the measure you were given is not a small thing; it is faithful work.

The fabric science. A curtain lets light through or blocks it depending on its **weave** and **fiber**. Thin cotton or linen lets soft light through; a tighter, heavier weave or a lining blocks it. Linen is strong and hangs beautifully but wrinkles; cotton is easy to sew and wash; polyester resists fading and wrinkling in a sunny window. Now the math. Measure the **rod** (or the window width) and multiply by the **fullness**, usually $1\frac{1}{2}$ to 2. For a 30-inch rod and a fullness of 2, you need 60 inches of width, so make two panels each 30 inches wide plus 2 inches for side hems: cut each panel **32 inches wide**. For the length, measure from the rod to where the curtain should end, then add about 3 inches for the rod pocket and 4 inches for a double bottom hem. For a 24-inch café curtain, cut each panel **31 inches long**.

Let's sew. You will make a café curtain or a rod-pocket curtain for a real window in your home, such as a bedroom or bathroom. Younger students may make a smaller curtain for a doll house or a puppet theater. The skill to do well is a **straight, even hem**: measure the fold at several places with a ruler and press it before you sew.

PICTURE STUDY



The Tabernacle in the Wilderness, Illustrators of the 1890 Holman Bible, 1890 · Color illustration from a printed Bible

Image: [Wikimedia Commons](#), public domain

This picture was printed in a family Bible in 1890 to help readers imagine the tabernacle described in Exodus. The artist shows the court surrounded by hangings of white linen on pillars, the tent of the tabernacle in the middle, and the tents of the tribes of Israel spread across the desert.

Look closely

- Find the white linen hangings that make the wall of the court. How are they held up?
- Look at the hangings closely. Are they pulled flat, or do they hang in folds like curtains? Where do you see fullness?
- Find the tabernacle tent in the center. What colors did the artist give it?
- Look at the crowds of people. What colors are their clothes? Which colors from Exodus 26:1 can you find?

Talk about it

1. The whole tabernacle had to be carried from camp to camp. How did using separate curtains with loops and clasps help?
2. Why do you think God asked for such fine, beautiful work for His dwelling place?

3. This is one artist's idea, drawn more than three thousand years after Moses. What would you want to check in Exodus 26 before drawing your own?

Safety first. A parent or responsible adult supervises all sewing-tool use. Measure a high window from a sturdy step stool with an adult holding it, or let the adult measure while you write the numbers down. Press long hems with an adult beside you and keep the iron cord where no one can trip on it; at the machine, sew slowly with your fingers an inch from the needle and never sew over pins.

SEWING PROJECT

A Rod-Pocket Café Curtain for a Real Window

You will measure a window, choose a fullness, figure the cutting size, and sew a pair of rod-pocket curtain panels with side hems, a bottom hem and a pocket for the rod. Then you will hang them in a real room.

You will need

- A sewing machine, or a hand-sewing needle and thimble
- Fabric scissors (cut with an adult nearby) and thread snips
- Pins and a pincushion
- A 60-inch tape measure, a ruler or hem gauge, and chalk
- An iron and ironing board (with an adult beside you)
- A café rod or tension rod for the window (an adult mounts any rod that needs screws)

PAIR OF ROD-POCKET CAFÉ CURTAIN PANELS

Finished size: Two panels, each 30 in wide × 24 in long finished (for a 30-inch rod at 2× fullness); change the sizes to fit your window · About 2 to 3 hours

Fabric and notions

- Fabric for two panels each cut **32 in wide × 31 in long** (81 × 79 cm). With 44-inch-wide fabric, buy 1¾ yards (cut the two panels one above the other); with 54-inch-wide home-décor fabric, the same amount
- Light- to medium-weight cotton, linen, or cotton blend: muslin, gingham, quilting cotton, a clean old sheet or tablecloth
- All-purpose thread to match
- A café rod or tension rod (½ to 1 inch thick)

How to make it

1. **Measure.** Measure the rod length and the length from the rod to where you want the curtain to end. Write: width needed = rod × 2; each panel = half of that + 2 inches. Cut length = finished length + 3 inches (rod pocket) + 4 inches (bottom hem).

2. Prewash and press the fabric (adult beside you). Mark both panels with chalk along the straight grain, and cut them out with an adult nearby.
3. **Side hems:** On each long side of each panel, fold $\frac{1}{2}$ inch to the wrong side and press, then fold another $\frac{1}{2}$ inch and press. Pin, and stitch close to the inner fold.
4. **Bottom hem:** Fold the bottom edge 2 inches to the wrong side and press. Fold another 2 inches and press. Measure in several places so the hem is even. Pin and stitch close to the inner fold.
5. **Rod pocket:** At the top, fold $\frac{1}{2}$ inch to the wrong side and press. Fold down another $2\frac{1}{2}$ inches and press. Pin and stitch close to the lower fold, backstitching at both ends. Leave the sides of the pocket open for the rod.
6. Check that the rod slides through the pocket easily. If it is tight, sew a second pocket line a little lower next time.
7. Press both panels with an adult beside you. Slide them onto the rod and hang it. Spread the folds evenly.

Fabric check: Choose a light- to medium-weight woven cotton, linen or cotton blend that is easy to press and lets in the amount of light you want. Hold the fabric up to a window in the store to see how much light comes through. Prewash it, because cotton and linen shrink. Avoid stretchy knits and slippery sheer fabrics, which are hard to hem straight. Polyester and polyester blends resist fading in a sunny window; use a lower iron setting and a press cloth on them.

Steps

1. **Measure twice.** Measure the rod and the length twice, on different days or with a helper, and compare. Write the numbers and your math in the notebook.
2. **Practice first.** On a scrap, press and sew a 2-inch double hem. Measure it in three places. Is it even?
3. Sew the curtains from the pattern card.
4. **Light test.** Before and after hanging, hold a flashlight behind your fabric in a dark room. Describe how much light passes through. Would you choose a heavier fabric or a lining for a bedroom?
5. Hang the curtain and photograph or draw it in place.

6. **Improve it.** Is the fullness right, or would $1\frac{1}{2}$ or $2\frac{1}{2}$ look better? Write what you would change.
7. **Clean up:** count pins and needles in, unplug the iron and machine, and put away the step stool.

Tips

- Press every fold before you pin it. A pressed hem is twice as easy to sew straight.
- For a window with no rod, a spring tension rod fits inside the frame and needs no screws.
- Younger students: make a small curtain for a doll house, puppet theater or cupboard (for example, 12×10 inches finished) using the same steps. Older students: line the curtain with a plain cotton lining to block more light.

Check your work

- ☐ I measured a real window and figured the cutting size with fullness, hems and a rod pocket.
- ☐ My hems are straight and even, and the rod slides through the pocket.
- ☐ I can tell what the tabernacle curtains were made of and how they were joined.

SEWING NOTEBOOK

1. Draw your window with its measurements, and draw one curtain panel with its cutting size, hems and rod pocket labeled.
2. Show your fullness math step by step.
3. Copy Exodus 26:1 and draw one tabernacle curtain with its loops of blue and clasps of gold (Exodus 26:4-6).

From history. Exodus also describes outer coverings for the tabernacle: eleven curtains of goats' hair over the linen, then a covering of rams' skins dyed red and another of badgers' skins (Exodus 26:7, 14). Layer upon layer protected the fine linen inside from sun, wind and sand.

COMMON MISTAKES

- Measuring the window glass instead of the rod. Curtains are sized to the rod and to where they should hang.

- Forgetting fullness, so the curtain hangs flat and looks skimpy. Multiply by 1½ to 2.
- Making the rod pocket too narrow for the rod. Test with the real rod before you sew.

Make it a game • Tabernacle Window Math. Name what God commanded: curtains of fine twined linen in blue, purple and scarlet, and the veil. Then measure a window's width with a ruler and double it for fullness. Figure how wide a panel to cut with side hems and a rod pocket. Your parent checks your math.

Scripture. “Moreover thou shalt make the tabernacle with ten curtains of fine twined linen, and blue, and purple, and scarlet: with cherubims of cunning work shalt thou make them.” (Exodus 26:1, KJV)

“Cunning work” means skillful work. God asked for careful, beautiful sewing for His dwelling place, and gave His people the skill to do it.

7.3 PATCHWORK AND THE QUILTING BEE

OBJECTIVES

- Tell how quilts were made in colonial and pioneer homes, and how quilting bees turned a big job into neighborly work.
- Cut accurate squares and sew them with a $\frac{1}{4}$ -inch seam allowance, pressing and matching seams so the corners meet.
- Make a nine-patch (or four-patch) doll quilt or table topper, finished by turning and tied with yarn.

Warm-up. Find a quilt in your house, or look at the photograph in the picture study. Find one block and count the pieces in it. Are they squares, triangles or rectangles? Now look at the back: can you see where it was tied or quilted?

WATCH

Nine Patch Quilting Block - Beginner Block Quilting Series

Missouri Star • 5:27

<https://www.youtube.com/watch?v=Quzu2H5xeGQ>

WHEN TO WATCH

After “Let’s sew.” Watch how Jenny Doan sews the squares and presses the seams, then watch again as you lay out your own nine squares.

Note: From the Missouri Star Quilt Company’s beginner block series. She cuts with a rotary cutter, which students in this course do not use; cut your squares with scissors and a cardboard template instead.

KEY TERMS

patchwork

Sewing small pieces of fabric together to make a larger piece, often in a pattern of blocks.

quilt

A bed cover made of three layers, a top, a soft middle (batting) and a back, held together by stitching or ties.

block

One unit of a quilt top, such as a nine-patch: nine squares sewn in three rows of three.

batting

The soft, flat middle layer of a quilt. Cotton batting is breathable and safe for potholders; polyester is light and does not shrink.

quilting bee

A gathering of neighbors who work together around a quilting frame to finish a quilt in a day.

nest the seams

Pressing seams in opposite directions in neighboring rows so they lock together and the corners match.

CORE IDEAS

The story. In colonial and pioneer America, cloth was costly and nothing was wasted. Worn-out shirts, dresses and feed sacks were cut into squares and sewn into quilts. A quilt top could be pieced at home in spare evenings, but the quilting itself, stitching the top, the batting and the back together across the whole quilt, was a huge job. So neighbors held a **quilting bee**. Women and older girls sat around a big wooden frame and stitched together, talking as they worked, and often finished a quilt in a day; afterward families shared a meal. In 1940 the photographer Russell Lee visited the little homestead town of Pie Town, New Mexico, for the U.S. Farm Security Administration. He photographed the families there building log houses, farming, and making quilts, including Mrs. Bill Stagg holding the “state quilt” she had made, the picture for this lesson.

How they figured it out. Quilters found that the simplest blocks are the most forgiving. The **nine-patch**, three rows of three squares, was often a girl’s first block, and it uses up small scraps beautifully. They learned that the secret of a quilt that lies flat is **accuracy**: every square cut exactly the same size and every seam exactly the same width. If each seam is off by only $\frac{1}{8}$ inch, a row of nine squares can be more than an inch too short. That is why quilters use a narrow **$\frac{1}{4}$ -inch seam** and check it often.

The fabric science. Quilters prefer 100% cotton for the top and back: it is firm, does not stretch much, holds a crease when pressed, and lets the quilt breathe. In a nine-patch, each square is cut **$4\frac{1}{2}$ inches**. A $\frac{1}{4}$ -inch seam on each side takes away $\frac{1}{2}$ inch, so each square shows as a 4-inch square, and the block finishes at **12 inches** (it measures $12\frac{1}{2}$ inches before it is sewn into anything). Seams are **pressed toward the**

darker fabric so they do not show through the light fabric. In neighboring rows, they are pressed in opposite directions so they **nest** and the corners meet in sharp points.

Let's sew. You will piece a nine-patch block and turn it into a small doll quilt or table topper, finished by the “turn and topstitch” method and **tied** with yarn instead of quilted. Younger students may make a four-patch with four 6½-inch squares; it is the same size. The skill to do well is an **accurate ¼-inch seam**: use the edge of the presser foot or a strip of tape on the machine as your guide, or draw the stitching line on the back of each square if you sew by hand.

PICTURE STUDY



Mrs. Bill Stagg with State Quilt Which She Made, Pie Town, New Mexico, Russell Lee, 1940 · Color slide photograph (Farm Security Administration) · Library of Congress, Washington, D.C.

Image: [Wikimedia Commons](#), public domain

In 1940 Russell Lee photographed the homesteaders of Pie Town, New Mexico, families who had moved there to farm and build their own houses. These are among the earliest color photographs of American country life. Here Mrs. Bill Stagg holds up the quilt she made, with a block for each of the states, against the log wall of her family's home.

Look closely

- Find one block. What is embroidered or appliquéd on it? How many blocks can you count across one row?
- Look at the red and green strips between the blocks. These are called sashing. What do they do for the design?
- Look at the log wall behind her. What does it tell you about how this family lived?
- Look closely at the white parts of the quilt. Can you see lines of quilting stitches?

Talk about it

1. A quilt like this takes many months. What does it tell you about the person who made it?

2. Why might a family far from town, with little money, make quilts instead of buying blankets?
3. If you made a quilt with a block for each member of your family, what would you put on each block?

Safety first. A parent or responsible adult supervises all sewing-tool use. Students in this course do not use a rotary cutter: cut squares with fabric scissors around a cardboard template, with an adult nearby. Press with an adult beside you and set the iron upright; sew slowly with fingers an inch from the needle, and count pins at the end.

SEWING PROJECT

A Nine-Patch Doll Quilt or Table Topper, Tied with Yarn

You will cut nine squares, sew them into three rows of three with $\frac{1}{4}$ -inch seams, press and match the seams, then layer the block with batting and a back and tie it with yarn. It becomes a small quilt for a doll bed, or a mat for the middle of the table.

You will need

- A sewing machine, or a hand-sewing needle and thimble
- Fabric scissors (with an adult nearby) and thread snips
- A $4\frac{1}{2}$ -inch square template cut from a cereal box (or a $6\frac{1}{2}$ -inch template for a four-patch)
- A clear ruler, a pencil or fabric marker, pins and a pincushion
- An iron and ironing board (with an adult beside you)
- A large-eye embroidery or chenille needle for tying

NINE-PATCH DOLL QUILT / TABLE TOPPER

Finished size: About 12×12 in (30×30 cm) finished · About 3 hours over two sessions

Fabric and notions

- **Squares:** 5 squares of a dark cotton and 4 squares of a light cotton, each cut $4\frac{1}{2} \times 4\frac{1}{2}$ in (11.4 cm). Scraps, fat quarters or old cotton shirts all work.
- **Backing:** one 13×13 in (33 cm) square of cotton
- **Batting:** one $12\frac{1}{2} \times 12\frac{1}{2}$ in square of thin cotton batting (or a layer of cotton flannel)
- Neutral cotton or all-purpose thread (gray or tan)
- About 2 yards of cotton perle thread, embroidery floss or thin yarn for ties
- **Four-patch option:** 2 dark and 2 light squares cut $6\frac{1}{2} \times 6\frac{1}{2}$ in

How to make it

1. Prewash and press the fabrics (adult beside you). Trace around the template on the back of the fabric and cut the squares on the line, with an adult nearby.
2. Lay out the squares in three rows of three, dark squares in the four corners and the center (a checkerboard).
3. Sew the squares of each row together with a $\frac{1}{4}$ -inch seam allowance, right sides together. Use the edge of the presser foot or a piece of tape on the machine as a guide; by hand, draw the $\frac{1}{4}$ -inch line on the back and backstitch on it.
4. **Press** the seams of Rows 1 and 3 toward the dark squares. Press the seams of Row 2 toward the dark center square too. (The rows will nest because the darks alternate.)
5. Pin Row 1 to Row 2, right sides together, nesting the seams so they lock, with a pin at each seam. Sew with a $\frac{1}{4}$ -inch seam. Add Row 3 the same way. Press. The block should measure $12\frac{1}{2}$ inches square.
6. Lay the batting flat. Place the backing on it, right side up. Place the nine-patch on top, right side down. Pin all around.
7. Sew around all four sides with a $\frac{1}{4}$ -inch seam, leaving a 4-inch opening on one side. Clip the corners and trim the batting close to the stitching.
8. Turn it right side out through the opening. Push out the corners, tuck in the opening's edges, and press (adult beside you). Topstitch $\frac{1}{8}$ inch from the edge all around, closing the opening; or slip stitch the opening closed by hand.
9. **Tie it:** At each place where four squares meet, push the large needle down through all layers and back up $\frac{1}{4}$ inch away, leaving 2-inch tails. Tie a square knot (right over left, left over right) and trim the tails to $\frac{3}{4}$ inch.

Fabric check: Use 100% cotton quilting fabric or cotton shirting for the squares and back: it presses crisply, does not stretch, and holds its shape. Prewash, because cotton shrinks. Avoid knits and slippery fabrics. Choose cotton batting if the topper may ever have a hot dish set on it: polyester batting can melt. If you have only polyester batting, use the piece as a doll quilt, not a hot mat. Pick dark and light fabrics with strong contrast so the pattern shows.

Steps

1. **Seam test.** Sew two 2½-inch scraps together with your ¼-inch guide, press, and measure: the piece should be exactly 4½ inches wide. If not, move your guide and test again.
2. **Predict.** If every seam in your block were ⅛ inch too wide, how much smaller would the block be? (Hint: a row has 2 seams, each taking an extra ⅛ inch from both squares.) Write your guess, then figure it out.
3. Make the nine-patch from the pattern card. Measure the block before layering: is it 12½ inches?
4. **Corner check.** Look at the four places where corners meet. Count how many match exactly.
5. **Use it or give it.** Put it on a doll bed or the table, or give it to a younger child.
6. **Improve it.** Write one change: more accurate seams, better contrast, or a border of 2-inch strips.
7. Clean up: count pins and needles in, unplug the iron and the machine, and save every scrap bigger than 2 inches for future patchwork.

Tips

- Sew a few “leader” scraps first so the machine does not pull the corner of your square down into the needle plate.
- A pin through both seams exactly where they meet helps them line up. Pull the pin just before the presser foot reaches it.
- Older students: make four nine-patch blocks with 2½-inch squares and sew them into a 16-inch pillow top, or add a border.

Check your work

- ☐ I cut accurate squares and sewed them with a ¼-inch seam allowance.
- ☐ I pressed seams toward the dark fabric so they nested and my corners met.
- ☐ I layered, turned and tied my quilt with square knots.

SEWING NOTEBOOK

1. Color a nine-patch layout on graph paper three ways (checkerboard, a cross, an X). Which will you sew?
2. Write the block math: cut size 4½ in, finished square 4 in, finished block 12 in. Show where the ½ inch went.

3. Tape in a swatch of each fabric and record how many corners matched.

From history. In the 1930s and 1940s, cotton flour and feed sacks were printed with pretty patterns so that farm families could sew them into dresses, aprons and quilts. Many quilts from those years are made almost entirely of feed-sack cotton.

COMMON MISTAKES

- Using a $\frac{5}{8}$ -inch seam (the garment seam) instead of $\frac{1}{4}$ inch. The block comes out too small.
- Pressing seams open or toward the light fabric, so dark seam allowances show through. Press toward the dark.
- Using polyester batting in a hot pad or table topper that will hold hot dishes. Polyester can melt; use cotton batting.

Make it a game · Paper Quilting Bee. Take turns with your parent placing colored paper squares on a grid, as neighbors at a quilting bee would work together. No two matching colors may touch. Keep a quarter-inch gap between squares to stand for seams. Tell how colonial and pioneer families made quilts. Fill sixteen squares.

Scripture. “Two are better than one; because they have a good reward for their labour.” (Ecclesiastes 4:9, KJV)

A quilting bee is this verse in action: neighbors working side by side finish together what would take one person many weeks.

7.4 COVERING FURNITURE: CUSHIONS AND SEATS

OBJECTIVES

- Explain what upholstery is, naming the frame, webbing, padding and cover fabric.
- Tell how William Morris designed printed fabrics for furniture and homes in the 1870s and 1880s, and what made a fabric right for covering a seat.
- Re-cover a stool or dining-chair seat (an adult uses the staple gun) or sew a tie-on chair cushion cover.

Warm-up. Turn a dining chair or footstool upside down (with an adult’s help). Look underneath the seat. Can you see staples, tacks, cardboard, fabric edges or screws? Push on the top of the seat. What is under the fabric that makes it soft?

WATCH

How to Reupholster a Dining Chair | This Old House

This Old House • 2:59

<https://www.youtube.com/watch?v=wCcr8MYBHo>

WHEN TO WATCH

After “The fabric science” paragraph. Watch the whole video, then watch again and list the order of his steps: remove, measure, pad, wrap, staple.

Note: From This Old House. An experienced upholsterer uses a power staple gun and a utility knife; in this course an adult does all stapling and any knife cutting.

BACKUP VIDEO

Seat Cushion with Ties DIY Sewing Tutorial

Sewing Craft DIY • 2:18

https://www.youtube.com/watch?v=_rrsNg3KwSU

If you are sewing a tie-on cushion cover instead, watch this short video: a paper template of the chair seat, a cover with ties sewn into the seam, and a foam pad slipped inside.

KEY TERMS

upholstery

Padding, springs, webbing and cover fabric fastened onto the frame of a chair, sofa or stool.

padding

The soft layers under the cover: foam, batting, or in old furniture, horsehair and cotton.

repeat

The distance before a printed pattern starts over. Big repeats must be centered on a seat.

webbing

Strong woven bands stretched across a seat frame to hold up the padding.

slipcover

A removable sewn cover that slips over a chair or sofa to protect it or give it a new look.

rub test

A test of how many rubs a fabric can take before it wears through. Upholstery fabrics are made to take far more rubbing than dress fabrics.

CORE IDEAS

The story. William Morris (1834–1896) was an English designer, writer and craftsman who believed a home should be full of things that were both well made and beautiful. He once told an audience, “Have nothing in your houses that you do not know to be useful, or believe to be beautiful.” With his company, Morris and Co., he designed wallpapers, carpets, tapestries, and printed and woven fabrics for curtains, cushions and chairs. One of his most famous designs, **Strawberry Thief** (1883), shows the thrushes he saw stealing strawberries in the garden of his country house, Kelmscott Manor. Morris insisted on the old, slow method of printing with indigo dye and carved wooden blocks. It took him years to get it right, but the colors were deep and lasting. Morris fabrics covered sofas, armchairs and seat cushions in English homes, and they are still printed today.

How they figured it out. Morris spent months in his dye works at Merton Abbey near London, testing dyes and printing again and again. In May 1883 he wrote to his daughter that he was anxiously watching over the first printing of the Strawberry Thief. He had learned that the right fabric for furniture must be strong as well as lovely: cotton printed with fast colors that would not fade or rub off, firmly woven so it would not sag. Upholsterers had learned the same thing over hundreds of years. A

chair seat is sat on thousands of times, so the cover is stretched tight over firm padding and fastened underneath, where it can be replaced when it wears out.

The fabric science. Under the cover of an upholstered seat are layers. On a dining chair, a flat board holds a layer of **foam** or firm padding, a thin layer of **batting** to soften the edges, and the **cover fabric**, pulled tight and stapled underneath. Bigger chairs have a frame with **webbing** or springs. Good seat fabric is a **firmly woven**, medium-to-heavy cloth such as cotton canvas, twill, denim or home-décor fabric; tightly woven fabrics resist the rubbing of sitting. To find the cutting size, measure the seat across the top and add the thickness of the padding plus about 3 inches on every side to wrap underneath. For a 16-inch seat with 2-inch padding: $16 + 2 + 2 + 3 + 3 = 26$ inches square.

Let's sew. You will give a tired stool or dining-chair seat a new cover. You measure, cut and fold; an adult does all the stapling. Or you will sew a tie-on cushion cover for a chair. Either way, the skill to do well is **even tension**: pull the fabric smooth from the center of each side toward the corners, so there are no wrinkles on top, and fold the corners neatly like wrapping a present.

PICTURE STUDY



Strawberry Thief, William Morris, 1883 · Indigo-discharge and block-printed cotton · Examples in the Victoria and Albert Museum, London, and other museums

Image: [Wikimedia Commons](#), public domain

This is not a painting but a piece of printed cotton, made to cover furniture and hang as curtains. William Morris drew the birds he saw in his own garden and turned them into a pattern that repeats across the whole cloth. Every color was printed by hand with a carved wooden block, one color at a time.

Look closely

- Find the thrushes. What are they holding in their beaks? How many birds can you count?
- Find the place where the pattern begins to repeat. Can you see that the left half mirrors the right half?
- Count the colors: blue, red, yellow, green, white. Each needed its own printing step. How many steps is that?
- Look at the stems. How do they lead your eye around the cloth?

Talk about it

1. If you covered a chair seat with this fabric, where would you put the birds so they are centered?
2. Morris said a home should hold things that are useful or beautiful. Is a chair cover useful, beautiful, or both?

3. What birds, plants or flowers from your own yard could you turn into a fabric pattern?

Safety first. A parent or responsible adult supervises all sewing-tool use. **Only an adult uses the staple gun** and any utility knife or screwdriver, and keeps everyone's fingers clear while stapling; the student holds the fabric only where the adult says. Pull out old staples with an adult beside you, wearing safety glasses, and put every old staple and tack in a jar right away.

SEWING PROJECT

Re-cover a Stool or Dining-Chair Seat (or Sew a Tie-On Cushion Cover)

You will measure a chair or stool seat, choose a firm fabric, cut it to size and wrap it neatly over new padding while an adult staples it underneath. If your family has no seat to re-cover, sew a tie-on cushion cover instead (see the tips).

You will need

- A screwdriver to remove the seat (an adult uses it)
- A staple gun with $\frac{3}{8}$ -inch staples (adult only) and safety glasses
- A flat-head screwdriver or staple remover and pliers for old staples (with an adult)
- Fabric scissors (with an adult nearby), a tape measure and chalk
- A small jar for old staples and tacks

RE-COVERED DROP-IN CHAIR SEAT

Finished size: One seat, about 16 × 16 in (40 × 40 cm) on top; change the sizes to fit your seat • About 1½ to 2 hours

Fabric and notions

- Cover fabric cut 26 × 26 in (66 cm) for a 16-inch seat with 2-inch padding (seat + padding thickness on both sides + 3 inches on every side to wrap underneath): about $\frac{3}{4}$ yard of 54-inch home-décor fabric, canvas, twill or denim
- Batting, one layer cut about 20 × 20 in, to soften the edges
- New foam, 1 or 2 inches thick, cut to the size of the seat board (only if the old padding is flat or crumbling; an adult cuts foam with an electric knife or scissors)
- A piece of plain black cotton cut 16 × 16 in for underneath (optional, for a tidy finish)

How to make it

1. An adult turns the chair over and unscrews the seat. Put the screws in the jar.

2. With an adult beside you, pull out the old staples with a screwdriver and pliers, wearing safety glasses, and drop each one into the jar. Remove the old fabric and keep it: it shows you how the corners were folded.
3. Measure the seat board across and front to back, and the thickness of the padding. Write your cutting size: seat + padding $\times$ 2 + 6 inches.
4. Press the cover fabric (adult beside you). If it has a big print, center the design on the top of the seat. Mark and cut the fabric with an adult nearby.
5. Lay the fabric right side down on a clean table. Center the batting on it, then the foam (if new), then the seat board, top side down.
6. Pull the fabric up over the middle of the back edge. Hold it while an adult puts in one staple. Then pull the front edge smooth and tight and the adult staples the middle of the front. Do the same with the two sides.
7. Working from the center of each side out toward the corners, pull the fabric smooth and the adult staples every 1½ inches, stopping 2 inches from each corner.
8. **Corners:** pull the corner point straight up onto the board and the adult staples it. Fold one side neatly over it like wrapping a present, then the other, and the adult staples. Trim the extra fabric (adult) so the underside lies flat.
9. Staple the plain black cotton underneath, turning its edges under (adult). Screw the seat back onto the chair (adult).

Fabric check: Choose a firmly woven, medium-to-heavy fabric: cotton canvas, duck, twill, denim, or a home-décor print. Tightly woven fabric stands up to the rubbing of sitting and does not sag. Avoid stretchy knits, thin quilting cotton (it wears through quickly on a seat), and slippery fabrics. A dark color or busy print hides spills. Polyester batting is fine under a seat cover because no heat touches it.

Steps

1. **Inspect first.** Before you remove anything, draw the underside of the seat: where the staples are and how the corners are folded.
2. **Practice the corner.** Wrap a hardback book in a scrap of fabric and fold the corners like a present. Practice until each corner is smooth with no bunched fabric on top.
3. Re-cover the seat from the pattern card, with an adult doing all stapling.

4. **Wrinkle check.** Look across the top in a low light. Can you see wrinkles or pulls? If so, the adult can pull a few staples and you can re-stretch that spot.
5. Photograph or draw the chair in its room, before and after.
6. **Improve it.** What would you do differently on a second chair: smoother corners, more centered print, or a different fabric?
7. Clean up: the adult unplugs and puts away the staple gun; count every old staple into the jar and sweep the floor with a magnet.

Tips

- **Tie-on cushion cover option:** Trace the chair seat on paper and add $\frac{1}{2}$ inch all around. Cut two pieces of fabric. Make four ties from 2×16 inch strips (fold the long edges to the middle, fold again, and stitch), or use 16-inch pieces of cotton twill tape. Pin two ties at each back corner, pointing inward. Sew the two pieces right sides together with a $\frac{1}{2}$ -inch seam, leaving the back edge open. Turn, insert a 1-inch foam pad or folded quilt batting, and slip stitch the opening closed.
- Pull the fabric firmly but not so hard that the weave distorts or a stripe bends. Check that stripes run straight from front to back.
- Younger students: choose the fabric, measure, and fold the corners while the adult cuts and staples. Older students: re-cover two matching chairs and keep the print centered on both.

Check your work

- ☐ I can name the layers of an upholstered seat: frame or board, webbing, padding, batting and cover.
- ☐ I measured my seat and figured the cutting size with padding and wrap allowance.
- ☐ My seat is smooth on top with neat, folded corners, and an adult did all the stapling.

SEWING NOTEBOOK

1. Draw a cross-section of your seat and label each layer: board, foam, batting, cover fabric, staples.
2. Show the cutting-size math for your seat.

3. Design your own repeating fabric in the style of William Morris: draw one square tile with a plant or bird, then copy it four times side by side.

From history. Before foam was invented, upholsterers padded chairs with curled horsehair, wool, cotton and even dried sea grass, sewn into shape with long needles and strong twine. When an antique chair is re-covered, an upholsterer may find padding more than a hundred years old inside.

COMMON MISTAKES

- Stapling one whole side before the opposite side. The fabric pulls crooked. Staple the middle of each side first, then work out toward the corners.
- Cutting the fabric exactly the size of the seat. There is nothing to wrap underneath. Add padding thickness plus 3 inches on every side.
- Letting a child use the staple gun. Staple guns can drive a staple into a finger. At this level an adult does all stapling.

Make it a game • Build a Seat. Stack household items from the bottom to make a seat: a tray for the frame, yarn strips for webbing, a folded towel for padding and a pillowcase for the cover. Your parent calls a layer and you name its job. Then tell what William Morris looked for in a fabric for chairs.

UNIT 7

HOME SEWING: PILLOWS, DRAPES & FURNITURE COVERS

Now your sewing comes home. In this unit you will make real things for real rooms: an **envelope pillow cover**, a **curtain** for a window, a **nine-patch quilt** top tied with yarn, and a **new cover for a chair or stool seat**. Each project starts with a tape measure: you will measure a pillow, a window, a quilt block and a seat, add the right seam allowances and hems, and figure out how much fabric to buy.

You will read how God told Moses to make the tabernacle's curtains of fine twined linen, visit a quilting family in a New Mexico homestead town in 1940, and meet William Morris, the English designer whose printed fabrics covered chairs and cushions in the 1880s. A sewing machine makes these projects faster, but every one can also be sewn by hand with a backstitch. If your family does not own a machine, one can often be borrowed from a relative or a friend at church.

PREREQUISITES

- Can sew a straight seam with a $\frac{5}{8}$ -inch or $\frac{1}{2}$ -inch seam allowance, by machine or with a hand backstitch (Units 3–4)
- Uses the sewing machine only at slow speed with an adult beside, fingers an inch from the needle, and pulls pins before they reach the presser foot (Unit 4)
- Presses seams with an adult beside, iron set upright when not in use (Unit 4)
- Can measure in inches and fractions of an inch to the nearest $\frac{1}{4}$ inch (Units 3–6)

MASTERY CHECKLIST

- ☐ I can measure a pillow form, a window and a chair seat, and add seam allowances, hems and overlap to find the size to cut.
- ☐ I can sew an envelope pillow cover with hemmed flaps and finished seams.
- ☐ I can explain fullness and a rod pocket, and make a curtain that fits a real window.
- ☐ I can piece a nine-patch block with $\frac{1}{4}$ -inch seams and tie a small quilt.
- ☐ I can explain what upholstery is (frame, webbing, padding, fabric) and re-cover a seat or make a tie-on cushion cover, with an adult using the staple gun.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A 60-inch tape measure and a clear 6 × 24 inch ruler:** The tape measure is for windows, pillows and seats. A clear ruler marked in $\frac{1}{8}$ inches makes cutting quilt squares accurate.
- **V&A: William Morris, “Strawberry Thief” furnishing fabric:** Free. The Victoria and Albert Museum’s page for a real piece of Morris’s printed cotton from 1883, with photographs you can zoom in on. Good for Lesson 7.4.
- **A pillow form (14 or 16 inches square):** Inexpensive at fabric and craft stores. An old pillow that needs a fresh cover works just as well.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

7.1 The Envelope Pillow	2 sessions of 45–60 minutes
7.2 The Curtains of the Tabernacle	2 sessions of 60–90 minutes
7.3 Patchwork and the Quilting Bee	2 sessions of 60–90 minutes
7.4 Covering Furniture: Cushions and Seats	2 sessions of 60–90 minutes

UNIT 7 REVIEW

Answer each question in complete sentences unless it asks you to show or to calculate. Show your math. The review is worth 50 points.

1. 5 pts

Your pillow form is 14 inches square and the seam allowance is $\frac{1}{2}$ inch. What size do you cut the front piece? Show your math.

2. 5 pts

How does an envelope closure work, and why do the two back flaps need a hem?

3. (5 pts)

What were the curtains of the tabernacle made of, and how were they joined (Exodus 26)?

4. (5 pts)

A curtain rod is 36 inches long. You want a fullness of 2 and two panels. How wide do you cut each panel if each needs 2 inches for side hems?

5. (5 pts)

Predict. You hang a curtain with a fullness of 1 (exactly as wide as the rod). What will it look like closed, compared with a fullness of 2?

6. (5 pts)

Why do quilters use a $\frac{1}{4}$ -inch seam, and why must it be accurate? If a $4\frac{1}{2}$ -inch square is sewn with $\frac{1}{4}$ -inch seams on both sides, how big does it look in the finished block?

7. (5 pts)

Show me. Tie a square knot through a quilt or two layers of scrap fabric, and press one seam toward the darker fabric with an adult beside you.

8. (5 pts)

What was a quilting bee, and why did neighbors hold them?

9. (5 pts)

Name the layers of an upholstered dining-chair seat, from the bottom up. Who uses the staple gun at your age?

10. (5 pts)

Who was William Morris, and what did Strawberry Thief show? Why is a firmly woven fabric best for a chair seat?

ANSWER KEY

1. $14 + \frac{1}{2} + \frac{1}{2} = 15$ inches, so 15×15 inches.
2. Two back pieces overlap; the pillow inside pushes them together so they stay closed, with no zipper or buttons. The overlapping edges show, so they are hemmed to hide the raw edges and keep them from fraying.
3. Fine twined linen in blue, purple and scarlet, embroidered with cherubim. The ten curtains were joined five and five with loops of blue and clasps (taches) of gold.
4. $36 \times 2 = 72$ inches total; $72 \div 2 = 36$ inches per panel; $36 + 2 = 38$ inches wide for each panel.
5. It will hang flat with no folds and may leave gaps at the sides; it looks skimpy. With a fullness of 2 it hangs in soft, even folds and covers the window fully.
6. A narrow seam saves fabric and keeps blocks flat; if seams vary, squares come out different sizes and the corners do not meet. A $4\frac{1}{2}$ -inch square loses $\frac{1}{4}$ inch on each side, so it finishes at 4 inches.
7. Parent checks: the knot is right over left, then left over right, lying flat; the seam allowance is pressed to the dark side; the iron was set upright between uses.
8. A gathering where neighbors sat around a quilting frame and stitched a quilt together, often finishing it in a day. Quilting a whole quilt by hand was a huge job, and working together made it faster and turned it into a friendly time.
9. The seat board (or frame with webbing), foam or padding, batting, and the cover fabric (with a plain cloth underneath). An adult does all stapling.
10. An English designer and craftsman (1834–1896) whose company made printed fabrics, wallpapers and furnishings; Strawberry Thief (1883) shows thrushes stealing strawberries in his garden. Firm, tight weaves resist the rubbing of sitting and do not sag or wear through quickly.

UNIT CHALLENGE: A FINISHED PIECE FOR A REAL ROOM

Finish one piece for a real room in your home: a pillow cover, a curtain, a doll quilt or table topper, a tie-on cushion cover, or a re-covered seat. It should be measured to fit the real pillow, window, table or chair.

In your notebook, include your measurements and math, a fabric swatch with a short note on why you chose that fabric, and a photo or drawing of the finished piece in place. Write one sentence about who uses it.

LOOK FOR	WHAT IT MEANS
Measured to fit	Measurements and cutting math are written out, and the piece fits the real pillow, window, table or chair.
Workmanship	Straight seams and even hems, sharp corners, raw edges finished or hidden.
Fabric choice	Fabric suits the job (firm for seats and pillows, the right weight for a curtain, cotton for anything near heat), with the reason written down.
Safety	Machine and iron used with an adult beside; adult did all stapling; pins and needles counted every session.
Record and improvement	Photo or drawing in place and one honest change for next time. A crooked first try that is honestly recorded and redone earns full credit.

DESIGN, CLOTHING & COSTUMES

In this last unit you become a designer and a dressmaker. You will learn how a tailor measures, and you will take your own measurements (over your clothes, with a parent) and turn a favorite pair of pajama pants into a **paper pattern**. You will design and sew a kitchen **apron**, thinking about line, color, texture and proportion, and you will make a **shepherd's or wise man's tunic** for a Christmas pageant or Bible play, cut without any pattern at all.

Finally, you will sew a real garment, a pair of elastic-waist pajama shorts or pants, and then hold your **family sewing fair**. You will lay out a whole year of work, from your first fiber swatch to your last seam, show a stitch to your guests, and give one piece away. Hannah made her son Samuel “a little coat” every year (1 Samuel 2:19), and Jacob made Joseph a coat of many colors (Genesis 37:3). Clothes made by hand for someone you love have always meant more than cloth.

PREREQUISITES

- Can sew a straight seam by machine at slow speed with an adult beside, or by hand with a backstitch, and press with an adult beside (Units 3–4, 7)
- Can measure in inches to the nearest $\frac{1}{4}$ inch and add seam allowances and hems (Unit 7)
- Can sew a casing or rod pocket and thread a cord or rod through it (Units 4 and 7)
- Knows which fabrics are woven or knit, which fray, and which shrink (Units 1–2)

MASTERY CHECKLIST

- ☐ I can take measurements for fit (with a parent, over light clothing) and record them on a measurement card for fit only.
- ☐ I can trace a pattern from a garment that fits, add seam allowances, a hem and a casing, and mark the grainline.
- ☐ I can use line, color, texture and proportion to plan a design, and sew an apron with a pocket and ties.
- ☐ I can cut and sew a simple costume tunic on the fold for a play or pageant.
- ☐ I can sew an elastic-waist garment and present a year of work at a sewing fair, giving one piece away.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A 60-inch cloth or fiberglass tape measure:** The tailor’s tool. A soft tape bends around a body or a garment; a metal carpenter’s tape does not.
- **The National Gallery, London: Moroni, *The Tailor*:** Free. The museum’s page for the painting in Lesson 8.1, with a large image you can zoom in on to see the chalk lines and the shears.
- **Pattern paper:** Inexpensive rolls of pattern paper, freezer paper, the back of wrapping paper, or newspaper taped together all work for tracing patterns.
- **1-inch (25 mm) knit elastic and a large safety pin or bodkin:** For the pajama shorts or pants in Lesson 8.4. Knit elastic stays flat in a casing better than braided elastic.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

8.1 Measuring and the Tailor’s Tape	2 sessions of 45–60 minutes
8.2 An Apron for the Kitchen	2 sessions of 60–90 minutes
8.3 Costumes for a Play	2 sessions of 60–90 minutes
8.4 Joseph’s Coat and the Sewing Fair	2 sessions of 60–90 minutes

UNIT 8 REVIEW

Answer each question in complete sentences unless it asks you to show or to calculate. Show your math. The review is worth 50 points.

1. 5 pts

How did many tailors measure a customer before the tape measure? What tool came into use in the early 1800s?

2. 5 pts

What rules do we follow when taking body measurements for sewing?

3. (5 pts)

What is ease? Why is a pattern piece larger than the body measurement?

4. (5 pts)

A traced pants side length (waist to hem line) is 28 inches. You add 2 inches for the casing and $1\frac{1}{2}$ inches for the hem. How long is the pattern piece?

5. (5 pts)

Name the four design ideas from Lesson 8.2 and give one example of each from your apron.

6. (5 pts)

Show me. Sew a box with an X through a 3-inch piece of twill tape on a scrap, by machine with an adult beside you or by hand. Tell why ties and straps are sewn this way.

7. (5 pts)

A child's chest is 26 inches and shoulder-to-ankle is 40 inches. Using the tunic rule (chest + 10 inches; $2 \times \text{length} + 2$ inches), what size rectangle do you cut?

8. (5 pts)

Predict. You sew a pair of pajama pants but stitch the crotch seam only once and do not clip the curve. What will probably happen when you wear them?

9. (5 pts)

Your waist measurement is 24 inches. How long do you cut the elastic, including a 1-inch overlap?

10. (5 pts)

Name two garments made with love in the Bible and who made or wore them.

ANSWER KEY

1. With a long strip of paper or parchment, cutting a notch for each measurement and keeping the strip with the customer's name. The flexible tape measure marked in inches.
2. A parent measures over light clothing, the tape level and snug but not tight; the numbers are written down for fit only, never compared or called good or bad.
3. Ease is extra room added so you can move, breathe and sit. A pattern also includes seam allowances, a casing and a hem, so it is bigger than the body.
4. $28 + 2 + 1\frac{1}{2} = 31\frac{1}{2}$ inches.
5. Line, color, texture and proportion. Examples will vary, such as up-and-down stripes (line), a red and white check (color), crisp cotton twill (texture), and a pocket about one-third the apron's width (proportion).
6. Parent checks: a neat square with an X inside, backstitched or knotted. It spreads the pull over many stitches so ties do not tear off.
7. Width $26 + 10 = 36$ inches; length $2 \times 40 + 2 = 82$ inches. Cut a rectangle 36×82 inches.
8. The curved seam will pucker and pull, and it may split when you sit, kneel or climb, because all the strain falls on that seam. Sewing it twice and clipping the curve makes it strong and flat.
9. $24 - 2 = 22$ inches, plus 1 inch overlap = 23 inches.
10. Any two: Joseph's coat of many colors, made by Jacob (Genesis 37:3); Samuel's little coat, made by Hannah every year (1 Samuel 2:19); the coats and garments Dorcas made for the widows (Acts 9:39); Jesus's seamless coat, woven from the top throughout (John 19:23); the coats of skins God made for Adam and Eve (Genesis 3:21).

UNIT CHALLENGE: THE FAMILY SEWING FAIR

Hold your family sewing fair. Display every finished piece from the year with a display card for each one (what it is, its fiber and fabric, the main skill, and one thing you learned). Wear one garment or costume you made.

Show your guests one stitch and let someone try it. Include a “Skills I Learned This Year” page in your notebook, and give one piece away with a handwritten note.

LOOK FOR	WHAT IT MEANS
Display	Every finished piece is shown neatly with a complete display card.
Garment or costume worn	A garment or costume the student made is finished (seams, casing or hems complete), modest, and comfortable to wear.
Showing a skill	The student shows a stitch clearly and helps a guest try it.
Skills page and record	A “Skills I Learned” page names at least one skill from each unit, with honest notes on what improved. Work that was redone and honestly recorded earns full credit.
Safety and giving	Tools counted and kept away from small guests; one piece given away with a note.

8.1 MEASURING AND THE TAILOR'S TAPE

OBJECTIVES

- Tell how tailors measured customers before and after the tape measure, using Moroni's *The Tailor* as a picture of the trade.
- Take measurements for fit (with a parent, over light clothing) and record them on a measurement card for fit only.
- Trace a paper pattern from a pair of pajama pants or a T-shirt that fits, adding seam allowances, a hem and a casing, and marking the grainline.

Warm-up. Find a T-shirt or pajama pants that fit you well. Turn them inside out. Find every seam. How many pieces of fabric were sewn together to make them? Lay them flat. Guess what shape each piece was before it was sewn.

WATCH

How To Measure For Sewing Patterns | Sewing For Beginners

The Stitch Sisters • 3:32

<https://www.youtube.com/watch?v=hqBSusCjASU>

WHEN TO WATCH

After “The craft” paragraph. Watch how each measurement is taken on the dress form, then take the same measurements with your parent.

Note: The measurements are shown on a dress form. In this course a parent measures the student over light clothing.

BACKUP VIDEO

DIY PJs: Learn to make a pattern from simple pieces like T-shirts and PJ pants. Easy!

Catherine Sews • 16:31

<https://www.youtube.com/watch?v=v3fuiFkm-ms>

Before you trace your pattern. Watch how she lays a pair of pajama pants and a T-shirt flat on paper, traces around them, and adds seam allowances.

KEY TERMS

tailor

A person who makes clothes, especially coats, trousers and suits, cut to fit each customer.

ease

Extra room added to a garment beyond the body measurement so you can move, breathe and sit comfortably.

grainline

An arrow on a pattern piece that must lie parallel to the fabric's selvage, so the garment hangs straight.

measurement card

A card where your measurements are written down so a garment can be made to fit.

pattern

A paper shape used as a guide for cutting fabric. Each pattern piece shows the seam allowances, the grainline and how many to cut.

inseam

The seam along the inside of the leg, from the crotch to the hem. Its length tells you how long to make pants.

CORE IDEAS

The story. About 1570, in northern Italy, the painter Giovanni Battista Moroni painted a tailor at work. The tailor stands at his cutting table in a fine cream-colored doublet, holding big iron shears over a length of black cloth marked with chalk lines. He looks up at us as if we were a customer who has just come in. A tailor of his day had no paper patterns from a store and no tape measure marked in inches. Many tailors measured a customer with a long strip of paper or parchment and cut a small notch in it for each measurement: one for the chest, one for the waist, one for the length of the arm. The strip was labeled with the customer's name and kept until his next coat. The flexible tape measure marked in inches came into tailors' use in the early 1800s, and it made measuring faster and easier to write down.

How they figured it out. Tailors learned that a body measurement alone does not make a good garment. A coat cut exactly to the chest measurement would be too tight to button or to move in. So they added **ease**, extra room for breathing, sitting, reaching and moving. They also learned to copy a garment that already fit: by laying it flat and tracing it, they could make a new one the same size. That is exactly what you will do today.

The craft. Measurements for sewing are taken **over light clothing**, standing naturally, by a parent, with the tape snug but not tight. A tailor measures for fit, not to judge anyone: the numbers are just like a shoe size, and no number is good or bad. We will record: **height**; **chest** (around the fullest part, under the arms); **waist** (around the natural waist, where you bend sideways); **hips** (around the widest part of the seat); **arm length** (shoulder to wrist with the arm slightly bent); and the **inseam** and side length of a pair of pants that already fit you. To make a pattern from pants, you fold them in half and trace around one leg on paper. Then you add a **seam allowance** ($\frac{1}{2}$ inch) on every edge that will be sewn, about 2 inches at the top for an elastic **casing**, and $1\frac{1}{2}$ inches at the bottom for a **hem**. Draw a **grainline** arrow parallel to the leg's center crease.

Let's sew. You will make a measurement card and trace a paper pattern for pajama pants (or shorts) that you will sew in Lesson 8.4. The skill to do well is **accurate, honest measuring**: the tape held level and snug, the number read carefully, and written down right away.

PICTURE STUDY



The Tailor (Il Tagliapanni), Giovanni Battista Moroni, about 1565–1570 · Oil on canvas · The National Gallery, London

Image: [Wikimedia Commons](#), public domain

Moroni painted many people from the towns of northern Italy, but this portrait is special: it shows a working tailor, not a nobleman. He is dressed in his best clothes, which he probably made himself, and he stands proudly at his table, ready to cut. Italian tailors of the 1500s were known all over Europe for their skill.

Look closely

- Find the shears. How big are they compared with his hand? Why would a tailor need such large, heavy shears?
- Find the black cloth. Look closely for the faint chalk lines. What are they for?
- Look at his own clothes: the doublet, the small ruff at his neck, the striped breeches. What does his clothing tell you about his skill?
- Look at his eyes. Who do you think he is looking at?

Talk about it

1. Why do you think this tailor wanted his portrait painted with his tools and his work?
2. The tailor marks the cloth with chalk before he cuts. Why is it wise to mark first and cut second?

3. How would a tailor measure a customer without a tape measure?

Safety first. A parent or responsible adult supervises all sewing-tool use. A parent takes all body measurements, over light clothing (for older students, the mother for a daughter and the father for a son), and the numbers are written for fit only and never compared or talked about as good or bad. Carry scissors points down and cut paper with paper scissors, not fabric shears.

SEWING PROJECT

A Measurement Card and a Pattern Traced from Pajama Pants

You will fill in a measurement card with a parent, then trace a paper pattern from a pair of pajama pants (or a T-shirt, for older students who want a second pattern) that fits you well. You will use this pattern in Lesson 8.4 to sew your own pajama shorts or pants.

You will need

- A 60-inch cloth tape measure
- An index card or notebook page for the measurement card
- Pattern paper, freezer paper, or newspaper taped together, about 24 × 45 inches
- A pencil, a ruler, and a marker
- Paper scissors (not fabric shears) and tape
- Pins and a pincushion, or pattern weights (cans of soup work)

TRACED PAJAMA-PANTS PATTERN (FRONT AND BACK)

Finished size: One pattern in your size, with ½-inch seams, a 2-inch casing allowance and a 1½-inch hem ·
About 1 hour

Fabric and notions

- A pair of loose-fitting, elastic-waist pajama pants or knee-length shorts that fit you comfortably
- Pattern paper about 24 inches wide and as long as the pants plus 6 inches
- No fabric is cut in this lesson

How to make it

1. Fold the pants in half lengthwise so the two legs lie exactly on top of each other, the front crotch curve sticking out on one side and the back on the other. Smooth them flat on the paper.
2. **Front:** Fold the back crotch curve inside so you see only the front curve. Trace around the outside of the leg, the waist (pulled out flat, not

gathered), the front crotch curve, the inseam and the hem.

3. **Back:** On a second piece of paper, trace again, this time folding the front curve inside so you see the back curve. The back curve is deeper and longer; that extra room lets you sit and bend.
4. Using a ruler, add $\frac{1}{2}$ inch outside every traced line that will be sewn: the side, the inseam and the crotch curve.
5. At the top, add 2 inches above the waist line for the elastic casing. At the bottom, add $1\frac{1}{2}$ inches below the hem line.
6. Draw a grainline arrow down the middle of each piece, parallel to the folded center of the leg.
7. Label each piece: “FRONT” or “BACK,” your name, the date, “ $\frac{1}{2}$ -inch seams,” and “Cut 2 (a left and a right).”
8. Cut out both pattern pieces on the outer line with paper scissors. Fold them and keep them in a large envelope for Lesson 8.4.

Fabric check: Choose pants made of a woven fabric (cotton flannel, cotton poplin, or a cotton blend), not stretchy knit pants, because the fabric for Lesson 8.4 will be woven and does not stretch. The pants should be loose and comfortable, with room to sit cross-legged. If you have only knit pants, add an extra 1 inch of width at the side seam of each piece so the woven fabric has enough ease.

Steps

1. **Measurement card.** With a parent measuring over light clothing, fill in your card: height, chest, waist, hips, arm length, and the inseam and side length of pants that fit. Write the date. These numbers are for fit only.
2. **Practice first.** Measure three things that are not people: a pillow, a book, and a jar around its middle. Measure each twice. Did you get the same number both times?
3. Trace the pattern from the pattern card.
4. **Check the pattern.** Measure the side length of your paper pattern without the casing and hem allowances, and compare it with the pants you traced. They should match.
5. **Ease check.** Measure across the traced front and back at the hip line, double it, and compare it with your hip measurement. How many inches of ease are there? Write it down.

6. **Improve it.** Is anything you would like to change for comfort: a little longer, a little roomier? Mark the change on the pattern in a different color.
7. Clean up: fold your pattern into its envelope and put away the scissors and pins, counting pins back in.

Tips

- Hold the tape level all the way around the body. If it dips in the back, the number will be too big.
- Measure with the tape snug but able to slide; a tape pulled tight gives a number that is too small.
- Younger students: trace a pattern for shorts (stop the tracing at the knee), or trace a T-shirt for a doll. Older students: trace a T-shirt pattern as well, front and back, with a ½-inch seam allowance.

Check your work

- ☐ I filled in a measurement card with a parent, for fit only.
- ☐ I traced front and back pattern pieces with seam allowances, a casing, a hem and a grainline.
- ☐ I can explain ease and why a pattern is bigger than the body.

SEWING NOTEBOOK

1. Glue in or copy your measurement card (or keep it in an envelope taped to the page). Remember: these numbers are for fit only.
2. Draw your two pattern pieces small, with every label: front, back, grainline, seam allowance, casing, hem.
3. Draw a tailor's paper measuring strip with notches, the way a tailor would have measured before the tape measure.

From history. In 1863, the American tailor Ebenezer Butterick began selling tissue-paper patterns in graded sizes, so families could buy a pattern in the right size instead of tracing their own. His wife, Ellen, is said to have given him the idea. Paper patterns soon became common in homes all over America.

COMMON MISTAKES

- Measuring over thick clothing or pulling the tape tight. Measure over light clothing, with the tape snug.

- Forgetting the seam allowance, so the finished garment is too small. Add $\frac{1}{2}$ inch to every sewn edge.
- Treating measurements as good or bad numbers. They are for fit only, like a shoe size. Never compare them with anyone else's.

Make it a game • Tailor's Guess. Choose five household items such as a book, a table edge or a teddy bear. Estimate each length in inches, then measure with a tailor's tape. The closest estimate wins the round. Say what ease means in clothing and why a tailor measures before cutting. Play to five rounds.

8.2 AN APRON FOR THE KITCHEN

OBJECTIVES

- Use the design ideas of line, color, texture and proportion to plan an apron.
- Choose a fabric and trim that suit the apron's job, and explain why.
- Sew a bib apron with hemmed edges, a pocket, a neck strap and ties, by machine with an adult beside or by hand.

Warm-up. Find an apron in your house (or a picture of one). Who wears it, and for what job: cooking, gardening, woodworking? Look at its pockets, ties and fabric. Why was each one chosen? Then draw a quick sketch of an apron you would like to wear.

WATCH

How To Make An Apron | Just Fabrics

Just Fabrics · 4:05

<https://www.youtube.com/watch?v=8qrzINz2d9U>

WHEN TO WATCH

After “The design.” Watch the whole video once to see the order of the steps: hems, pocket, ties. Then watch the pocket part again before you sew yours.

Note: Her apron has curved sides; ours has straight cut corners, which are easier to hem. The order of work is the same.

BACKUP VIDEO

Sew a Child Apron! | 3 Sizes | Easy to Sew Beginners Project | Fat Quarter Sewing

Homemaking on the Homestead · 16:18

<https://www.youtube.com/watch?v=RIJAwXO1iqk>

A slower, step-by-step child's apron in three sizes, from a sewing teacher at home. Helpful if you are sewing for a younger brother or sister.

KEY TERMS

design

Planning how something will look and work before you make it.

line

The direction the eye travels: the stripes in a fabric, the edges of a pocket, the lines of the ties. Up-and-down lines look tall; side-to-side lines look wide.

texture

How a fabric feels and looks on its surface: smooth, crisp, soft, nubby or shiny.

proportion

How the sizes of the parts relate to the whole, such as how big a pocket is compared with the apron.

bib apron

An apron that covers the chest as well as the lap, held up by a strap around the neck.

twill tape

A strong, flat woven tape used for ties and straps.

CORE IDEAS

The story. For hundreds of years, aprons protected clothes in kitchens, farmyards, workshops and schoolrooms. A dress or a shirt took many hours to make, but an apron was quick to sew and easy to wash. In the painting for this lesson, by the French painter Jean-Siméon Chardin, a mother in a long apron sets the table while her little girl says grace. When American home-economics classes and 4-H clothing clubs began in the early 1900s, a plain, well-made apron was very often a girl's first garment. It taught her straight hems, a pocket and ties, and she wore it in the kitchen at home. Proverbs 31:27 praises the woman who "looketh well to the ways of her household," and an apron is the uniform of that work.

How they figured it out. Apron makers learned to fit the apron to the job. A cook's apron needs to cover the front and wipe hands easily. A gardener's apron needs deep, strong pockets. A carpenter's apron needs a tough fabric that nails will not tear. They learned that sturdy cotton twill, denim or canvas outlasts thin cloth, and that ties should be stitched on with a box and an X so they never pull off when tied in a hurry.

The design. Designers think about four things. **Line:** stripes running up and down lead the eye up; stripes running across lead it side to side. **Color:** colors next to each other on the color wheel, like blue and green, look calm together; colors across from each other, like red and green or blue and orange, look lively. A dark or busy print hides kitchen spots. **Texture:** a crisp twill or canvas stands out from the body and protects; a soft, thin fabric clings and wrinkles. **Proportion:** a pocket about one-third as wide as the apron looks balanced; a tiny pocket looks lost, and a huge one looks heavy. Every choice should also fit the job and the occasion.

Let's sew. You will design and sew a bib apron for yourself or as a gift. The skill to do well is **pressing before stitching:** press each double hem with an adult beside you, then sew it straight, and stitch the ties on with a strong box-and-X so they last.

PICTURE STUDY



Saying Grace (Le Bénédicité), Jean-Siméon Chardin, 1740 · Oil on canvas · Musée du Louvre, Paris

Image: [Wikimedia Commons](#), public domain

Jean-Siméon Chardin painted quiet scenes of French households in the 1700s. This painting was so loved that Chardin painted several versions of it. A mother is about to serve supper, and she waits while the youngest child says grace. Look at what everyone is wearing, and at how much of the household's cloth you can find: the tablecloth, the aprons, the caps.

Look closely

- Find the mother's apron. What color is it, and how much of her clothing does it cover?
- Find the white tablecloth. How is it laid on the table? Why would a family use one?
- Look at the children's clothes and caps. Which pieces could have been made at home?
- Find the drum hanging on the chair. What does it tell you about the child who sits there?

Talk about it

1. Why would a mother long ago wear an apron for most of the day?
2. What design choices (color, line, texture) did Chardin make in the clothes to make the picture feel calm?

3. How does saying grace before a meal fit with making things for your family?

Safety first. A parent or responsible adult supervises all sewing-tool use. Cut fabric with an adult nearby and press with an adult beside you, setting the iron upright and keeping the cord out of the way. At the machine, sew slowly, keep fingers an inch from the needle, and pull each pin before it reaches the presser foot.

SEWING PROJECT

A Bib Apron with a Pocket and Ties

You will design an apron on paper, choose fabric and trim, and sew a bib apron with hemmed edges, a two-part pocket, a neck strap and waist ties. Wear it in the kitchen, or give it to someone who cooks for your family.

You will need

- A sewing machine, or a hand-sewing needle and thimble
- Fabric scissors (with an adult nearby), thread snips and a ruler
- Pins and a pincushion, chalk or a washable marker
- An iron and ironing board (with an adult beside you)
- A safety pin

CHILD'S BIB APRON

Finished size: About 19 in wide × 24 in long finished (fits ages about 7–11); see tips to resize · About 2 to 3 hours

Fabric and notions

- $\frac{7}{8}$ yard (80 cm) of 44-inch medium-weight cotton: twill, canvas, denim, or sturdy quilting cotton, prewashed and pressed
- **Apron body:** one rectangle 20 in wide × 26 in long (51 × 66 cm)
- **Pocket:** one rectangle 9 in wide × 8 in tall (23 × 20 cm)
- $2\frac{1}{4}$ yards (2 m) of 1-inch cotton twill tape (cut into one 22-inch neck strap and two 28-inch waist ties), or fabric strips sewn into ties
- All-purpose thread to match or contrast

How to make it

1. **Cut the corners.** On the apron body, measure 5 inches in from each top corner along the top edge, and 7 inches down each side from the top. Draw a straight line between the two marks at each corner and cut along it (adult nearby). The top of the bib is now 10 inches wide.
2. **Hem the angled edges first.** Fold each angled edge $\frac{1}{2}$ inch to the wrong side and press (adult beside you), then fold another $\frac{1}{2}$ inch, press, pin

and stitch close to the inner fold. Handle these edges gently; they are cut on the bias and stretch easily.

3. **Side hems:** Fold each side $\frac{1}{2}$ inch, then $\frac{1}{2}$ inch again; press, pin and stitch.
4. **Top and bottom hems:** Fold the top edge $\frac{1}{2}$ inch, then 1 inch; press and stitch. Fold the bottom edge $\frac{1}{2}$ inch, then 1 inch; press and stitch.
5. **Pocket:** Fold the top edge of the pocket $\frac{1}{2}$ inch, then 1 inch; press and stitch. Fold the other three edges $\frac{1}{2}$ inch to the wrong side and press.
6. Pin the pocket to the front of the apron, centered, with its top edge about 13 inches below the top of the bib. Stitch down the sides and across the bottom, backstitching firmly at the two top corners. Stitch a straight line down the middle of the pocket to make two pockets.
7. **Neck strap:** Turn under $\frac{1}{2}$ inch at each end of the 22-inch tape. Pin the ends to the back of the two top corners of the bib, 1 inch down. Stitch a square with an X inside it through all layers at each end.
8. **Waist ties:** Turn under $\frac{1}{2}$ inch at one end of each 28-inch tie and stitch it with a box and an X to the back of the apron at the point where the angled edge meets the side. Knot or hem the free ends so they do not fray.
9. Press the finished apron (adult beside you). Try it on and adjust the neck strap if needed.

Fabric check: Choose a firmly woven, medium-weight cotton: twill, canvas, denim or sturdy quilting cotton. Cotton soaks up spills, washes hot, and does not melt near a stove the way polyester can. A busy print or darker color hides spots. Prewash it, because cotton shrinks. Avoid thin, slippery or stretchy fabrics. An old pair of adult jeans, cut open, makes a tough apron with ready-made pockets.

Steps

1. **Design it.** Draw two or three apron designs in your notebook. For each, write one sentence each about line, color, texture and proportion. Choose one.
2. **Fabric board.** Tape in swatches of your fabric and trim (or color them) and say why they suit the job.
3. **Practice first.** Press and sew a double hem on a scrap cut at an angle, and sew a box-and-X on a scrap of twill tape.

4. Sew the apron from the pattern card.
5. **Test it.** Wear it while you help cook a meal. Is it long enough? Is the pocket in a handy place? Do the ties stay tied?
6. **Improve it.** Write one change: a longer bib, a pocket for a recipe card, a contrasting band at the hem.
7. Clean up: count pins and needles back in, unplug the iron and the machine, and save scraps for patchwork.

Tips

- To resize: for a younger child, cut the body 17 × 22 inches; for an adult, 24 × 33 inches with a 30-inch neck strap and 36-inch ties.
- Stitch the pocket with a contrasting thread for a decorative line, or add rickrack along the top of the pocket.
- Younger students may sew a waist apron instead: a 20 × 14 inch rectangle, hemmed, with a pocket and a 1¾-yard tie stitched across the top.

Check your work

- ☐ I planned my apron using line, color, texture and proportion, and wrote my reasons.
- ☐ My hems are pressed and straight, and my ties are sewn on with a box and an X.
- ☐ I used the iron and machine with an adult beside me and followed the safety rules.

SEWING NOTEBOOK

1. Draw your apron design from the front, label line, color, texture and proportion, and color it in.
2. Make a fabric board: tape in your fabric and trim, and write the fiber and why you chose it.
3. Draw the box-and-X stitch and explain why it is used for ties and straps.

From history. Many old aprons were made from cotton flour and feed sacks printed with flowers and checks. Some families still keep a grandmother's feed-sack apron as a treasure.

COMMON MISTAKES

- Sewing hems without pressing first. They wander and twist. Press every fold with an adult beside you, then sew.
- Pulling on the angled (bias) edges while hemming. They stretch and ripple. Handle them gently.
- Sewing ties on with a single line of stitching. They pull off. Use a box with an X.

Make it a game • Apron Pitch. You are the designer. Your parent is a customer who needs an apron for a job, such as baking or gardening. Pitch your design: fabric, trim, pocket size and ties, using line, color, texture and proportion. Explain why each choice fits the work. A convincing pitch earns a paper ribbon.

Scripture. “She looketh well to the ways of her household, and eateth not the bread of idleness.” (Proverbs 31:27, KJV)

An apron is a sign of ready, willing work in the home. Making one is a small way to look well to the ways of your household.

8.3 COSTUMES FOR A PLAY

OBJECTIVES

- Tell how Hannah made Samuel a little coat every year, and how Christmas pageants began with Francis of Assisi's manger scene at Greccio in 1223.
- Plan a costume for a Bible-story play or Christmas pageant using simple shapes, colors and fabrics that fit the character and the time.
- Measure, cut on the fold, and sew a shepherd's or wise man's tunic with a sash and a headpiece from an old sheet, pillowcase or fabric.

Warm-up. Look at the shepherds in the painting for this lesson. List every piece of clothing you can see on them. Then look in a closet or the rag bag for old sheets, towels, tablecloths or scarves. Which ones could become part of a shepherd's or wise man's costume?

WATCH

Bible Costume in Five Minutes

Susan Evans • 3:41

<https://www.youtube.com/watch?v=sqQlFJwS41k>

WHEN TO WATCH

After "The craft" paragraph. Watch how she folds the fabric and cuts the tunic with no pattern. Then do the same with your fabric, step by step.

Note: A short, clear demonstration of a no-pattern Bible-times tunic cut from one long piece of fabric folded at the shoulders.

BACKUP VIDEO

Easy to Make Bible Costumes

kidskout • 17:26

<https://www.youtube.com/watch?v=WgKCKcrh6S8>

Ideas for headpieces, sashes and simple Bible costumes for children and adults. Watch to plan the rest of your cast's costumes.

KEY TERMS

costume

Clothing worn to play a character in a play, pageant or history day.

tunic

A simple long shirt or gown, often with no fastenings, worn in Bible times and for many centuries after.

cut on the fold

Cutting fabric while it is folded, so both halves come out exactly the same and there is no seam along the fold.

sash

A long strip of cloth tied around the waist like a belt.

headpiece

A cloth worn over the head, held with a band, as shepherds and travelers wore against sun and dust.

pageant

A play or procession that tells a story, such as the Christmas story, often performed by a church or school.

CORE IDEAS

The story. In the days of the judges, a woman named Hannah prayed for a son, and God gave her Samuel. When he was still a little boy, she brought him to serve in the house of the Lord at Shiloh. And every year, the Bible tells us, “his mother made him a little coat, and brought it to him from year to year” when she came up for the yearly sacrifice (1 Samuel 2:19). Each year the coat was a little bigger, because Samuel was growing. Many centuries later, in 1223, Francis of Assisi wanted the people of the little Italian town of Greccio to see how humbly Jesus was born. He set up a manger with hay, an ox and a donkey in a cave, and people came by torchlight to hear the Christmas story. From scenes like this grew the Christmas pageants that churches and families still put on, with children dressed as shepherds, wise men and angels.

How they figured it out. People in Bible times did not have zippers, buttons or paper patterns. Their everyday clothes were mostly made from rectangles of woven wool or linen: a long tunic, a cloak, a cloth for the head, and a belt or sash. Cutting cloth in rectangles wasted almost nothing, and garments could be passed from one person to another. Costume makers today have learned that the same simple shapes make the best Bible-times costumes: they are quick to sew, fit many sizes, and look right on stage.

The craft. A no-pattern tunic is one long rectangle folded in half at the shoulders. Two measurements are all you need: the **length**, from the top of the shoulder to the ankle (or mid-calf for a shepherd who must walk on stage), and the **width**, the chest measurement plus about 10 inches of ease. Cut the rectangle twice the length (plus 2 inches for hems) by the width. Fold it in half crosswise; the fold is the shoulders. Cut a neck opening at the center of the fold, sew up the two sides, leaving armholes at the top, and hem the bottom. **Color** tells the audience who the character is: shepherds wear plain browns, tans and stripes; wise men wear rich colors such as purple, deep red and gold; angels wear white. **Texture** helps too: rough cloth or burlap for a shepherd, a shiny trim for a king.

Let's sew. You will make a shepherd's or wise man's tunic, with a sash and a headpiece, for a Christmas pageant, a Bible-story play or a history day. The skill to do well is **cutting on the fold**: fold the fabric neatly, keep the fold straight along the grain, and cut through both layers at once so both sides match.

PICTURE STUDY



The Adoration of the Shepherds, Georges de La Tour, about 1644 · Oil on canvas · Musée du Louvre, Paris

Image: [Wikimedia Commons](#), public domain

Georges de La Tour was a French painter famous for scenes lit by a single candle. Here the shepherds have come to see the newborn Jesus, just as Luke 2 tells. Look at how La Tour dresses each person in simple, plain clothing, and at the bright white cloth wrapped around the baby. He shows us what humble working people wore, the kind of costumes you are making.

Look closely

- Find the baby Jesus. How is He wrapped? Luke 2:7 says Mary “wrapped him in swaddling clothes.” What do you think swaddling clothes were?
- Find a shepherd. What is he wearing on his head and body? What is he holding?
- Look at the colors of everyone’s clothes. Which colors would be easy to find in an old sheet or blanket?
- Find the lamb. What is it doing?

Talk about it

1. La Tour shows the shepherds as ordinary, poor working people. Why is that important in the Christmas story?
2. If you were dressing this cast for a pageant, what would each person need?

3. How does the single candle make you feel about this night?

Safety first. A parent or responsible adult supervises all sewing-tool use. Cut the long fabric on a clean floor or large table with fabric scissors, with an adult nearby, keeping fingers out of the path of the blades. Never pull a costume over a younger child's head with pins still in it, and count every pin and needle back into the pincushion.

SEWING PROJECT

A Shepherd's or Wise Man's Tunic with a Sash and Headpiece

You will measure a cast member (yourself or a younger child), cut a tunic on the fold from an old sheet or fabric, sew the side seams, and add a sash and a headpiece. It is ready for the Christmas pageant, a Bible-story play, or a history day.

You will need

- A sewing machine, or a hand-sewing needle and thimble
- Fabric scissors (with an adult nearby), a tape measure, chalk and a ruler
- Pins and a pincushion
- An iron (with an adult beside you), optional

NO-PATTERN BIBLE-TIMES TUNIC, SASH AND HEADPIECE

Finished size: One child-size costume; tunic about 36 in wide and shoulder-to-ankle long • About 2 hours

Fabric and notions

- **Tunic:** an old flat sheet, or about 2¼ yards of 45-inch cotton or cotton blend (muslin, broadcloth, homespun, striped cotton). Cut a rectangle: width = chest + 10 inches (about 36 inches for a child); length = 2 × (shoulder to ankle) + 2 inches
- **Sash:** a strip 4 × 60 in (10 × 150 cm) of a contrasting color, or a length of soft rope
- **Headpiece:** a square about 27 × 27 in (a striped tea towel or a piece of an old tablecloth) and a band from a 2 × 30 in strip or a stretchy headband
- **For a wise man:** a rich-colored fabric (purple, deep red, gold), and gold ribbon or braid for trim
- Thread to match; a long-sleeved shirt in brown, tan or white to wear underneath

How to make it

1. A parent measures the cast member over light clothing: shoulder to ankle (or mid-calf) and chest. Write the numbers and figure the cutting

size.

2. Fold the fabric in half crosswise. The fold is the top of the shoulders. Then fold it in half again lengthwise, so the second fold marks the center front and back.
3. **Neck:** At the corner where both folds meet, mark 4½ inches along the shoulder fold and 1½ inches down the center fold. Draw a gentle curve between the marks and cut through all layers (adult nearby). Unfold once and cut a 3-inch slit down the center front only, so the tunic goes over the head easily.
4. **Armholes:** Unfold the tunic to its shoulder fold. On each side, measure 8 inches down from the fold and mark it. This part stays open for the arms.
5. **Side seams:** With right sides together, pin each side from the mark down to the bottom. Sew with a ½-inch seam, by machine at slow speed or by hand with a backstitch. Backstitch firmly at the armhole mark.
6. Turn the raw edges of the armholes and neck under ¼ inch and stitch, or leave the selvage or sheet hem if it is already finished.
7. Try on the tunic. Mark the hem so it clears the floor, then fold it up ½ inch and 1 inch, press (adult beside you) and stitch. A sheet's ready-made hem can be used as the bottom hem if you cut the length from that end.
8. **Sash:** Fold the 4-inch strip in half lengthwise, right sides together, sew the long side and one end with ½-inch seams, turn it right side out with a safety pin, and close the end.
9. **Headpiece:** Hem the edges of the square if they are raw. Lay it on the head with a straight edge across the forehead and hold it with the band tied at the back. **Wise man:** stitch gold braid around the neck and hem of the tunic, and twist a rich fabric into a turban.

Fabric check: Old flat sheets are ideal: they are wide, soft, inexpensive and already hemmed. Cotton and cotton blends are easy to cut and sew and comfortable under hot stage lights. For a shepherd, choose plain browns, tans, creams or stripes; burlap is rough and scratchy, so use it only for a sash or over another layer. For a wise man, choose a rich color; avoid very slippery satins for a first costume, because they slide while you cut and sew. Fabric glue or iron-on hem tape can replace some sewing if time is short.

Steps

1. **Plan the cast.** List the characters in your play or pageant. For each, write the colors and pieces they need (tunic, sash, headpiece, cloak).
2. **Practice first.** Fold a piece of paper twice and cut a neck opening at the folded corner. Unfold it. Is the opening the shape you expected? Try again until you can predict it.
3. Sew the tunic, sash and headpiece from the pattern card.
4. **Fit test.** Have the cast member walk, kneel and lift their arms. Is the tunic long enough but not a tripping danger? Can they see under the headpiece?
5. Take a photo or draw the costume being worn.
6. **Improve it.** Write one change for the next costume: a different fabric, a longer sash, or trim.
7. Clean up: count pins and needles back in, unplug the machine and iron, and fold the costume with its sash and headpiece in a labeled bag.

Tips

- Younger students: make a pillowcase tunic. With an adult cutting, cut a neck hole in the closed end of an old pillowcase and an armhole in each side near the top. Add a rope sash and a tea-towel headpiece.
- For an angel, make the tunic in white and add a band of gold ribbon at the neck. For a Roman soldier, make a short red tunic to the knee and add a belt; for a pioneer or Pilgrim, add an apron from Lesson 8.2.
- Older students: add long sleeves by cutting the tunic as a T-shape on the fold, or make a matching cloak from a rectangle gathered at the neck.

Check your work

- ☐ I measured, folded and cut a tunic on the fold with both sides matching.
- ☐ My side seams are sewn with the armholes left open, and the hem clears the floor.
- ☐ My costume's colors and fabrics fit the character, and it is modest and comfortable to wear on stage.

SEWING NOTEBOOK

1. Draw your folded fabric with the neck curve and armhole marks, and write the measurements.
2. Design costumes for three characters in your play, coloring each one and labeling the fabrics.
3. Copy 1 Samuel 2:19 and write one sentence about what Hannah's little coat tells you about her.

From history. In the Middle Ages, churches in England and France acted out Bible stories in plays called mystery plays. Each craft guild often took one story: in the English city of York, for example, the shipwrights played the building of Noah's ark. Costumes were made by the guild members themselves.

COMMON MISTAKES

- Cutting the neck opening too big at first. You cannot add fabric back. Cut it small, try it on, and enlarge it a little at a time.
- Making the tunic so long that the actor trips on stage stairs. Hem it to clear the floor by an inch or two.
- Sewing the side seams all the way to the fold, with no room for the arms. Stop at the armhole mark.

Make it a game • Two-Minute Costume. Using towels, scarves and belts, make a costume for a Bible-story character in two minutes. Your parent guesses who you are and the time and place. Try a shepherd, a wise man or Mary. Tell how Hannah made little coats for Samuel and how Francis set up a manger at Greccio.

Scripture. "Moreover his mother made him a little coat, and brought it to him from year to year, when she came up with her husband to offer the yearly sacrifice." (1 Samuel 2:19, KJV)

Hannah could not keep Samuel at home, but every year she sewed him a new coat. A garment made with your own hands carries your love to the person who wears it.

8.4 JOSEPH'S COAT AND THE SEWING FAIR

OBJECTIVES

- Tell what the Bible says about Joseph's coat of many colors and Jesus's coat without seam, and why handmade clothing has always been a gift of love.
- Sew elastic-waist pajama shorts or pants from the pattern traced in Lesson 8.1, with a reinforced crotch seam, a casing and a hem.
- Hold a family sewing fair: display the year's work with a card for each piece, show a stitch to your guests, and give one piece away.

Warm-up. Gather everything you have made this year: swatch book, placemat, sampler, bags, crochet, knitting, pillow, curtain, quilt, apron and costume. Lay them out on the floor. Which piece took the longest? Which are you most thankful for? Which would you like to give away?

WATCH

How To Sew: DIY Pajama Pants For Beginners

Makers Gonna Learn • 4:50

<https://www.youtube.com/watch?v=y7189sER7VE>

WHEN TO WATCH

After “The craft” paragraph. Watch the whole video once; then watch the crotch-seam and casing parts again just before you sew those steps.

Note: She makes her own pattern from a pair of pants, as you did in Lesson 8.1, and sews the whole pair in a few minutes of video. Your pair will take longer; take your time.

KEY TERMS

coat of many colours

The special coat Jacob made for his son Joseph (Genesis 37:3). The words in the original language of Genesis may describe a long coat with sleeves, a costly garment that showed Jacob's love.

seamless

Woven or made in one piece with no seams. Jesus's coat was “without seam, woven from the top throughout” (John 19:23).

crotch seam

The curved seam that joins the two legs of pants from the front waist to the back waist. It is sewn twice for strength.

casing

A tunnel of fabric at the waist that holds the elastic.

elastic

A stretchy band, often made with rubber or spandex threads woven or knitted in, that pulls fabric in and springs back.

display card

A small card set beside a finished piece that tells what it is, what it is made of, and what the maker learned.

CORE IDEAS

The story. The Bible tells of many garments made with love. Jacob “made him a coat of many colours” for his son Joseph (Genesis 37:3), and it set Joseph apart from his brothers. Hannah made Samuel a little coat every year. Dorcas was “full of good works,” and the widows of Joppa showed Peter “the coats and garments which Dorcas made” (Acts 9:36, 39). And John tells us that Jesus’s own coat “was without seam, woven from the top throughout” (John 19:23), a garment so fine that no one wanted to tear it. Clothes made by hand were costly in time and skill. To give one was to give a piece of your life.

How they figured it out. Sewers in every age have had to make clothes that move with the body. Pants are the hardest test, because when you sit, kneel or climb, all the strain falls on the curved crotch seam. Dressmakers learned to sew that seam **twice**, to clip the curve so it lies flat, and to give the back a deeper curve than the front so the wearer can bend. They learned that an **elastic waist** fits many sizes and needs no buttons or zipper. That is why pajama pants are such a good first garment.

The craft. Pajama pants have four pieces: two fronts and two backs, a left and a right of each. First you sew each front to its back along the side and the inseam, making two leg tubes. Then you turn one leg right side out and slip it inside the other, so the right sides face each other, and sew the **crotch seam** all the way around the curve. At the top you fold down a **casing**, a tunnel a little wider than your elastic, and thread the elastic through with a safety pin. Elastic is cut about 2 inches shorter than the waist measurement, so it holds the pants up gently and comfortably. Cotton flannel

is a favorite pajama fabric: its brushed fibers trap warm air, and it is soft and easy to sew.

Let's sew. You will sew elastic-waist pajama shorts or pants from your Lesson 8.1 pattern. Younger students may sew a second costume piece or a gift instead. Then you will hold your **family sewing fair**. The skill to do well is **matching the inseams** at the crotch so the two legs meet exactly, and stitching that seam twice for strength.

PICTURE STUDY



Seated Grandmother Mending (Sitzende Grossmutter beim Flicken), Albert Anker, 1905 · Watercolor on paper · Private collection

Image: [Wikimedia Commons](#), public domain

Albert Anker, the Swiss painter of the knitting girl in Lesson 6.2, painted this grandmother near the end of his own long life. She sits in her wicker chair, glasses on her nose, threading or drawing her needle as she mends a heavy brown garment. She has probably sewn and mended for her family for sixty years or more. Your sewing fair is the end of one year of work; her hands show what a lifetime of it looks like.

Look closely

- Find her needle and thread. How close does she hold them to her eyes? Why?
- Look at the brown cloth in her lap. Is it something new, or something being mended? How can you tell?
- Look at her glasses, her headscarf and her hands. What do they tell you about her age and her years of work?
- Notice the round shape of the picture. Where does your eye go first?

Talk about it

1. Who in your family has sewn or mended for you? What could you make or mend for them?
2. Why is mending a garment a kind of gift, just as making a new one is?

3. What piece from your year of sewing would you like to give away, and to whom?

Safety first. A parent or responsible adult supervises all sewing-tool use. Sew slowly with an adult beside you, fingers an inch from the needle, and never sew over pins; press with an adult beside you and set the iron upright. At the sewing fair, keep pins, needles and scissors out of the display and out of reach of small guests, and count every pin and needle back in at the end.

SEWING PROJECT

Elastic-Waist Pajama Shorts or Pants, and the Family Sewing Fair

You will cut and sew a real garment from your own pattern: elastic-waist pajama shorts or pants. Then you will lay out the whole year's work for your family sewing fair, write a card for each piece, show your guests a stitch, and give one piece away.

You will need

- Your traced front and back pattern pieces from Lesson 8.1
- A sewing machine, or a hand-sewing needle and thimble
- Fabric scissors (with an adult nearby), pins and a pincushion, chalk, a ruler
- An iron and ironing board (with an adult beside you)
- A large safety pin or a bodkin
- Index cards and markers for display cards

ELASTIC-WAIST PAJAMA SHORTS OR PANTS

Finished size: One pair, sized from your own pattern (child sizes) · About 3 to 4 hours over two sessions

Fabric and notions

- **Pants:** about 2 yards of 44-inch cotton flannel or cotton (prewashed).
Shorts: about 1 yard
- 1-inch (25 mm) knit elastic: your waist measurement minus 2 inches, plus 1 inch for overlap
- All-purpose thread to match
- Pattern pieces: Front, cut 2 (a left and a right); Back, cut 2 (a left and a right). ½-inch seams; 2-inch casing allowance; 1½-inch hem allowance
- A small piece of ribbon to mark the back (optional)

How to make it

1. Prewash, dry and press the fabric (adult beside you). Fold it in half, right sides together, selvages matching. Pin the Front pattern with its grainline arrow parallel to the selvage, and the Back the same way. Cut

through both layers with an adult nearby. You now have two fronts and two backs, mirror images.

2. **Side seams:** Pin one front to one back along the outer side edge, right sides together, and sew with a ½-inch seam. Repeat for the other leg.
3. **Inseams:** Pin each leg's inner leg edges together, right sides together, and sew from the hem up to the crotch. You now have two leg tubes. Press the seams (adult beside you).
4. **Crotch seam:** Turn one leg right side out and slip it inside the other leg, which is still wrong side out. Match the inseams exactly at the crotch and pin. Match and pin the front and back waist edges. Sew the curve from the front waist to the back waist with a ½-inch seam.
5. Sew the crotch curve a second time, right on top of the first line, for strength. Clip into the seam allowance along the curve every inch, not cutting the stitches. Pull the inner leg out and turn the pants right side out.
6. **Casing:** Turn the pants wrong side out. Fold the waist edge ¼ inch to the wrong side and press, then fold it 1¼ inches and press (adult beside you). Pin. Stitch close to the lower fold all the way around, leaving a 2-inch opening at the back.
7. **Elastic:** Pin a safety pin to one end of the elastic and push it through the casing all the way around. Do not let the other end slip in (pin it to the pants). Overlap the ends 1 inch, check that the elastic is not twisted, and stitch a square with an X through both layers. Stitch the opening closed.
8. **Hems:** Fold each leg's bottom edge ½ inch, then 1 inch; press and stitch.
9. Sew a small loop of ribbon into the back of the casing so you always know which side is the back. Try them on!
10. **Hand-sewn option:** sew every seam with a small backstitch, and the crotch seam twice.

Fabric check: Cotton flannel is the classic pajama fabric: soft, warm and easy to sew. Lightweight cotton (quilting cotton, poplin or seersucker) makes cool summer pajamas. Prewash, because cotton and flannel shrink. Avoid stretchy knits for a first garment unless an adult shows you how, and avoid slippery satins. Choose a print without a one-way direction so all four pieces can be cut either way.

Steps

1. **Practice first.** On scraps, sew a curved seam, sew it again on top, and clip the curve. Turn it and press it. Does it lie flat?
2. Sew the shorts or pants from the pattern card.
3. **Fit test.** Put them on and sit cross-legged, kneel, and reach for your toes. Are they comfortable? Is the waist snug but not tight? Write what you notice about comfort and movement.
4. **Prepare the fair.** Choose a table or a cleared floor. Lay out every finished piece from the year, from Unit 1 to Unit 8. Write a display card for each: what it is, the fiber and fabric, the main stitch or skill, and one thing you learned.
5. **Hold the fair.** Invite family, grandparents or friends. Wear your costume or a garment you made. Show your guests one stitch (a backstitch, a single crochet, a knit stitch) and let a guest try it.
6. **Give one piece away.** Choose one piece and give it with a handwritten note: to a guest, a neighbor, a grandparent, or a place that helps people.
7. Clean up: pack your work carefully, count every pin and needle back in, and unplug the iron and the machine.

Tips

- Mark the wrong side of each cut piece with a chalk X right away. Flannel looks almost the same on both sides.
- If the elastic twists inside the casing, stitch straight down through the casing at each side seam to hold it flat.
- Younger students: sew pajama shorts, or make a second costume piece (a sash, a headpiece, a cloak) or a gift such as a pillowcase, and bring it to the fair. Older students: add a pocket to the pants or sew a matching pair for a younger brother or sister.

Check your work

- ☐ I sewed a garment from my own pattern, with a double-stitched crotch seam, a casing with elastic, and hems.
- ☐ My pajamas are comfortable to sit, kneel and move in.
- ☐ I held a sewing fair with a display card for each piece, showed a stitch, and gave one piece away with a note.

SEWING NOTEBOOK

1. Draw your pajama pants laid flat and label the side seam, inseam, crotch seam, casing and hem.
2. Write your “Skills I Learned This Year” page: one skill from each unit, with a small drawing.
3. Copy Genesis 37:3 and write two sentences about a garment someone made for you or that you made for someone else.

From history. In many towns, county fairs have long had a sewing and needlework hall where children and grown-ups show quilts, garments and knitting, and judges give ribbons. 4-H clothing clubs have helped young people show their sewing at fairs for more than a hundred years. Your family sewing fair is part of that old tradition.

COMMON MISTAKES

- Cutting two right fronts instead of a left and a right. Fold the fabric in half so the pieces come out as mirror images.
- Sewing the crotch seam only once. It splits the first time you sit down. Sew it twice and clip the curve.
- Cutting the elastic as long as the waist measurement. The pants fall down. Cut it about 2 inches shorter.

Make it a game • Sewing Fair Ribbon Judge. You are the judge at the sewing fair. Your parent presents pretend entries, such as a pillowcase or pajama shorts. Say what you check: even stitches, secure seams, a strong crotch seam, a neat casing and a hem. Award a paper ribbon. Tell about Joseph's coat of many colors.

Scripture. “Now Israel loved Joseph more than all his children, because he was the son of his old age: and he made him a coat of many colours.” (Genesis 37:3, KJV)

Jacob's love for Joseph took the form of a coat. Our gifts of sewing, given to family, friends and neighbors, can show love in the same way.

DESIGN, CLOTHING & COSTUMES

In this last unit you become a designer and a dressmaker. You will learn how a tailor measures, and you will take your own measurements (over your clothes, with a parent) and turn a favorite pair of pajama pants into a **paper pattern**. You will design and sew a kitchen **apron**, thinking about line, color, texture and proportion, and you will make a **shepherd's or wise man's tunic** for a Christmas pageant or Bible play, cut without any pattern at all.

Finally, you will sew a real garment, a pair of elastic-waist pajama shorts or pants, and then hold your **family sewing fair**. You will lay out a whole year of work, from your first fiber swatch to your last seam, show a stitch to your guests, and give one piece away. Hannah made her son Samuel “a little coat” every year (1 Samuel 2:19), and Jacob made Joseph a coat of many colors (Genesis 37:3). Clothes made by hand for someone you love have always meant more than cloth.

PREREQUISITES

- Can sew a straight seam by machine at slow speed with an adult beside, or by hand with a backstitch, and press with an adult beside (Units 3–4, 7)
- Can measure in inches to the nearest $\frac{1}{4}$ inch and add seam allowances and hems (Unit 7)
- Can sew a casing or rod pocket and thread a cord or rod through it (Units 4 and 7)
- Knows which fabrics are woven or knit, which fray, and which shrink (Units 1–2)

MASTERY CHECKLIST

- ☐ I can take measurements for fit (with a parent, over light clothing) and record them on a measurement card for fit only.
- ☐ I can trace a pattern from a garment that fits, add seam allowances, a hem and a casing, and mark the grainline.
- ☐ I can use line, color, texture and proportion to plan a design, and sew an apron with a pocket and ties.
- ☐ I can cut and sew a simple costume tunic on the fold for a play or pageant.
- ☐ I can sew an elastic-waist garment and present a year of work at a sewing fair, giving one piece away.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A 60-inch cloth or fiberglass tape measure:** The tailor’s tool. A soft tape bends around a body or a garment; a metal carpenter’s tape does not.
- **The National Gallery, London: Moroni, *The Tailor*:** Free. The museum’s page for the painting in Lesson 8.1, with a large image you can zoom in on to see the chalk lines and the shears.
- **Pattern paper:** Inexpensive rolls of pattern paper, freezer paper, the back of wrapping paper, or newspaper taped together all work for tracing patterns.
- **1-inch (25 mm) knit elastic and a large safety pin or bodkin:** For the pajama shorts or pants in Lesson 8.4. Knit elastic stays flat in a casing better than braided elastic.

Not required. Every project in this unit works with ordinary fabric-store supplies. School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

8.1 Measuring and the Tailor’s Tape	2 sessions of 45–60 minutes
8.2 An Apron for the Kitchen	2 sessions of 60–90 minutes
8.3 Costumes for a Play	2 sessions of 60–90 minutes
8.4 Joseph’s Coat and the Sewing Fair	2 sessions of 60–90 minutes

UNIT 8 REVIEW

Answer each question in complete sentences unless it asks you to show or to calculate. Show your math. The review is worth 50 points.

1. 5 pts

How did many tailors measure a customer before the tape measure? What tool came into use in the early 1800s?

2. 5 pts

What rules do we follow when taking body measurements for sewing?

3. (5 pts)

What is ease? Why is a pattern piece larger than the body measurement?

4. (5 pts)

A traced pants side length (waist to hem line) is 28 inches. You add 2 inches for the casing and $1\frac{1}{2}$ inches for the hem. How long is the pattern piece?

5. (5 pts)

Name the four design ideas from Lesson 8.2 and give one example of each from your apron.

6. (5 pts)

Show me. Sew a box with an X through a 3-inch piece of twill tape on a scrap, by machine with an adult beside you or by hand. Tell why ties and straps are sewn this way.

7. (5 pts)

A child's chest is 26 inches and shoulder-to-ankle is 40 inches. Using the tunic rule (chest + 10 inches; $2 \times \text{length} + 2$ inches), what size rectangle do you cut?

8. (5 pts)

Predict. You sew a pair of pajama pants but stitch the crotch seam only once and do not clip the curve. What will probably happen when you wear them?

9. (5 pts)

Your waist measurement is 24 inches. How long do you cut the elastic, including a 1-inch overlap?

10. (5 pts)

Name two garments made with love in the Bible and who made or wore them.

ANSWER KEY

1. With a long strip of paper or parchment, cutting a notch for each measurement and keeping the strip with the customer's name. The flexible tape measure marked in inches.
2. A parent measures over light clothing, the tape level and snug but not tight; the numbers are written down for fit only, never compared or called good or bad.
3. Ease is extra room added so you can move, breathe and sit. A pattern also includes seam allowances, a casing and a hem, so it is bigger than the body.
4. $28 + 2 + 1\frac{1}{2} = 31\frac{1}{2}$ inches.
5. Line, color, texture and proportion. Examples will vary, such as up-and-down stripes (line), a red and white check (color), crisp cotton twill (texture), and a pocket about one-third the apron's width (proportion).
6. Parent checks: a neat square with an X inside, backstitched or knotted. It spreads the pull over many stitches so ties do not tear off.
7. Width $26 + 10 = 36$ inches; length $2 \times 40 + 2 = 82$ inches. Cut a rectangle 36×82 inches.
8. The curved seam will pucker and pull, and it may split when you sit, kneel or climb, because all the strain falls on that seam. Sewing it twice and clipping the curve makes it strong and flat.
9. $24 - 2 = 22$ inches, plus 1 inch overlap = 23 inches.
10. Any two: Joseph's coat of many colors, made by Jacob (Genesis 37:3); Samuel's little coat, made by Hannah every year (1 Samuel 2:19); the coats and garments Dorcas made for the widows (Acts 9:39); Jesus's seamless coat, woven from the top throughout (John 19:23); the coats of skins God made for Adam and Eve (Genesis 3:21).

UNIT CHALLENGE: THE FAMILY SEWING FAIR

Hold your family sewing fair. Display every finished piece from the year with a display card for each one (what it is, its fiber and fabric, the main skill, and one thing you learned). Wear one garment or costume you made.

Show your guests one stitch and let someone try it. Include a “Skills I Learned This Year” page in your notebook, and give one piece away with a handwritten note.

LOOK FOR	WHAT IT MEANS
Display	Every finished piece is shown neatly with a complete display card.
Garment or costume worn	A garment or costume the student made is finished (seams, casing or hems complete), modest, and comfortable to wear.
Showing a skill	The student shows a stitch clearly and helps a guest try it.
Skills page and record	A “Skills I Learned” page names at least one skill from each unit, with honest notes on what improved. Work that was redone and honestly recorded earns full credit.
Safety and giving	Tools counted and kept away from small guests; one piece given away with a note.