

GRADE 3 COOKING & FOOD

First edition

8 units

32 lessons · one school year

A video for every lesson

FIRST EDITION

COURSE GUIDE

This course follows eight strands of cooking and food through the school year: kitchen and food safety, the food groups and the balanced meal, taste and smell, heat and cold, food chemistry, cravings and a balanced way of eating, fire and spice, and meal planning for the family table. Each unit is built around real people and real moments: a baker's oven on Pudding Lane in 1666, George Washington Carver in his Tuskegee laboratory, Helen Keller knowing her garden by its smell, Frederic Tudor sending a ship full of ice to the tropics, Antoine Parmentier serving potato dinners in Paris, and Marco Polo writing about pepper and ginger in faraway lands.

Every lesson follows the same path. First comes **the story**. Then **how they figured it out**: the question someone faced, what they tried and what they learned. Then **the kitchen science**, told simply for a third grader. Last, **let's cook**: the student makes a real recipe for the family, with an adult beside, and records it in a cook's notebook. This is the year a young cook learns the claw grip with a small knife, flips a quesadilla, stirs a pot of soup and slides a pan into the oven, always with an adult right there.

Food is treated as God's good gift, received with thanks and shared with others. We talk about food in terms of skill, safety, nourishment, thankfulness and hospitality, never in terms of body size or appearance. The year ends with a family feast: the student plans three dishes, makes a menu card, cooks with an adult, sets the table and gives thanks. The old Latin saying *Fabricando fit faber*, "by making, one becomes a maker," fits the kitchen well: by cooking, one becomes a cook.

Most videos come from trusted teaching sources: fire departments and county health departments, the Partnership for Food Safety Education, Oregon State University's Food Hero, Nemours KidsHealth, SciShow Kids, Homeschool Pop, Peekaboo Kidz and careful cooking teachers chosen lesson by lesson. Every video was previewed for content, accuracy and modest dress. Most are short. Some channels end with an invitation to subscribe or a word about

their other videos; you can stop the video when the teaching ends. A few cooking videos show a grown-up cook using a sharp knife or a hot stove alone; in this course a third grader does those steps only with an adult right beside.

Start with Lesson 1.1 →

WHO IT IS FOR

Written for students in grade 3 (about ages 8–9) who are reading on their own and can measure with cups and spoons. A parent or responsible adult reads along when needed, stands right beside the student for every knife and stove step, and does all the grilling. Nothing needs to be bought beyond an ordinary kitchen and ordinary groceries; an instant-read food thermometer is the one inexpensive tool we strongly recommend.

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 kitchen project: cook the recipe, do the little test inside it, clean up, and write in the cook's notebook. In the last week of each unit, add a third session for the unit review and the unit challenge.
2. **An adult supervises all cooking.** A parent or responsible adult is present for every kitchen project in this course. Before cooking, check every recipe and every taste test against your own family's food allergies; each recipe card names the major allergens it contains and offers swaps where they are easy.
3. **The grade 3 safety ladder.** Third graders use a small serrated knife or paring knife only with an adult right beside them, on a cutting board that cannot slide (a damp towel underneath), using the “claw” and “bridge” grips taught in Lesson 1.2. They use the stove and oven with an adult beside them, pot handles turned in, oven mitts on, and never reach over steam. The microwave is used with an adult nearby. There is no frying in more than a thin film of oil. At the grill, the student helps prepare the food and watches from 3 feet back while an adult does all the grilling.
4. **Story, then science, then cooking.** Read the core ideas aloud together, or let the student read them. The paragraphs marked *The story* and *How they figured it out*

tell what happened; *The kitchen science* explains what is happening to the food; *Let's cook* names the recipe 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.

5. **Picture study.** Each lesson has one painting or old photograph of a kitchen, a market, a harvest or a table. 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 the questions, which point to the food, the heat, the tools and the people in the picture.
6. **The cook's notebook.** Use one notebook for the whole year. For every recipe, write the date, copy the recipe in your own words, write down what you noticed, draw the finished dish, ask your family to rate it, and write one thing you would change next time. Then, when you can, cook it again and make that change. Cook it, record it, improve it.
7. **How we talk about food and bodies.** This course never talks about weight or how bodies look. We call foods “everyday foods” and “sometimes foods,” never “good” or “bad.” Treats and feasts are good gifts in their place. Grades rest on effort, care, safety, cleanliness and improvement.
8. **Groceries.** The recipes use ordinary grocery-store ingredients and feed a family of four to six. Most weeks the kitchen project can be the family's lunch, snack or supper, so the course adds little to the grocery bill beyond what the family already buys. Read the recipe card a few days ahead and add its ingredients to the shopping list.
9. **Optional books and tools.** Some units list free charts, guides and simple tools. They are extras. Every recipe can be made without them.
10. **Unit review and unit challenge.** Each unit ends with a short review (50 points; it may be done out loud) and a unit challenge: something real cooked, served and recorded, such as a family fire-safety and kitchen check, three balanced lunches, a family taste test, or a soup kept hot in a thermos. Keep the challenge pages and photographs in a folder for the year.
11. **The family feast.** In the last week the student plans a three-dish meal, makes a menu card, cooks with an adult beside, sets the table, and leads or joins in giving thanks.

SCOPE AND SEQUENCE

UNIT 1 • WEEKS 1–4

Kitchen & Food Safety

The Great Fire of London and kitchen fire safety; the claw and bridge grips with a small knife; Clean, Separate, Cook, Chill; and leftovers and the two-hour rule, with a pan of fried rice.

- 1.1 The Great Fire of London Began in a Bakery
- 1.2 Your First Knife Grip: The Claw
- 1.3 Clean, Separate, Cook, Chill
- 1.4 Leftovers and the Two-Hour Rule

UNIT 3 • WEEKS 9–12

Taste, Smell & Your Taste Buds

Thousands of taste buds and the five tastes; Helen Keller, smell and memory; getting used to new foods one taste at a time; and crunch, from the Saratoga chip legend to oven-baked potato chips.

- 3.1 Thousands of Taste Buds
- 3.2 Smell and Memory
- 3.3 Getting Used to New Foods
- 3.4 Texture and Crunch

UNIT 2 • WEEKS 5–8

Food Groups & the Balanced Meal

MyPlate and the five food groups in a burrito bowl; George Washington Carver and the sweet potato; calcium and vitamin D for strong bones; and packing a balanced lunch.

- 2.1 MyPlate Builds a Meal
- 2.2 George Washington Carver and the Sweet Potato
- 2.3 Calcium and Vitamin D for Bones
- 2.4 A Balanced Lunch

UNIT 4 • WEEKS 13–16

Heat & Cold

Frederic Tudor the Ice King and fruit slushies; James Dewar’s vacuum flask and hot soup in a thermos; boiling, simmering and poaching; and baking cornbread with heat all around.

- 4.1 Frederic Tudor, the Ice King
- 4.2 The Thermos and a Bowl of Hot Soup
- 4.3 Boiling, Simmering and Poaching
- 4.4 Baking: Heat All Around

UNIT 5 • WEEKS 17–20

Food Chemistry

Antoine Parmentier and potato starch; a thin film of oil for sautéing; Fleischmann’s yeast and an easy no-knead bread; and sugar crystals growing into rock candy.

- 5.1 Antoine Parmentier and the Potato
- 5.2 Oil in the Pan
- 5.3 Fleischmann’s Yeast
- 5.4 Sugar Crystals and Moisture

UNIT 7 • WEEKS 25–28

Fire, the Grill & Spice

Grill safety for helpers and grilled drumsticks; Marco Polo and the spices of the East; hot peppers and mild ones; and sweet and sour together on pineapple-chicken skewers.

- 7.1 Grill Safety for Helpers
- 7.2 Marco Polo and the Spices of the East
- 7.3 Hot Peppers and Mild Peppers
- 7.4 Sweet and Sour Together

UNIT 6 • WEEKS 21–24

Cravings, Reward & a Balanced Diet

Jonathan and the honeycomb; how the brain learns to want sweet foods; hidden sugar in drinks; and how fiber, protein and water help us feel full.

- 6.1 Jonathan and the Honeycomb
- 6.2 How Your Brain Learns to Want Foods
- 6.3 Hidden Sugar in Drinks
- 6.4 Fiber and Protein Help You Feel Full

UNIT 8 • WEEKS 29–32

Meal Planning & the Family Table

Martha and Mary and a simple supper for guests; reading a recipe all the way through; manna and planning meals for a day; and the family feast with a menu card.

- 8.1 Martha and Mary
- 8.2 Reading a Recipe All the Way Through First
- 8.3 Planning Meals for a Day
- 8.4 The Family Feast

WEEKLY PACING CALENDAR

WEEK	PLAN
1	- Session 1: Lesson 1.1 The Great Fire of London Began in a Bakery: warm-up, video, teaching and picture study - Session 2: Lesson 1.1 kitchen project (cook the recipe) and cook’s notebook <i>Two sessions a week is the usual rhythm: one to learn, one to cook. Younger children can split a long session in two. Cook the week’s recipe again at home whenever you can.</i>
2	Session 1: Lesson 1.2 Your First Knife Grip: The Claw: warm-up, video, teaching and picture study

WEEK	PLAN
	Session 2: Lesson 1.2 kitchen project (cook the recipe) and cook's notebook
3	- Session 1: Lesson 1.3 Clean, Separate, Cook, Chill: warm-up, video, teaching and picture study - Session 2: Lesson 1.3 kitchen project (cook the recipe) and cook's notebook
4	- Session 1: Lesson 1.4 Leftovers and the Two-Hour Rule: warm-up, video, teaching and picture study - Session 2: Lesson 1.4 kitchen project (cook the recipe) and cook's notebook - Session 3: Unit 1 review and unit challenge
5	- Session 1: Lesson 2.1 MyPlate Builds a Meal: warm-up, video, teaching and picture study - Session 2: Lesson 2.1 kitchen project (cook the recipe) and cook's notebook
6	- Session 1: Lesson 2.2 George Washington Carver and the Sweet Potato: warm-up, video, teaching and picture study - Session 2: Lesson 2.2 kitchen project (cook the recipe) and cook's notebook
7	- Session 1: Lesson 2.3 Calcium and Vitamin D for Bones: warm-up, video, teaching and picture study - Session 2: Lesson 2.3 kitchen project (cook the recipe) and cook's notebook
8	- Session 1: Lesson 2.4 A Balanced Lunch: warm-up, video, teaching and picture study - Session 2: Lesson 2.4 kitchen project (cook the recipe) and cook's notebook - Session 3: Unit 2 review and unit challenge
9	- Session 1: Lesson 3.1 Thousands of Taste Buds: warm-up, video, teaching and picture study - Session 2: Lesson 3.1 kitchen project (cook the recipe) and cook's notebook
10	- Session 1: Lesson 3.2 Smell and Memory: warm-up, video, teaching and picture study - Session 2: Lesson 3.2 kitchen project (cook the recipe) and cook's notebook
11	- Session 1: Lesson 3.3 Getting Used to New Foods: warm-up, video, teaching and picture study - Session 2: Lesson 3.3 kitchen project (cook the recipe) and cook's notebook
12	- Session 1: Lesson 3.4 Texture and Crunch: warm-up, video, teaching and picture study - Session 2: Lesson 3.4 kitchen project (cook the recipe) and cook's notebook

WEEK	PLAN
	Session 3: Unit 3 review and unit challenge
13	- Session 1: Lesson 4.1 Frederic Tudor, the Ice King: warm-up, video, teaching and picture study - Session 2: Lesson 4.1 kitchen project (cook the recipe) and cook's notebook
14	- Session 1: Lesson 4.2 The Thermos and a Bowl of Hot Soup: warm-up, video, teaching and picture study - Session 2: Lesson 4.2 kitchen project (cook the recipe) and cook's notebook
15	- Session 1: Lesson 4.3 Boiling, Simmering and Poaching: warm-up, video, teaching and picture study - Session 2: Lesson 4.3 kitchen project (cook the recipe) and cook's notebook
16	- Session 1: Lesson 4.4 Baking: Heat All Around: warm-up, video, teaching and picture study - Session 2: Lesson 4.4 kitchen project (cook the recipe) and cook's notebook - Session 3: Unit 4 review and unit challenge
17	- Session 1: Lesson 5.1 Antoine Parmentier and the Potato: warm-up, video, teaching and picture study - Session 2: Lesson 5.1 kitchen project (cook the recipe) and cook's notebook
18	- Session 1: Lesson 5.2 Oil in the Pan: warm-up, video, teaching and picture study - Session 2: Lesson 5.2 kitchen project (cook the recipe) and cook's notebook
19	- Session 1: Lesson 5.3 Fleischmann's Yeast: warm-up, video, teaching and picture study - Session 2: Lesson 5.3 kitchen project (cook the recipe) and cook's notebook
20	- Session 1: Lesson 5.4 Sugar Crystals and Moisture: warm-up, video, teaching and picture study - Session 2: Lesson 5.4 kitchen project (cook the recipe) and cook's notebook - Session 3: Unit 5 review and unit challenge
21	- Session 1: Lesson 6.1 Jonathan and the Honeycomb: warm-up, video, teaching and picture study - Session 2: Lesson 6.1 kitchen project (cook the recipe) and cook's notebook

WEEK	PLAN
22	• Session 1: Lesson 6.2 How Your Brain Learns to Want Foods: warm-up, video, teaching and picture study • Session 2: Lesson 6.2 kitchen project (cook the recipe) and cook's notebook
23	• Session 1: Lesson 6.3 Hidden Sugar in Drinks: warm-up, video, teaching and picture study • Session 2: Lesson 6.3 kitchen project (cook the recipe) and cook's notebook
24	• Session 1: Lesson 6.4 Fiber and Protein Help You Feel Full: warm-up, video, teaching and picture study • Session 2: Lesson 6.4 kitchen project (cook the recipe) and cook's notebook • Session 3: Unit 6 review and unit challenge
25	• Session 1: Lesson 7.1 Grill Safety for Helpers: warm-up, video, teaching and picture study • Session 2: Lesson 7.1 kitchen project (cook the recipe) and cook's notebook
26	• Session 1: Lesson 7.2 Marco Polo and the Spices of the East: warm-up, video, teaching and picture study • Session 2: Lesson 7.2 kitchen project (cook the recipe) and cook's notebook
27	• Session 1: Lesson 7.3 Hot Peppers and Mild Peppers: warm-up, video, teaching and picture study • Session 2: Lesson 7.3 kitchen project (cook the recipe) and cook's notebook
28	• Session 1: Lesson 7.4 Sweet and Sour Together: warm-up, video, teaching and picture study • Session 2: Lesson 7.4 kitchen project (cook the recipe) and cook's notebook • Session 3: Unit 7 review and unit challenge
29	• Session 1: Lesson 8.1 Martha and Mary: warm-up, video, teaching and picture study • Session 2: Lesson 8.1 kitchen project (cook the recipe) and cook's notebook
30	• Session 1: Lesson 8.2 Reading a Recipe All the Way Through First: warm-up, video, teaching and picture study • Session 2: Lesson 8.2 kitchen project (cook the recipe) and cook's notebook

WEEK	PLAN
31	• Session 1: Lesson 8.3 Planning Meals for a Day: warm-up, video, teaching and picture study • Session 2: Lesson 8.3 kitchen project (cook the recipe) and cook's notebook
32	• Session 1: Lesson 8.4 The Family Feast: warm-up, video, teaching and picture study • Session 2: Lesson 8.4 kitchen project (cook the recipe) and cook's notebook • Session 3: Unit 8 review and unit challenge <i>Last week. Hold a family feast: the student plans the menu, shops with a parent, cooks a balanced meal with a dish from several units, sets the table, says grace with the family and shows the cook's notebook.</i>

MATERIALS

Cook's notebook (any notebook)

One for the whole year: recipes in your own words, what you noticed, taste charts, drawings, family ratings and “what I would change next time.”

An instant-read food thermometer

The one tool we strongly recommend. Used from Lesson 1.3 on to check the refrigerator, cooked chicken, eggs and leftovers.

A refrigerator thermometer

Optional and inexpensive. Leave it in the fridge to check that it stays at or below 40 °F.

Measuring cups (dry and liquid) and measuring spoons

Used in every recipe.

A small serrated knife or paring knife, a vegetable peeler and a cutting board

Used only with an adult right beside the student. Put a damp towel under the board so it cannot slide. Two boards are best: one for raw meat and one for ready-to-eat foods.

A large skillet, a medium and a large pot with lids, a baking sheet, an 8-inch square pan and oven mitts

Ordinary kitchen equipment for the stovetop and oven recipes.

Mixing bowls, a whisk, a wooden spoon, a spatula, a colander and clean jars

For mixing, draining and storing.

A sturdy step stool

So the student can work at counter height safely. It should not wobble or slide.

Clean dish towels, dish soap and paper towels

Cleanup is part of every recipe.

A timer and a camera or phone

For timing cooking and tests and photographing finished dishes and unit challenges.

GRADING

Grades come mostly from the kitchen projects and the cook's notebook, because cooking is learned by doing, writing it down and trying again. A dish that flops but is honestly recorded and then made again with one improvement earns full credit.

PART	%
Kitchen projects (effort, safety, cleanliness and the improve round)	40
Cook's notebook (recipes in your own words, observations, taste charts, drawings)	20
Unit reviews	15
Unit challenges	25

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

- Grade the cook, not the dish. Did the student wash up first, follow the safety steps, measure carefully, notice and record honestly, clean up, and try an improvement?
- A notebook page earns full marks when it has a date, the recipe in the student's own words, at least one thing noticed or measured, a drawing or photo, a family rating and one sentence about what to change.
- A dish that flops but is honestly recorded and tried again earns full credit. A burnt quesadilla or a flat loaf teaches as much as a perfect one.
- Unit reviews may be done out loud; the parent writes down the answers.

- Never grade or comment on anyone's body, size or how much they ate. Grades rest on effort, care, safety, cleanliness and improvement.

A NOTE TO PARENTS

You do not need to be a chef to teach this course. Read the story together, watch the video, and then be the student's kitchen partner: stand right beside the cutting board and the stove, hand over the thermometer, and ask "What do you think will happen?" and "Why do you think it happened?" Those two questions are most of what a good cooking teacher does. Let the student do as much of the work as the safety ladder allows, including the cleanup.

Third grade is a big year in the kitchen. Your child will hold a small knife for the first time in this course, flip food in a skillet and slide pans into the oven, always with you beside. Go slowly at first, praise careful hands more than fast ones, and expect some flops. Cooks learn by tasting, noticing and trying again. *Fabricando fit faber*: by making, one becomes a maker.

Food in this course is a good gift to be received with thanks and shared. We keep the conversation on skill, nourishment, thankfulness and hospitality, never on weight or appearance, and we name foods neutrally as "everyday foods" and "sometimes foods." Food allergies and any special medical needs belong to your family and your doctor: please read each recipe card's allergen note and make the swaps your family needs.

UNIT 1

KITCHEN & FOOD SAFETY

A good cook is first of all a safe cook. In this unit you will hear how one baker's oven on a narrow London street started the Great Fire of London in 1666, and you will learn what to do if a pan ever catches fire at home. You will hold a small knife for the first time in this course, with an adult right beside you, and learn the **claw** and the **bridge**, two grips that keep your fingers safe.

Then you will meet BAC, the cartoon germ, and the four steps that beat him: **Clean, Separate, Cook, Chill**. You will learn why perishable food goes back into the refrigerator within two hours, and you will turn yesterday's rice into a pan of fried rice. Jesus told His disciples, "Gather up the fragments that remain, that nothing be lost" (John 6:12). Saving leftovers safely is part of not wasting God's good gifts.

PREREQUISITES

- Can wash hands with soap for 20 seconds
- Can measure with cups and spoons and pour carefully
- Can stand steadily on a sturdy step stool at the counter
- Listens and stops right away when an adult says "Stop"

MASTERY CHECKLIST

- ☐ I can tell how the Great Fire of London started and name three ways to keep a kitchen fire from starting.
- ☐ I can explain why a grease fire gets a lid and never water, and what to do if a fire grows (get out and call 911).
- ☐ I can use the claw and the bridge grips with a small knife, with an adult right beside me, on a board that does not slide.
- ☐ I can name and explain the four steps: Clean, Separate, Cook, Chill.
- ☐ I can explain the two-hour rule and put leftovers away safely in shallow containers.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **FoodSafety.gov: Safe Minimum Internal Temperatures:** Free; search for it at FoodSafety.gov. A printable chart of safe cooking temperatures to tape inside a cupboard door for Lessons 1.3–1.4 and the whole year.
- **Fight BAC! from the Partnership for Food Safety Education:** Free. Kids’ pages, posters and handouts on Clean, Separate, Cook and Chill for Lesson 1.3 and the unit challenge.
- **A small kitchen fire extinguisher and a box of baking soda by the stove:** For the adult. Many families keep both near the kitchen. Read the extinguisher’s label together during the Lesson 1.1 fire drill.
- **A refrigerator thermometer:** Inexpensive. Leave it in the refrigerator to check that it stays at or below 40 °F for Lesson 1.3 and the unit challenge.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

1.1	The Great Fire of London Began in a Bakery	2 sessions of 45–60 minutes
1.2	Your First Knife Grip: The Claw	2 sessions of 45–60 minutes
1.3	Clean, Separate, Cook, Chill	2 sessions of 45–60 minutes
1.4	Leftovers and the Two-Hour Rule	2 sessions of 45–60 minutes

UNIT 1 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

Where and how did the Great Fire of London start in 1666?

2. **5 pts**

Name the three sides of the fire triangle.

3. 5 pts

Predict: what will happen if someone throws water on a pan of burning oil?
What should be done instead?

4. 5 pts

Describe the claw grip. How does it keep your fingers safe?

5. 5 pts

Why do we put a damp towel under the cutting board, and why do we cut round foods in half first?

6. 5 pts

Name the four steps to food safety and give one example of each.

7. 5 pts

What temperatures are the danger zone? How cold should a refrigerator and a freezer be?

8. 5 pts

Predict: a big, deep pot of hot soup goes straight into the refrigerator. Will the middle cool quickly? What is a better way?

9. 5 pts

How many days can cooked leftovers be kept in the refrigerator, and how hot should they be reheated?

10. 5 pts

What did Jesus tell His disciples after He fed the five thousand, and what does it teach us about food?

ANSWER KEY

1. In Thomas Farriner's bakery on Pudding Lane in London. Sparks or coals from his oven were still alive at night and started a fire that spread through the wooden houses.
2. Heat, fuel and oxygen.
3. The water turns to steam instantly and throws burning oil everywhere, making the fire bigger. Turn off the burner and slide a lid over the pan (or use baking soda). If the fire grows, get out and call 911.
4. Fingertips curl under and the knuckles are in front. The side of the knife can touch the knuckles, but it cannot reach the fingertips.
5. The damp towel keeps the board from sliding. Cutting a round food in half gives it a flat side so it cannot roll.
6. Clean (wash hands for 20 seconds), Separate (keep raw meat away from ready-to-eat food), Cook (cook chicken to 165 °F), Chill (refrigerate perishable food within 2 hours).
7. The danger zone is 40 °F to 140 °F. A refrigerator should be at or below 40 °F and a freezer at 0 °F.
8. No. The middle stays warm in the danger zone for a long time. Divide the soup into shallow containers so it cools quickly.
9. Three to four days, and reheated to 165 °F (steaming hot).
10. "Gather up the fragments that remain, that nothing be lost." Food is a gift, and we should not waste it.

UNIT CHALLENGE: OUR FAMILY KITCHEN SAFETY CHECK

Lead your family in a kitchen safety check. Use a checklist you make yourself with at least eight items, such as: handles turned in, towels away from the stove, a lid near the skillet, baking soda by the stove, the smoke alarm tested by an adult, the refrigerator at or below 40 °F, raw meat on the bottom shelf, leftovers labeled and dated.

Fix anything you can with an adult's help. Then make a hand-washing poster for the kitchen sink, and show your family the fire plan you made in Lesson 1.1. Take a photo of the poster and your finished checklist.

LOOK FOR	WHAT IT MEANS
Checklist	At least eight clear items covering fire safety and food safety (Clean, Separate, Cook, Chill).
Thermometer readings	Refrigerator and freezer temperatures recorded honestly, with a note on whether they are safe.
Fixes made	At least two problems found and fixed with an adult, or a note that everything was already safe.
Poster and fire plan	A neat hand-washing poster hung by the sink and a fire plan with two ways out and a meeting place.
Effort and care	Worked carefully, explained the rules to the family, and cleaned up afterward.

1.1 THE GREAT FIRE OF LONDON BEGAN IN A BAKERY

OBJECTIVES

- Tell how the Great Fire of London started in Thomas Farriner's bakery in 1666 and what London learned from it.
- Explain the fire triangle and why a pan fire gets a lid or baking soda, never water.
- Make a family kitchen fire plan, then cook cheese quesadillas at the stove with an adult beside you.

Warm-up. Walk around your kitchen with an adult. Point to everything that can get hot (stove, oven, toaster, microwave, kettle). Then point to everything near them that could burn (towels, paper, oven mitts, a cereal box). Is anything that can burn sitting too close to something hot? Move it together.

WATCH

The Great Fire of London for kids - Simple facts and fun quiz

Learning with Lisa · 6:07

<https://www.youtube.com/watch?v=ONaDxIL2h0c>

WHEN TO WATCH

After you read the story. Answer the quiz questions at the end out loud before Lisa gives the answers.

Note: A simple cartoon retelling of the fire made for young children. It shows the fire spreading through wooden houses but nothing frightening.

BACKUP VIDEO

Kitchen Grease Fire Safety

PBC Fire Rescue · 2:12

<https://www.youtube.com/watch?v=PoGkFxtV9Uw>

Before the fire drill in Session 2. A firefighter shows what happens when water is thrown on a grease fire, and how a lid puts it out.

KEY TERMS

fire triangle

The three things every fire needs: heat, fuel (something to burn) and oxygen (from the air). Take away one and the fire goes out.

smother

To put out a fire by covering it so it cannot get any air.

grease fire

A fire in hot oil or fat in a pan. Water makes it splash and spread, so it is smothered with a lid or baking soda instead.

fire plan

A family plan for what to do if there is a fire: how to get out, where to meet outside and who calls 911.

CORE IDEAS

The story. Very early on Sunday morning, September 2, 1666, a fire started in the bakery of Thomas Farriner on Pudding Lane in London, England. Farriner baked bread for the king's navy. He later said he had checked his oven the night before, but sparks or hot coals were still alive. The houses on Pudding Lane were built of wood, pressed close together, and the summer had been dry. A strong east wind blew the flames from roof to roof. The fire burned for four days. It destroyed about 13,000 houses, 87 churches and the great old St Paul's Cathedral.

How they figured it out. People fought the fire with leather buckets of water and long hooks for pulling down burning roofs, but the fire was too big. A man named Samuel Pepys wrote everything he saw in his diary; he even buried his precious Parmesan cheese in his garden to keep it safe! At last the wind dropped, and people stopped the fire by pulling down and blowing apart houses to make empty gaps that the flames could not jump. Afterward, Londoners rebuilt with **brick and stone** instead of wood, made the streets wider, and started some of the first fire insurance companies and fire brigades. Sir Christopher Wren designed a new St Paul's Cathedral and a tall column called the Monument, which still stands near Pudding Lane.

The kitchen science. Every fire needs three things: **heat, fuel and oxygen**. This is the **fire triangle**. Take away any one side and the fire goes out. Most kitchen fires start when a pan of food is left alone on the stove, or when something that burns (a towel, a paper bag) is too close to the heat. If oil in a pan catches fire, an adult turns off the burner and slides a lid over the pan. The lid takes away the oxygen. Baking soda also smothers a small grease fire. **Never use water:** water sinks under the hot oil, turns to

steam in a flash, and throws burning oil everywhere. If a fire grows bigger than a pan, everyone gets out of the house and calls 911 from outside.

Let's cook. First you and your family will make a **kitchen fire plan**. Then you will cook cheese quesadillas in a skillet on the stove. This is a third-grade job: **an adult stands right beside you the whole time**. The skill to do well is the **careful flip**: slide a wide spatula all the way under the quesadilla, lift it a little, and turn it over close to the pan, with the pan handle turned in and your other hand well away from the heat.

PICTURE STUDY



The Great Fire of London, Unknown artist, about 1675 · Oil on canvas · London Museum, London

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

This painting was made a few years after the fire by an artist who wanted to show how huge it was. We are looking along the River Thames at the burning city, with the Tower of London on the right and Old London Bridge on the left. Notice how the flames light up the whole sky. All of this began with one baker's oven.

Look closely

- Find the river and the crowds on the shore. Why do you think people carried their belongings down to the water and the boats?
- Look at the church towers and the long line of buildings. Which way do you think the wind is blowing the flames and smoke?
- Find the brightest part of the fire. What do you think the houses there were built of?
- Look at the sky. How can you tell this is happening at night?

Talk about it

1. The fire started in a bakery oven. What are two things the baker could have done to make his oven safer at night?
2. After the fire, London was rebuilt with brick and stone and wider streets. How would those changes help stop the next fire?

3. What is one thing in your own kitchen that you will now keep away from the stove?

Safety first. A parent or responsible adult supervises all cooking in this course, and stands right beside you at the stove. Before cooking, your family should check every recipe against your own food allergies. Turn pot and pan handles in, keep towels and paper away from the burner, never leave a pan alone on the stove, and remember: a grease fire gets a lid, never water.

Our Family Fire Plan and Cheese Quesadillas

Before you cook, you will make a simple fire plan with your family and practice what to do. Then you will cook golden cheese quesadillas in a skillet, with an adult beside you, and practice the careful flip.

You will need

- Paper and colored pencils for the fire plan
- A large skillet with a lid that fits it
- A wide, thin spatula
- Measuring cups
- A cutting board and a pizza wheel or knife (for the adult)
- A plate and oven mitts
- A box of baking soda (to find and keep by the stove)

GOLDEN CHEESE QUESADILLAS

Serves 4 (8 wedges each) · Prep 10 min · Cook about 4 min each

Ingredients

- 8 flour tortillas (8-inch)
- 2 cups (8 ounces) grated cheese, such as cheddar or Monterey Jack
- 1 cup canned black beans, rinsed and drained (optional)
- 1 teaspoon butter or vegetable oil for the pan
- Salsa, plain yogurt or sour cream for dipping (optional)

Method

1. Wash your hands. Lay 4 tortillas on a clean counter. Sprinkle each with $\frac{1}{2}$ cup cheese and a spoonful of beans, leaving a little space at the edge. Top each with a second tortilla and press down gently.
2. With an adult beside you, set the skillet on the burner and turn the handle in so it does not stick out. The adult turns the burner to medium.
3. Add a little butter or oil and spread it thin with the spatula. Slide one quesadilla into the pan.

4. Cook 2 to 3 minutes, until the bottom is golden brown. Peek by lifting one edge with the spatula.
5. The careful flip: slide the spatula all the way under, hold the top with the flat of the spatula if you need to, and turn it over close to the pan. Cook 1 to 2 minutes more, until the cheese melts.
6. Slide the quesadilla onto the cutting board. Let it rest 1 minute (melted cheese is very hot). The adult cuts it into wedges.
7. Repeat with the rest. When you are done, the adult turns off the burner. Let the pan cool on the back burner before washing.

Allergy check: Contains milk and wheat. For a milk-free version, use a dairy-free grated cheese; for wheat-free, use corn tortillas (they are smaller, so use more).

Steps

1. **Fire plan.** With your family, draw a map of your home. Mark two ways out of the kitchen and a meeting place outside (a tree, a mailbox). Write “Get out, stay out, call 911” at the top.
2. **Find the tools.** Find the lid that fits your skillet, the box of baking soda and the smoke alarm nearest the kitchen. If your family has a fire extinguisher, have the adult show you where it is and read its label together. Watch while the adult presses the smoke alarm’s test button.
3. **Practice.** With the stove *off* and the pan cold, practice what the adult would do in a pan fire: turn off the burner, slide the lid on from the side, and leave it on. Say the rule out loud: “Never water on a grease fire.”
4. Cook the quesadillas as the recipe says, with an adult beside you.
5. **Watch and record.** For one quesadilla, write how many minutes it took to turn golden on the first side and on the second side. Which side took longer? Why do you think so?
6. **Taste test.** Rate your quesadillas from 1 to 5 for crispness and meltiness. Ask your family to rate them too.
7. **Improve it.** Plan one change for next time: a little less heat, a different cheese, or adding beans or chopped peppers.
8. **Clean up:** when the pan is cool, wash it, wipe the stove top and counters, and put everything away.

Tips

- Medium heat is your friend. Too hot and the tortilla burns before the cheese melts.
- If a quesadilla is hard to flip, make smaller ones by folding one tortilla in half over the cheese.
- Keep a plate right next to the stove so you never have to carry hot food far.

Check your work

- ☐ I can tell how the Great Fire of London started and name the three parts of the fire triangle.
- ☐ I can explain why a grease fire gets a lid and never water.
- ☐ I helped make a family fire plan and cooked quesadillas safely with an adult beside me.

COOK'S NOTEBOOK

1. Draw the fire triangle. Write *heat*, *fuel* and *oxygen* on its sides, and draw what takes away each side (a lid, turning off the burner, moving the towel away).
2. Copy your family fire plan map into your notebook, with the meeting place marked.
3. Copy the quesadilla recipe in your own words, draw a golden quesadilla, and write your family's ratings and one change for next time.

From history. The Monument to the Great Fire of London is 202 feet tall, and it stands 202 feet from the place on Pudding Lane where the fire began. Visitors can still climb its 311 steps. Bakers in London today sometimes remember the fire, and in 2016, 350 years later, the bakers' company of London made a public apology for Thomas Farriner's oven, all in good fun.

COMMON MISTAKES

- Throwing water on a pan of burning oil. It makes the fire explode outward; use a lid or baking soda and turn off the heat.
- Leaving a pan alone on the stove "just for a minute." Most kitchen fires start this way.
- Letting a pan handle stick out over the edge of the stove, where someone can bump it.
- Keeping dish towels, paper towels or oven mitts right next to the burner.

Make it a game • Grease Fire Rescue. Your grown-up calls out a kitchen emergency, like a pan fire on the stove. You have five seconds to shout the right steps: turn off the heat, slide on a lid or pour baking soda, never water, and get an adult. Score a point per correct step. Then race a timer to your family fire exit and meeting spot.

1.2 YOUR FIRST KNIFE GRIP: THE CLAW

OBJECTIVES

- Name the parts of a small kitchen knife and explain why a sharp, steady knife is safer than a dull, wobbly one.
- Use the claw grip and the bridge grip on soft vegetables, with an adult right beside you, on a board that does not slide.
- Make a cucumber and tomato salad with a simple lemon dressing.

Warm-up. Make a “claw” with the hand you do not write with: curl your fingertips under, so your knuckles stick out in front and your thumb tucks behind your fingers. Now walk your claw slowly across the table like a little crab. Where are your fingertips? Why do you think a cook holds food this way?

WATCH

Knife Skills 101: Chef Ann Butler Teaches Kids to Properly Use a Knife

[InkandescentTV](https://www.youtube.com/watch?v=NS372AyUGwQ) · 4:11

<https://www.youtube.com/watch?v=NS372AyUGwQ>

WHEN TO WATCH

Before Session 2. Watch once all the way through, then again with your hands copying the grips (no knife yet).

Note: Chef Ann Butler of Edible Education teaches two children the claw and bridge grips. The children use plastic knives; in this lesson the student uses a small serrated knife with an adult right beside.

BACKUP VIDEO

Knife Skills - Bridge and Claw method

[Royal Academy of Culinary Arts' Adopt a School](https://www.youtube.com/watch?v=MmYadhbZ7bA) · 3:30

<https://www.youtube.com/watch?v=MmYadhbZ7bA>

A close-up look at the hands. Watch how the chef’s knuckles guide the blade and how the bridge holds a round tomato steady.

KEY TERMS

claw grip

Holding food with your fingertips curled under and your knuckles in front, so the side of the knife rests against your knuckles, not your fingertips.

bridge grip

Making an arch over the food with your thumb on one side and fingers on the other, then cutting under the arch, between them.

serrated

Having a wavy or saw-toothed edge. A small serrated knife grips slippery skins like tomatoes.

flat side down

Cutting round food in half first so it lies flat and cannot roll.

CORE IDEAS

The story. People have cut food with knives since the very beginning. But many of the knives in your kitchen drawer are newer than you might think. In 1919 Joseph E. Burns of Syracuse, New York, received a patent for a knife with a wavy, scalloped edge for slicing soft bread without squashing it. Small serrated knives like it are good for young cooks, because their little teeth grip the slippery skin of a tomato instead of sliding off.

How cooks figured it out. Cooks in busy kitchens cut thousands of vegetables a day. Over the years they learned two grips that keep their fingers safe even when they work quickly. In the **claw**, the hand holding the food curls its fingertips under, so the knuckles are in front. The flat side of the blade can touch your knuckles, but it cannot reach your fingertips. In the **bridge**, your hand makes an arch over the food, and the knife cuts under the arch. Cooks also learned to cut a round food in half first and lay it **flat side down**, so it cannot roll away.

The kitchen science. A knife works by pressing a very thin edge into the food. A sharp edge slides in with only a little push. A dull knife needs a hard push, and hard pushing makes knives slip. That is why cooks say a sharp knife used carefully is safer than a dull one. A cutting board that slides around is dangerous too. A damp towel or a damp paper towel underneath grips the counter and holds the board still.

Let's cook. You will make a crunchy cucumber and tomato salad. You will use a small serrated knife or paring knife, **with an adult right beside you**, on a board with a

damp towel underneath. The skill to do well is the claw: **fingertips tucked, knuckles in front, slow and steady cuts.** Speed comes later. Today, careful is the goal.

PICTURE STUDY



A Woman Peeling Apples, Pieter de Hooch, about 1663 · Oil on canvas · The Wallace Collection, London

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

Pieter de Hooch painted quiet Dutch homes full of light. Here a mother peels apples with a small knife while her little girl watches and reaches for the peel. Look closely at how the knife is held.

Look closely

- Find the knife. Is the mother cutting toward her body or away? How is she keeping her fingers safe?
- Find the long curl of apple peel. How careful do you have to be to peel an apple in one long piece?
- Look at the little girl. How close is she standing? What is her job?
- Find the basket on her lap and the dish on the floor. Where do the peeled apples go?

Talk about it

1. This little girl is learning by watching first. What did you watch an adult do before you used a knife yourself?
2. Why is it safer to sit or stand still and work slowly with a knife than to hurry?
3. What do you think the mother will make with the apples?

Safety first. Use a knife only with an adult right beside you. Put a damp towel under the cutting board, cut on the board (never in your hand), keep your fingertips curled in the claw, and set the knife down flat, away from the counter edge, when you are not using it. Never try to catch a falling knife: step back and let it fall.

KITCHEN PROJECT

Claw and Bridge: Cucumber and Tomato Salad

You will practice the claw and the bridge on soft, easy vegetables, then toss them with a simple lemon dressing. You will also test why a board needs a damp towel underneath.

You will need

- A small serrated knife or paring knife
- A cutting board and a damp kitchen towel or damp paper towel
- A vegetable peeler (optional)
- A large bowl and a small jar with a lid
- Measuring spoons
- A colander for washing the vegetables

CRUNCHY CUCUMBER AND TOMATO SALAD

Serves 4–6 as a side dish • Prep 25 min

Ingredients

- 2 medium cucumbers (or 1 long English cucumber)
- 2 cups cherry or grape tomatoes
- $\frac{1}{4}$ small red onion (the adult slices it thin) or 2 green onions (optional)
- **Dressing:** 3 tablespoons olive oil
- 2 tablespoons lemon juice (about 1 lemon)
- $\frac{1}{2}$ teaspoon salt and a pinch of black pepper
- 1 teaspoon dried dill or 1 tablespoon chopped fresh parsley

Method

1. Wash your hands. Rinse the cucumbers and tomatoes under cool running water and pat them dry.
2. Set up your station: a damp towel flat on the counter, the board on top, the knife beside the board with its blade pointing away from you.

3. With an adult right beside you, cut each cucumber in half the long way with the bridge grip. Lay each half *flat side down* so it cannot roll.
4. Now use the claw: fingertips tucked, knuckles in front. Slice the cucumber halves into half-moons about as thick as a coin, moving your claw back a little after each cut.
5. Cut each cherry tomato in half using a small bridge (or hold it with the claw flat on the board). Go slowly; tomatoes are slippery.
6. Put the cucumbers and tomatoes in the bowl. The adult slices the onion thin, if you are using it.
7. Put all the dressing ingredients in the jar, close the lid tight and shake hard for 15 seconds. Pour over the salad and toss gently. Serve right away or chill up to 2 hours.
8. Clean up: wash the knife by itself, blade away from you (never drop it in a sink full of soapy water), and dry and put it away. Wash the board and bowl.

Allergy check: Contains none of the nine major allergens.

Steps

1. **Board test.** Before you cut, put the board on the bare counter and give it a gentle push. Now put a damp towel under it and push again. Write what happened each time.
2. **Practice without a knife.** Show the adult your claw and your bridge on a cucumber, with no knife in your hand. Then show them again with the knife.
3. Make the salad as the recipe says, with the adult right beside you.
4. **Count and measure.** Count how many cucumber slices you cut. Lay five of them in a row and see if they are all about the same thickness. Even slices look nice and taste the same in every bite.
5. **Taste test.** Taste a slice of plain cucumber, then a slice with dressing. What did the lemon and salt change? Rate the salad from 1 to 5.
6. **Improve it.** Plan one change for next time: thinner slices, a different herb, or adding a soft cheese such as mozzarella pearls.
7. Clean up: wash, dry and put everything away, and wipe the counter.

Tips

- Hold the knife handle with your whole hand, not with a finger on top of the blade.
- If the food starts to slide, stop, set the knife down, and fix your grip.
- Going slowly is not a mistake. Even chefs started slowly.

Check your work

- ☐ I can show the claw grip and the bridge grip and explain how each one keeps my fingers safe.
- ☐ I can explain why the board needs a damp towel underneath and why round food should be cut flat side down.
- ☐ I cut a salad safely with an adult beside me and cleaned the knife safely.

COOK'S NOTEBOOK

1. Trace your hand in the claw position and label the fingertips (tucked) and the knuckles (in front).
2. Draw the bridge grip over half a tomato and draw an arrow where the knife goes.
3. Write the results of your board test and copy the salad recipe in your own words.

From history. Long ago, most families did not own many knives. A farmer or cook might carry one good knife for everything, from cutting bread to peeling apples, and kept it clean, dry and sharp. A knife was a tool to be cared for, just as yours should be.

COMMON MISTAKES

- Holding food with flat fingers. The fingertips stick out where the knife can reach them.
- Cutting round food without making a flat side first, so it rolls.
- Putting a knife in a sink full of soapy water, where someone could reach in and get cut.
- Trying to catch a falling knife. Always step back.

Make it a game • Claw and Bridge Drill. No knives for this game. Your grown-up calls claw or bridge, and you shape your hand to match: fingertips curled under with knuckles forward for the claw, a flat bridge over a potato or ball for the bridge. Hold for ten seconds. Then draw a knife from memory and label the blade, tip, spine and handle.

1.3 CLEAN, SEPARATE, COOK, CHILL

OBJECTIVES

- Name the four steps to food safety (Clean, Separate, Cook, Chill) and give an example of each.
- Use a thermometer to check that the refrigerator is at or below 40 °F, and explain the danger zone of 40–140 °F.
- Make turkey and cheese pinwheels with clean hands and a clean board, and chill them safely.

Warm-up. Open the refrigerator with an adult and look for three things: Where is the raw meat kept? Where are the ready-to-eat foods, like cheese and fruit? Is anything leaking or sitting where its juices could drip onto other food? Close the door quickly so the cold stays in.

WATCH

Smart Kids Fight Bac!

BACFighter · 16:02

https://www.youtube.com/watch?v=_jr9VD-zSb4

WHEN TO WATCH

After the story paragraph. It is long, so you may watch it in two parts: Clean and Separate first, then Cook and Chill.

Note: From the Partnership for Food Safety Education, the group that created the Fight BAC! campaign. A cartoon school play teaches the four steps. It begins with a class getting sick after a picnic, told without detail.

BACKUP VIDEO

Food Safety - Cooling, Storing and Using Leftovers

Springfield-Greene County Health Department · 2:10

<https://www.youtube.com/watch?v=0EErECU8PXU>

A short look at the Chill step: how a health inspector cools food quickly (also used in Lesson 1.4).

KEY TERMS

bacteria

Living things too small to see. Most are harmless, but a few kinds in food can make people sick.

cross-contamination

Spreading germs from one food or surface to another, such as raw chicken juice dripping onto lettuce.

danger zone

The temperatures between 40 °F and 140 °F, where bacteria grow fastest.

perishable

Food that spoils quickly unless it is kept cold, such as meat, milk, cheese, eggs and cooked leftovers.

CORE IDEAS

The story. In 1997 a group of food scientists, farmers, grocers and government food-safety workers, including people from the USDA, the FDA and the CDC, wanted to teach families four simple steps to keep food safe. They formed the Partnership for Food Safety Education. To make the lesson stick, they invented a cartoon villain: a green, grumpy germ named **BAC** (short for bacteria). Their campaign was called *Fight BAC!*, and its four steps have been taught in schools and kitchens ever since.

How they figured it out. Scientists studied how people get sick from food. They found that most problems came from just a few mistakes: hands or boards not washed, raw meat juices touching foods that would not be cooked, meat not cooked hot enough, and food left out too long. So they made one step to fix each mistake. **Clean:** wash hands and surfaces often. **Separate:** keep raw meat, poultry, seafood and eggs away from ready-to-eat food. **Cook:** cook food to a safe temperature, checked with a food thermometer. **Chill:** refrigerate food promptly.

The kitchen science. Bacteria grow by splitting in two, then two become four, four become eight, and on and on. In warm food they can double about every 20 minutes. They grow fastest in the **danger zone**, between 40 °F and 140 °F. Cold slows them down, so a refrigerator should be at **40 °F or below** and a freezer at **0 °F**. Heat kills them, which is why cooks check meat with a thermometer: chicken and turkey are safe at 165 °F. Perishable food should go back into the refrigerator within **2 hours** (or 1 hour on a day hotter than 90 °F).

Let's cook. You will make turkey and cheese pinwheels, rolled up in tortillas and chilled. There is no stove today, so your focus is on **Clean** and **Chill**: clean hands, a

clean board and quick trips back to the refrigerator. The knife skill is slicing a soft roll with the claw grip, with an adult right beside you.

PICTURE STUDY



Kitchen Utensils with Leeks, Fish, and Eggs, Jean-Siméon Chardin, about 1730 · Oil on canvas ·
Cleveland Museum of Art, Cleveland, Ohio
Image: [Wikimedia Commons](#), public domain

Jean-Siméon Chardin loved to paint ordinary kitchen things: pots, jugs, eggs and vegetables. He painted them so carefully that they look solid enough to pick up. This little picture shows raw foods waiting to be cooked.

Look closely

- Find the eggs and the fish. Are they raw or cooked? How can you tell?
- Find the leeks. Would you eat leeks raw, or cook them first?
- Look at how close the foods are to each other on the shelf. What would a Fight BAC! cook move apart?
- Find the copper pot, the little pan and the mortar (a stone cup for grinding). Which one do you think would be used to cook the fish?

Talk about it

1. This kitchen had no refrigerator. How do you think the cook kept the fish and eggs fresh?
2. If the fish were laid on a cutting board, what would you do to that board before cutting bread on it?

3. Which of the four steps (Clean, Separate, Cook, Chill) do you think is the most important for the food in this picture? Why?

Safety first. Wash your hands for 20 seconds before you start and after touching deli meat. Keep the turkey and cheese in the refrigerator until you need them and put the pinwheels back within 2 hours. Use the knife only with an adult right beside you, with the claw grip on a board that cannot slide.

KITCHEN PROJECT

Fight BAC! Turkey and Cheese Pinwheels

You will check your refrigerator with a thermometer, make a Clean-Separate-Cook-Chill chart, and roll up turkey and cheese pinwheels, keeping everything clean and cold.

You will need

- A refrigerator thermometer or an instant-read thermometer
- A clean cutting board and a damp towel to put under it
- A small serrated knife
- A butter knife or small spatula for spreading
- Plastic wrap
- A timer
- A plate or container with a lid

TURKEY AND CHEESE PINWHEELS

Serves 4–6 (about 24 pinwheels) · Prep 20 min · Chill 30 min

Ingredients

- 4 large flour tortillas (10-inch)
- 4 ounces cream cheese, softened at room temperature for 20 minutes
- 8 ounces thinly sliced deli turkey
- 4 slices cheese, such as cheddar or Swiss
- 1 cup baby spinach leaves or 4 lettuce leaves
- ½ cup grated carrot (optional)

Method

1. Wash your hands for 20 seconds. Wipe the counter clean. Take the turkey and cheese out of the refrigerator only when you are ready to use them.
2. Lay a tortilla flat. Spread about 2 tablespoons of cream cheese all over it, right to the edges (the cream cheese is the glue).

3. Lay a single layer of turkey over the cream cheese, then a slice of cheese, a few spinach leaves and a sprinkle of carrot. Leave a 1-inch strip bare at the far edge.
4. Roll the tortilla up tightly, starting at the edge nearest you. The bare strip seals the roll. Wrap it in plastic wrap. Make the other three.
5. Put the turkey and cheese back in the refrigerator right away. Chill the wrapped rolls for 30 minutes so they firm up and slice neatly.
6. With an adult right beside you, unwrap a roll, trim off the uneven ends, then use the claw grip to slice it into 1-inch pinwheels with a gentle sawing motion.
7. Serve right away, or cover and refrigerate. Eat within 2 hours if they sit out. Leftovers keep in the refrigerator for 1 day.
8. Clean up: wash the board, knife and counter with hot, soapy water, and wash your hands again.

Allergy check: Contains wheat and milk. For wheat-free, use gluten-free wraps; for milk-free, use a dairy-free cream cheese and leave out the cheese slice, or use hummus (contains sesame) as the glue.

Steps

1. **Fridge check.** Put a thermometer in a glass of water in the middle of the refrigerator for an hour (or use a fridge thermometer). Read it. Is it at or below 40 °F? Check the freezer too: it should be 0 °F.
2. **Four-step chart.** Fold a page into four boxes labeled Clean, Separate, Cook, Chill. In each box draw one thing your family does to keep food safe.
3. **Glitter-germ test.** Rub a pinch of glitter (or a little cinnamon) on your hands like germs. Wipe them on a towel. Then wash for only 5 seconds. Look. Wash again for 20 seconds with soap, singing the doxology or the Happy Birthday song twice. Look again. What did you learn?
4. Make the pinwheels as the recipe says.
5. **Two-hour timer.** Set a timer for 2 hours when the pinwheels come out. When it rings, any that are still out go back in the refrigerator.
6. **Taste test and improve it.** Rate the pinwheels from 1 to 5. Plan one change: a different filling, thinner layers, or a vegetable cream cheese.
7. Clean up: wash, dry and put everything away, and wipe the counter.

Tips

- Softened cream cheese spreads easily and does not tear the tortilla.
- A tight roll makes neat pinwheels. Tuck the first turn in firmly with your fingers.
- Deli meat is ready to eat, but it is still perishable. Keep it cold.

Check your work

- ☐ I can name the four steps to food safety and give an example of each.
- ☐ I can explain the danger zone and the two-hour rule.
- ☐ I checked our refrigerator's temperature and made pinwheels with clean hands, a clean board and quick chilling.

COOK'S NOTEBOOK

1. Draw your own Fight BAC! poster with the four steps and a picture for each.
2. Draw a thermometer and color the danger zone (40–140 °F) red. Mark 0 °F (freezer), 40 °F (refrigerator) and 165 °F (cooked chicken).
3. Write your refrigerator and freezer readings and copy the pinwheel recipe in your own words.

From history. The refrigerator thermometer is a newer kitchen tool. Before refrigerators, families kept food cool in springhouses over cold streams, in cellars, or in iceboxes filled with blocks of ice. They could not check the exact temperature, so they ate fresh meat and milk quickly or preserved them by salting, drying and smoking.

COMMON MISTAKES

- Washing hands for only a few seconds without soap. It takes 20 seconds of scrubbing to get hands really clean.
- Leaving deli meat, cheese or leftovers on the counter for the whole afternoon.
- Using the same board for raw chicken and then for bread or vegetables without washing it in hot, soapy water.
- Thinking food is safe because it smells fine. Harmful bacteria usually cannot be seen, smelled or tasted.

Make it a game • Fight BAC Four Corners. Label the four corners of a room: Clean, Separate, Cook, Chill. Your grown-up calls a kitchen action, like washing hands, using a different board for raw chicken, or putting leftovers away. Race to the right corner. Score a point for each correct one. Then say why 40 to 140 degrees is the danger zone.

1.4 LEFTOVERS AND THE TWO-HOUR RULE

OBJECTIVES

- Explain how to cool and store leftovers safely: within 2 hours, in shallow containers, eaten within 3–4 days, and reheated to 165 °F.
- Tell why Jesus asked His disciples to gather up the leftover pieces, and why wasting less food is good stewardship.
- Cook fried rice from leftover rice at the stove with an adult beside you.

Warm-up. Look in your refrigerator with an adult for any leftovers. For each one, ask: When was it cooked? Is it in a covered container? Is it labeled? Make a guess: how many days do you think cooked leftovers can safely stay in the refrigerator? (You will find out today.)

WATCH

Food Safety - Cooling, Storing and Using Leftovers

Springfield-Greene County Health Department · 2:10

<https://www.youtube.com/watch?v=0EErECU8PXU>

WHEN TO WATCH

After the kitchen-science paragraph. Watch how the health inspector cools the pot of chili in an ice bath before it goes into the refrigerator.

Note: From a county health department in Missouri. Short and practical.

KEY TERMS

leftovers

Cooked food saved to eat at another meal.

two-hour rule

Perishable food should go into the refrigerator within 2 hours of cooking or serving (1 hour if it is hotter than 90 °F).

shallow container

A container about 2 inches deep or less, so food cools quickly all the way through.

reheat

To heat cooked food again until it is steaming hot, 165 °F.

CORE IDEAS

The story. One day near the Sea of Galilee, a great crowd of about five thousand men, besides women and children, had followed Jesus far from town, and they were hungry. A boy had five barley loaves and two small fishes. Jesus gave thanks and fed the whole crowd, and everyone ate until they were full. Then He told His disciples, “Gather up the fragments that remain, that nothing be lost” (John 6:12). They filled twelve baskets with the pieces left over. Even after a miracle, Jesus did not want good food wasted.

How cooks figured it out. Cooks all over the world have found clever ways to use leftovers. In China, cooks have long stir-fried yesterday’s rice with eggs and vegetables to make fried rice; one famous kind is named for the city of Yangzhou. Cooks discovered that **cold, day-old rice** makes better fried rice than fresh rice. Fresh rice is soft and wet and clumps into mush. Rice that has rested in the refrigerator has dried a little on the outside, so each grain stays separate and gets lightly toasted in the pan.

The kitchen science. Leftovers need to cool down quickly, because bacteria grow fastest in the danger zone between 40 °F and 140 °F. A big, deep pot of hot food can stay warm in the middle for hours, even in the refrigerator. So cooks divide leftovers into **shallow containers**, cover them, and put them in the refrigerator within **2 hours**. Cooked rice especially should be chilled quickly. Eat leftovers within **3 to 4 days**, and reheat them until they are steaming hot, **165 °F** on a food thermometer. When in doubt, throw it out.

Let’s cook. You will cook vegetable fried rice from rice made the day before. **An adult stands beside you at the stove the whole time.** The skill to do well is **stirring and tossing in a hot pan** with a thin film of oil, keeping your hand on the handle and your arm out of the steam. You will cook the eggs until they are firm, with no runny parts.

PICTURE STUDY



The Miracle of the Loaves and Fishes, James Tissot, 1886–1894 · Opaque watercolor over graphite on paper · Brooklyn Museum, New York

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

James Tissot traveled to the Holy Land to see the real hills and valleys before he painted hundreds of pictures of the life of Jesus. Here the great crowd sits in rows on a rocky hillside, just as the Gospels say they sat down on the grass in groups.

Look closely

- Look at how the people are seated. Why would it help to have a big crowd sit down in rows before passing out food?
- Find people passing or carrying food. How is the bread getting from person to person?
- Look at the hills and rocks. Is this near a town or far from one? Why would that make the people hungry?
- Look for anyone carrying a basket. What might the baskets be used for at the end of the meal?

Talk about it

1. Why do you think Jesus told the disciples to gather up the leftover pieces?
2. What are some ways your family uses leftovers so that nothing is lost?

3. How is putting leftovers away safely a way of taking care of the food God gives us?

Safety first. An adult stands beside you at the stove the whole time. Use only a thin film of oil, keep the pan handle turned in, stir with a long spoon or spatula, and keep your face and arms out of the steam. Cook the eggs until firm, reheat the rice until it is steaming hot (165 °F), and refrigerate leftovers within 2 hours.

KITCHEN PROJECT

Yesterday's Rice, Today's Fried Rice

You will compare fresh rice and day-old rice, cook a skillet of vegetable fried rice with an adult beside you, check its temperature, and pack the leftovers safely.

You will need

- A large skillet or wok
- A wooden spoon or heat-proof spatula
- A small bowl and a fork for beating eggs
- Measuring cups and spoons
- A small serrated knife, a cutting board and a damp towel (for the green onions)
- An instant-read thermometer
- Shallow containers with lids, masking tape and a marker for labels

VEGETABLE AND EGG FRIED RICE

Serves 4 · Prep 15 min · Cook 10 min (rice cooked and chilled the day before)

Ingredients

- 3 cups cold cooked rice (made the day before and refrigerated within 2 hours)
- 2 tablespoons vegetable oil, divided
- 2 large eggs
- 1 cup frozen peas and carrots
- 3 green onions
- 2 tablespoons low-sodium soy sauce
- 1 teaspoon toasted sesame oil (optional)

Method

1. Wash your hands. Break up any big clumps of cold rice with clean fingers. Crack the eggs into a small bowl and beat them with a fork. Wash your hands again.

2. With an adult beside you, slice the green onions into thin rings with the claw grip.
3. With the adult beside you, heat 1 tablespoon oil in the skillet over medium heat. Pour in the eggs. Stir gently until they are cooked firm, with no runny parts, about 2 minutes. Spoon them onto a plate.
4. Add the other tablespoon of oil and the peas and carrots. Stir for 2 minutes.
5. Add the rice. Spread it out and let it sit for 1 minute so it toasts a little, then stir and toss. Do this 3 or 4 times, about 4 minutes in all, until the rice is hot all the way through.
6. Add the soy sauce, the eggs and most of the green onions. Stir to mix. The adult checks the temperature in the middle: it should be 165 °F.
7. The adult turns off the burner. Stir in the sesame oil and sprinkle with the rest of the green onions. Serve hot.
8. Put leftovers into a shallow container, label it with the date, and refrigerate within 2 hours. Eat within 3 to 4 days.

Allergy check: Contains eggs, soybeans (soy sauce) and wheat (most soy sauce). Sesame oil contains sesame. For wheat-free, use a gluten-free tamari; for soy-free, use coconut aminos; leave out the sesame oil if needed; for egg-free, add diced cooked chicken or tofu (soy) instead.

Steps

1. **Rice test.** If you can, cook a little fresh rice too. Squeeze a spoonful of fresh warm rice and a spoonful of cold day-old rice. Which one sticks together? Which one falls into separate grains? Predict which will make better fried rice.
2. Cook the fried rice as the recipe says, with an adult beside you.
3. **Thermometer check.** Write the temperature the adult read in the middle of the rice. Was it 165 °F or more?
4. **Leftover label.** Make a label for your leftovers: what it is, the date, and “eat by” (3 days later). Put it on the container.
5. **Taste test.** Rate the fried rice from 1 to 5. Ask each family member which part they liked best.

6. **Improve it.** Plan one change: a different vegetable, adding leftover chicken, or using a little less soy sauce.
7. Clean up: when the pan is cool, wash it, wipe the stove and counters, and put everything away.

Tips

- Have every ingredient measured and ready before the pan gets hot. Fried rice cooks fast.
- If the rice starts to stick, turn the heat down a little rather than adding lots of oil.
- Rice cooked for dinner tonight can become fried rice tomorrow. Cool it in a shallow container.

Check your work

- ☐ I can explain the two-hour rule and why leftovers go in shallow containers.
- ☐ I can tell how long leftovers keep and how hot to reheat them.
- ☐ I cooked fried rice safely with an adult beside me and stored the leftovers correctly.

COOK'S NOTEBOOK

1. Draw a deep pot and a shallow container of hot soup. Draw arrows to show which one cools faster in the refrigerator, and why.
2. Make a “leftover rules” card: 2 hours, shallow containers, 3–4 days, reheat to 165 °F. Tape it on the refrigerator.
3. Copy the fried rice recipe in your own words and draw your finished bowl.

COMMON MISTAKES

- Putting a whole big pot of hot food into the refrigerator. The middle stays warm too long; divide it into shallow containers.
- Leaving cooked rice out on the stove all afternoon.
- Using freshly cooked, hot rice for fried rice. It turns mushy; day-old rice works best.
- Keeping leftovers “until they look bad.” Many harmful germs do not change how food looks; eat leftovers within 3 to 4 days.

Make it a game • Leftover Number Match. Make eight cards. Write four numbers and four rules: 2 hours, 3-4 days, 165 degrees, and shallow. Match each number to its rule face down, like a memory game. Take turns flipping two cards. The first to collect every pair wins. Then tell why Jesus asked His disciples to gather the leftover pieces.

Scripture. “When they were filled, he said unto his disciples, Gather up the fragments that remain, that nothing be lost.” (John 6:12, KJV)

Jesus had just fed thousands of people, yet He cared about the pieces that were left. Saving leftovers safely and using them well is a small way to follow Him.

UNIT 1

KITCHEN & FOOD SAFETY

A good cook is first of all a safe cook. In this unit you will hear how one baker's oven on a narrow London street started the Great Fire of London in 1666, and you will learn what to do if a pan ever catches fire at home. You will hold a small knife for the first time in this course, with an adult right beside you, and learn the **claw** and the **bridge**, two grips that keep your fingers safe.

Then you will meet BAC, the cartoon germ, and the four steps that beat him: **Clean, Separate, Cook, Chill**. You will learn why perishable food goes back into the refrigerator within two hours, and you will turn yesterday's rice into a pan of fried rice. Jesus told His disciples, "Gather up the fragments that remain, that nothing be lost" (John 6:12). Saving leftovers safely is part of not wasting God's good gifts.

PREREQUISITES

- Can wash hands with soap for 20 seconds
- Can measure with cups and spoons and pour carefully
- Can stand steadily on a sturdy step stool at the counter
- Listens and stops right away when an adult says "Stop"

MASTERY CHECKLIST

- ☐ I can tell how the Great Fire of London started and name three ways to keep a kitchen fire from starting.
- ☐ I can explain why a grease fire gets a lid and never water, and what to do if a fire grows (get out and call 911).
- ☐ I can use the claw and the bridge grips with a small knife, with an adult right beside me, on a board that does not slide.
- ☐ I can name and explain the four steps: Clean, Separate, Cook, Chill.
- ☐ I can explain the two-hour rule and put leftovers away safely in shallow containers.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **FoodSafety.gov: Safe Minimum Internal Temperatures:** Free; search for it at FoodSafety.gov. A printable chart of safe cooking temperatures to tape inside a cupboard door for Lessons 1.3–1.4 and the whole year.
- **Fight BAC! from the Partnership for Food Safety Education:** Free. Kids’ pages, posters and handouts on Clean, Separate, Cook and Chill for Lesson 1.3 and the unit challenge.
- **A small kitchen fire extinguisher and a box of baking soda by the stove:** For the adult. Many families keep both near the kitchen. Read the extinguisher’s label together during the Lesson 1.1 fire drill.
- **A refrigerator thermometer:** Inexpensive. Leave it in the refrigerator to check that it stays at or below 40 °F for Lesson 1.3 and the unit challenge.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

1.1	The Great Fire of London Began in a Bakery	2 sessions of 45–60 minutes
1.2	Your First Knife Grip: The Claw	2 sessions of 45–60 minutes
1.3	Clean, Separate, Cook, Chill	2 sessions of 45–60 minutes
1.4	Leftovers and the Two-Hour Rule	2 sessions of 45–60 minutes

UNIT 1 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

Where and how did the Great Fire of London start in 1666?

2. **5 pts**

Name the three sides of the fire triangle.

3. **5 pts**

Predict: what will happen if someone throws water on a pan of burning oil?
What should be done instead?

4. **5 pts**

Describe the claw grip. How does it keep your fingers safe?

5. **5 pts**

Why do we put a damp towel under the cutting board, and why do we cut round foods in half first?

6. **5 pts**

Name the four steps to food safety and give one example of each.

7. **5 pts**

What temperatures are the danger zone? How cold should a refrigerator and a freezer be?

8. **5 pts**

Predict: a big, deep pot of hot soup goes straight into the refrigerator. Will the middle cool quickly? What is a better way?

9. **5 pts**

How many days can cooked leftovers be kept in the refrigerator, and how hot should they be reheated?

10. **5 pts**

What did Jesus tell His disciples after He fed the five thousand, and what does it teach us about food?

ANSWER KEY

1. In Thomas Farriner's bakery on Pudding Lane in London. Sparks or coals from his oven were still alive at night and started a fire that spread through the wooden houses.
2. Heat, fuel and oxygen.
3. The water turns to steam instantly and throws burning oil everywhere, making the fire bigger. Turn off the burner and slide a lid over the pan (or use baking soda). If the fire grows, get out and call 911.
4. Fingertips curl under and the knuckles are in front. The side of the knife can touch the knuckles, but it cannot reach the fingertips.
5. The damp towel keeps the board from sliding. Cutting a round food in half gives it a flat side so it cannot roll.
6. Clean (wash hands for 20 seconds), Separate (keep raw meat away from ready-to-eat food), Cook (cook chicken to 165 °F), Chill (refrigerate perishable food within 2 hours).
7. The danger zone is 40 °F to 140 °F. A refrigerator should be at or below 40 °F and a freezer at 0 °F.
8. No. The middle stays warm in the danger zone for a long time. Divide the soup into shallow containers so it cools quickly.
9. Three to four days, and reheated to 165 °F (steaming hot).
10. "Gather up the fragments that remain, that nothing be lost." Food is a gift, and we should not waste it.

UNIT CHALLENGE: OUR FAMILY KITCHEN SAFETY CHECK

Lead your family in a kitchen safety check. Use a checklist you make yourself with at least eight items, such as: handles turned in, towels away from the stove, a lid near the skillet, baking soda by the stove, the smoke alarm tested by an adult, the refrigerator at or below 40 °F, raw meat on the bottom shelf, leftovers labeled and dated.

Fix anything you can with an adult's help. Then make a hand-washing poster for the kitchen sink, and show your family the fire plan you made in Lesson 1.1. Take a photo of the poster and your finished checklist.

LOOK FOR	WHAT IT MEANS
Checklist	At least eight clear items covering fire safety and food safety (Clean, Separate, Cook, Chill).
Thermometer readings	Refrigerator and freezer temperatures recorded honestly, with a note on whether they are safe.
Fixes made	At least two problems found and fixed with an adult, or a note that everything was already safe.
Poster and fire plan	A neat hand-washing poster hung by the sink and a fire plan with two ways out and a meeting place.
Effort and care	Worked carefully, explained the rules to the family, and cleaned up afterward.

UNIT 2

FOOD GROUPS & THE BALANCED MEAL

When God made the world, He filled it with good things to eat: grains and beans, fruits and vegetables, and animals that give milk, eggs and meat (Genesis 1:29; Psalm 104:14). Each kind of food does a different job in your body. In this unit you will learn the five food groups on **MyPlate** and build a balanced plate in a burrito bowl.

You will meet **George Washington Carver**, the plant scientist who taught farm families to grow and cook sweet potatoes and peanuts, and you will bake sweet-potato fries. You will learn how **calcium** and **vitamin D** build strong bones, and you will finish by packing a balanced lunch with something from every group, kept cold and safe until lunchtime.

PREREQUISITES

- Uses the claw and bridge grips with an adult beside (Lesson 1.2)
- Knows Clean, Separate, Cook, Chill and the two-hour rule (Unit 1)
- Cooks at the stove only with an adult beside (Unit 1)

MASTERY CHECKLIST

- ☐ I can name the five food groups on MyPlate and give two foods from each.
- ☐ I can build a balanced plate: half fruits and vegetables, with a grain, a protein and dairy.
- ☐ I can tell how George Washington Carver helped farm families with sweet potatoes and peanuts.
- ☐ I can explain what calcium and vitamin D do for bones and name foods that give them.
- ☐ I can pack a balanced lunch that stays cold and safe until lunchtime.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **MyPlate Kids' Place (USDA):** Free; search for it at MyPlate.gov. Activity sheets, a printable MyPlate and simple tips for kids from the U.S. Department of Agriculture. Good for Lessons 2.1 and 2.4.
- **Food Hero (Oregon State University Extension):** Free. Kid-friendly recipes, MyPlate videos and tasting ideas from a university extension program.
- **A reusable lunch box with two small ice packs:** For Lesson 2.4 and the unit challenge. Two ice packs keep perishable food cold until lunchtime.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

2.1	MyPlate Builds a Meal	2 sessions of 45–60 minutes
2.2	George Washington Carver and the Sweet Potato	2 sessions of 45–60 minutes
2.3	Calcium and Vitamin D for Bones	2 sessions of 45–60 minutes
2.4	A Balanced Lunch	2 sessions of 45–60 minutes

UNIT 2 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
Name the five food groups on MyPlate.
2. **5 pts**
How much of a MyPlate plate should be fruits and vegetables?
3. **5 pts**
What does each of these give your body: grains, protein foods, dairy?
4. **5 pts**
How did George Washington Carver help farm families in Alabama?

5. (5 pts)

Why are sweet potatoes orange, and what does that do for your body?

6. (5 pts)

Predict: you crowd sweet-potato fries close together on a pan. How will they turn out, and why?

7. (5 pts)

What do calcium and vitamin D each do for bones?

8. (5 pts)

What did Harry Steenbock discover in 1923?

9. (5 pts)

Predict: a turkey-and-cheese lunch sits in a warm backpack for 4 hours with no ice pack. Is it safe to eat? Why?

10. (5 pts)

Name one food from each group that you could pack in a balanced lunch.

ANSWER KEY

1. Fruits, vegetables, grains, protein foods and dairy.
2. Half the plate, with a little more vegetables than fruit.
3. Grains give energy; protein foods build muscles and the body; dairy gives calcium for strong bones and teeth.
4. He taught them crop rotation (planting peanuts or sweet potatoes after cotton to rest the soil) and wrote free bulletins on how to grow and cook these crops.
5. They are full of beta-carotene, which your body turns into vitamin A for your eyes and for fighting sickness.
6. They will be soft and soggy instead of crisp, because the steam from each fry gets trapped and they steam instead of roast.
7. Calcium makes bones and teeth hard and strong. Vitamin D helps your body take in the calcium.
8. That shining ultraviolet light (like sunlight) on food added vitamin D to it, which led to vitamin D being added to milk.
9. No. It has been in the danger zone (40–140 °F) too long, so bacteria could have grown. Pack it with two ice packs.
10. Answers vary. Example: whole-grain crackers (grain), turkey (protein), cheese (dairy), carrot sticks (vegetable), grapes (fruit).

UNIT CHALLENGE: THREE BALANCED LUNCHES

Plan, pack and eat three balanced lunches this week, one on each of three different days. Each lunch must have something from all five food groups and be packed with two ice packs.

Before packing, draw a MyPlate check for each lunch and fill in the five groups. After eating, write one sentence about how it tasted and whether it stayed cold and fresh. Take a photo of each packed lunch.

LOOK FOR	WHAT IT MEANS
Five groups	Each of the three lunches has a grain, protein, dairy, vegetable and fruit, shown on a MyPlate check.
Kept safe	Perishable foods were packed cold with two ice packs and kept in the refrigerator until leaving.
Knife and kitchen safety	Cut foods with the claw grip with an adult beside, and cleaned up each time.
Records	Plans, photos and a sentence about each lunch are in the notebook.
Improvement	Each lunch shows at least one change learned from the one before.

2.1 MYPLATE BUILDS A MEAL

OBJECTIVES

- Name the five food groups on MyPlate and tell what each one gives your body.
- Build a balanced plate with half fruits and vegetables, a grain, a protein and dairy.
- Cook rice at the stove with an adult beside you and build a burrito bowl with all five groups.

Warm-up. Draw a big circle on paper for a plate. Without looking anything up, draw what you ate for dinner last night on it. Then guess: what part of the plate do you think should be fruits and vegetables? A little? A quarter? Half?

WATCH

MyPlate - Overview

Food Hero • 5:35

https://www.youtube.com/watch?v=4hZ4_mkavLY

WHEN TO WATCH

After the story paragraph. Pause after each food group and name one food from that group that your family eats.

Note: From Food Hero, a nutrition program of Oregon State University Extension.

BACKUP VIDEO

MyPlate - Dairy Group

Food Hero • 2:41

<https://www.youtube.com/watch?v=YaDL9N27zm0>

A closer look at one food group, the dairy cup beside the plate (also used in Lesson 2.3).

KEY TERMS

MyPlate

A picture of a plate made by the U.S. Department of Agriculture in 2011 that shows the five food groups in a balanced meal.

food group

Foods that give your body similar nourishment: fruits, vegetables, grains, protein foods and dairy.

balanced meal

A meal with foods from several groups, so your body gets many kinds of nourishment at once.

whole grain

A grain food that still has all three parts of the seed, such as brown rice, oatmeal and whole-wheat bread.

CORE IDEAS

The story. For many years, people in the United States learned about food groups from charts and posters. In 1992 the U.S. Department of Agriculture (USDA) made a **Food Guide Pyramid**, with grains at the wide bottom and fats and sweets at the tiny top. But many people found the pyramid hard to use at the table. So on June 2, 2011, the USDA showed a new, simpler picture: a dinner plate called **MyPlate**. It looks like the plate you eat from, divided into four parts, with a small circle beside it for dairy.

How they figured it out. The people who made MyPlate asked a simple question: what does a balanced meal look like when you sit down to eat? They split the plate so that **half is fruits and vegetables**, a little more vegetables than fruit. The other half is **grains and protein foods**. The cup beside the plate stands for **dairy**, such as milk, yogurt and cheese. Instead of memorizing numbers, a family can just look at their plate and see if all the groups are there.

The kitchen science. Each group does a different job. **Grains** (bread, rice, oats, tortillas) give your body energy to run and think. **Protein foods** (beans, eggs, meat, chicken, fish, nuts) are building blocks for muscles and every part of you. **Vegetables and fruits** give vitamins, minerals and fiber that keep your body working well and help you heal. **Dairy** gives calcium for strong bones and teeth. No single food has everything, which is why God gave us so many kinds to enjoy.

Let's cook. You will make a build-your-own burrito bowl with all five groups: rice, black beans, vegetables, cheese and a side of fruit. You will cook the rice on the stove **with an adult beside you**. The skill to do well is **simmering with the lid on**: once the water boils, turn the heat to low, cover the pot and leave the lid alone until the timer rings.

PICTURE STUDY



Market Woman at a Vegetable Stall, Pieter Aertsen, 1567 · Oil on wood · Gemäldegalerie, Berlin

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

Pieter Aertsen painted market sellers surrounded by heaps of food from the fields. Here a woman sits at her stall full of vegetables, fruit and loaves, ready for shoppers. Count how many different foods you can find.

Look closely

- Find at least five different vegetables. Which ones do you know?
- Find the fruit. Which food group is it in?
- Find the bread. Which food group is it in? Can you find anything from the protein or dairy groups?
- Look at the woman's hands and face. Is she proud of her food? How can you tell?

Talk about it

1. If you bought food at this stall, which two foods would you choose to fill the vegetable half of your plate?
2. What would you need to buy somewhere else to make a balanced meal with all five groups?
3. Why do you think the artist painted so much food in such bright colors?

Safety first. An adult stands beside you at the stove. Turn the pot handle in, open the lid away from your face so the steam goes the other way, and use oven mitts on hot handles. Wash the fruit and vegetables under running water before you cut them.

KITCHEN PROJECT

A Five-Group Burrito Bowl

You will cook a pot of rice, warm a pan of beans, cut toppings, and let everyone build a bowl. Then you will check each bowl against MyPlate to see if all five groups made it in.

You will need

- A medium pot with a tight lid
- A small saucepan
- Measuring cups and spoons
- A small serrated knife, a cutting board and a damp towel
- A colander and a can opener
- Small bowls for toppings
- A timer and oven mitts

BUILD-YOUR-OWN BURRITO BOWLS

Serves 4–5 • Prep 20 min • Cook 25 min

Ingredients

- 1 cup long-grain white or brown rice
- 2 cups water (2½ cups for brown rice) and ½ teaspoon salt
- 1 can (15 ounces) black beans, rinsed and drained
- ½ teaspoon ground cumin and ¼ teaspoon garlic powder
- 1 cup corn kernels (frozen and thawed, or canned and drained)
- 1 bell pepper and 2 cups chopped romaine lettuce
- 1 cup cherry tomatoes or ½ cup mild salsa
- 1 cup grated cheddar or Monterey Jack cheese, or plain yogurt as a topping
- Fruit on the side: 2 oranges, a mango or a cup of grapes
- Optional: 1 lime, cut into wedges by the adult

Method

1. Wash your hands. Rinse the rice in a fine strainer under cold water until the water runs mostly clear.
2. With an adult beside you, put the rice, water and salt in the pot. Bring to a boil over high heat, uncovered.
3. When it boils, the adult turns the heat to low. Stir once, cover tightly, and set a timer for 18 minutes (40 minutes for brown rice). Do not lift the lid.
4. While the rice cooks, warm the beans with the cumin, garlic powder and 2 tablespoons water in the small saucepan over medium-low heat, stirring now and then, about 5 minutes.
5. With an adult right beside you, cut the pepper into strips and then small pieces with the claw grip. Halve the cherry tomatoes with the bridge. Put each topping in its own bowl.
6. When the timer rings, the adult turns off the heat. Let the rice stand, covered, 5 minutes, then fluff it with a fork.
7. Set out everything in a line. Each person builds a bowl: rice, beans, vegetables, cheese, a squeeze of lime, with fruit on the side.
8. Refrigerate leftovers within 2 hours in shallow containers. Clean up and wipe the counters.

Allergy check: Contains milk (cheese or yogurt). For milk-free, leave off the cheese or use a dairy-free cheese and add avocado. No wheat, eggs or nuts. Corn and beans are not major allergens.

Steps

1. **Plate check before.** Look at the drawing from your warm-up. Which food groups were on your plate? Which were missing?
2. Cook the rice and beans and cut the toppings as the recipe says, with an adult beside you.
3. **Five-group check.** Make a chart with each family member's name and the five groups. After everyone builds a bowl, check off each group in their bowl.
4. **Count the colors.** How many different colors are in your bowl? Many colors usually means many different vitamins.
5. **Taste test.** Rate your bowl from 1 to 5. Which topping was the family favorite?

6. **Improve it.** Plan one change: brown rice instead of white, a new vegetable, or adding cooked chicken.

7. Clean up: wash, dry and put everything away, and store the leftovers safely.

Tips

- Lifting the lid lets out the steam the rice needs to cook. Trust the timer.
- Rinsing canned beans washes away the thick, salty liquid.
- Leftover rice can become fried rice tomorrow (Lesson 1.4).

Check your work

- ☐ I can name the five food groups and tell what each gives my body.
- ☐ I can build a plate that is half fruits and vegetables with a grain, protein and dairy.
- ☐ I cooked rice safely with an adult beside me and checked every bowl against MyPlate.

COOK'S NOTEBOOK

1. Draw MyPlate and label the five groups. Draw two foods in each section that you like.
2. Draw your burrito bowl from above and label which group each topping belongs to.
3. Copy the rice recipe in your own words and write how long it simmered.

COMMON MISTAKES

- Lifting the lid to peek at rice while it cooks. The steam escapes and the rice cooks unevenly.
- Thinking a meal is balanced if it has lots of one good food. Balance means several groups together.
- Forgetting that beans count as a protein food.
- Leaving the pot handle sticking out over the edge of the stove.

Make it a game • Sixty-Second Plate. Draw a big plate on paper. Your grown-up sets a sixty-second timer. Draw or write foods to build a balanced meal: half the plate fruits and vegetables, plus a grain, a protein and dairy. Then name what each group gives your body. Score a point for every correct group and try to beat your score.

Scripture. “And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.” (Genesis 1:29, KJV)

In the King James Bible, “meat” means food of any kind. From the very beginning, God gave people seeds, grains and fruit to eat, a good gift for every day.

2.2 GEORGE WASHINGTON CARVER AND THE SWEET POTATO

OBJECTIVES

- Tell how George Washington Carver helped farm families grow and cook sweet potatoes and peanuts.
- Explain what vitamin A and fiber in sweet potatoes do for the body, and why sweet potatoes are orange.
- Bake sweet-potato fries in the oven with an adult beside you, cutting them evenly with the claw grip.

Warm-up. Hold a sweet potato and a white potato. Look, smell and feel them. Which one is heavier? Which one has a smoother skin? Make a guess: what color will each one be on the inside? Ask an adult to cut each one in half to check.

WATCH

George Washington Carver for Kids

Homeschool Pop • 2:45

<https://www.youtube.com/watch?v=X9Xyw43cC7M>

WHEN TO WATCH

After you read the story. Then tell an adult two new things you learned about Carver.

Note: A short slideshow biography for children. It mentions plainly that Carver was born during the Civil War into hard times and was freed as a young child.

KEY TERMS

botanist

A scientist who studies plants.

crop rotation

Planting different crops in a field in different years, so the soil can rest and stay healthy.

vitamin A

A vitamin that helps your eyes see in dim light and helps your skin and body fight sickness. Orange foods like sweet potatoes and carrots are full of it.

fiber

The part of plant foods your body does not digest. It keeps food moving through you and helps you feel full.

CORE IDEAS

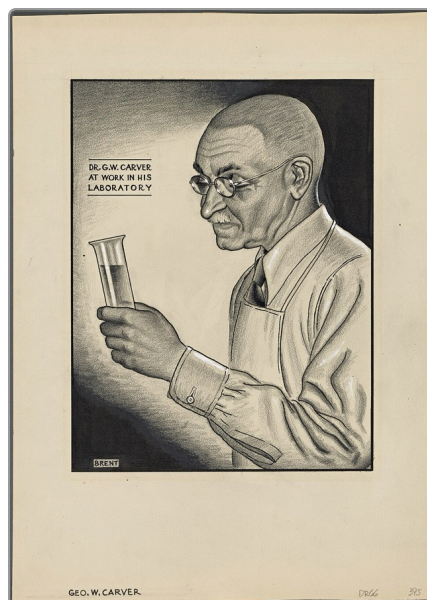
The story. George Washington Carver was born in Missouri around 1864, near the end of the Civil War. He was raised by Moses and Susan Carver on their farm. As a boy he was often too sickly for heavy farm work, so he spent his days in the garden and the woods, studying plants. Neighbors called him “the plant doctor” because he could nurse a sick plant back to health. He worked hard for his schooling, studied plants at Iowa State, and in 1896 Booker T. Washington invited him to teach at the Tuskegee Institute in Alabama. He stayed there for the rest of his life.

How he figured it out. In Alabama, Carver saw that years of growing only cotton had worn out the soil, and many farm families did not have enough good food. He tested the soil and grew crops in plots at the school. He found that **peanuts** and other beans put goodness back into tired soil, and that **sweet potatoes** grew well and fed a family richly. So he taught **crop rotation**: cotton one year, peanuts or sweet potatoes the next. He wrote free bulletins for farm families, full of ways to grow and cook these crops, and he and his students even drove a wagon from farm to farm as a school on wheels. Carver was a man of faith who prayed over his work; he called his laboratory “God’s little workshop.”

The kitchen science. A sweet potato is a root that stores food for the plant. Its bright orange color comes from **beta-carotene**, which your body turns into **vitamin A**, important for your eyes and for fighting sickness. Sweet potatoes also have **fiber** and natural sugars. When you roast them in a hot oven, some of those sugars brown at the edges and taste sweeter still. Because they are vegetables, sweet potatoes belong on the vegetable half of your plate.

Let’s cook. You will bake crispy sweet-potato fries. Raw sweet potatoes are very hard, so **an adult cuts them into flat planks first**, and then you cut the planks into sticks with the claw grip, **with the adult right beside you**. The skill to do well is **cutting pieces the same size**, so they all finish baking at the same time.

PICTURE STUDY



Dr. G. W. Carver at Work in His Laboratory, Richard Brent, between 1935 and 1943 · Drawing (ink on paper) · New York Public Library, Schomburg Center for Research in Black Culture

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

This drawing was made near the end of George Washington Carver's long life. It shows him in his laboratory at Tuskegee, studying a test tube. He tested soils, plants, peanuts and sweet potatoes, looking for new ways farm families could use what they grew.

Look closely

- Find the test tube. How is Carver holding it, and what is he doing?
- Look at his face and glasses. Is he hurrying, or looking carefully?
- Look at his clothes. Why might a scientist wear an apron at work?
- Find the words written in the corner of the drawing. What do they say?

Talk about it

1. Carver called his laboratory "God's little workshop." What do you think he meant?
2. Carver gave his bulletins to farm families for free. Why do you think he wanted to share what he learned?
3. What is one question about a plant or food you would like to test in your own kitchen?

Safety first. An adult cuts the hard raw sweet potatoes into planks; you cut the planks into sticks with the claw grip, with the adult right beside you, on a board that does not slide. The oven is very hot: the adult puts the pan in and takes it out with oven mitts, and you stand back when the oven door opens.

KITCHEN PROJECT

Crispy Baked Sweet-Potato Fries

You will cut and bake sweet-potato fries, then do a test: do thin fries and thick fries bake the same way? You will also compare a sweet potato and a white potato in a taste test.

You will need

- A large rimmed baking sheet and parchment paper
- A small serrated knife or paring knife, a cutting board and a damp towel
- A vegetable brush
- A large bowl and measuring spoons
- A wide spatula and oven mitts
- A ruler

BAKED SWEET-POTATO FRIES

Serves 4 • Prep 15 min • Bake 25–30 min

Ingredients

- 2 large sweet potatoes (about 2 pounds)
- 2 tablespoons olive oil or vegetable oil
- 2 teaspoons cornstarch (helps them crisp; optional)
- ½ teaspoon salt
- ½ teaspoon paprika and ¼ teaspoon garlic powder (optional)

Method

1. An adult heats the oven to 425 °F and lines the baking sheet with parchment paper.
2. Wash your hands. Scrub the sweet potatoes under running water with a brush and pat them dry. You may leave the skin on.
3. The adult cuts each sweet potato into flat planks about ½ inch thick.
4. With the adult right beside you, lay each plank flat and cut it into sticks about ½ inch wide, using the claw grip. Try to make them all the same

size.

5. Put the sticks in the bowl. Sprinkle with cornstarch and toss, then add the oil, salt and spices and toss again with clean hands until every fry is coated.
6. Spread the fries on the pan in one layer with space between them (crowded fries steam instead of crisp).
7. The adult bakes them 15 minutes, takes the pan out, and you flip them with the spatula while the pan sits on the stove top. Bake 10 to 15 minutes more, until browned at the edges.
8. Let them cool 5 minutes on the pan; they crisp as they cool. Clean up while they cool.

Allergy check: Contains none of the nine major allergens.

Steps

1. **Inside look.** Draw the inside of a sweet potato and a white potato after the adult cuts them. Write the colors.
2. **Thin and thick test.** Cut 5 fries extra thin ($\frac{1}{4}$ inch) and 5 extra thick (1 inch). Mark where they are on the pan. Predict which will brown first.
3. Bake the fries as the recipe says.
4. **Check the test.** When the regular fries are done, look at the thin and thick fries. Which are burnt, which are soft, which are just right? Measure them with a ruler and write what happened.
5. **Taste test.** Rate the fries from 1 to 5 for crispness and sweetness. If you have a white potato baked the same way, compare the two.
6. **Improve it.** Plan one change: more space on the pan, a different spice, or a yogurt dip.
7. Clean up: wash the board, knife and bowl, and wipe the counter.

Tips

- Same-size pieces cook in the same time. This is true for every vegetable you will ever cut.
- If a sweet potato rocks on the board, ask the adult to cut a thin slice off one side so it sits flat.

- Leave the skin on for extra fiber and less work.

Check your work

- ☐ I can tell how George Washington Carver helped farm families.
- ☐ I can explain why sweet potatoes are orange and what vitamin A does.
- ☐ I cut fries evenly with the claw grip and baked them with an adult beside me.

COOK'S NOTEBOOK

1. Draw a timeline of Carver's life: born around 1864, studies at Iowa State, goes to Tuskegee in 1896, teaches crop rotation.
2. Draw a field in two years: cotton in year one, peanuts or sweet potatoes in year two. Write why this helps the soil.
3. Write the results of your thin-and-thick fry test and copy the recipe in your own words.

From history. Carver wrote a famous bulletin in 1916 called *How to Grow the Peanut and 105 Ways of Preparing It for Human Consumption*. He also wrote about sweet potatoes, cowpeas and other crops a family could grow. Many people today remember him for peanut butter, but he did not invent it; his great work was helping farm families grow better food and use it well.

COMMON MISTAKES

- Crowding the fries on the pan, so they steam and turn soft instead of crisp.
- Cutting fries in all different sizes, so some burn while others are still raw.
- Trying to cut a whole raw sweet potato with a small knife. Hard, round foods need an adult to make the first cuts.

Make it a game • Carver's Wrong Fact. Be George Washington Carver, teaching a farm family. Explain what a sweet potato gives the body and why it is orange. Your grown-up sneaks in one wrong fact, such as saying the orange color means vitamin C instead of vitamin A. Catch it. Add one thing about peanuts or crop rotation to win a bonus point.

Scripture. “O LORD, how manifold are thy works! in wisdom hast thou made them all: the earth is full of thy riches.” (Psalm 104:24, KJV)

Carver spent his life studying the riches God put into plants and soil. “Manifold” means many and varied, like the many ways to use a single sweet potato.

2.3 CALCIUM AND VITAMIN D FOR BONES

OBJECTIVES

- Explain what calcium and vitamin D do for growing bones and teeth.
- Tell how Harry Steenbock discovered that sunlight could add vitamin D to food.
- Make a honey-yogurt dip and cut fruit for dipping with the claw grip.

Warm-up. Feel your arm, your knee and your jaw. Under your skin are hard bones. Tap a chicken bone or look at a picture of the bones inside the human body. Your bones are growing right now! Guess: what do you think bones are made of, and what food might help build them?

WATCH

MyPlate - Dairy Group

Food Hero • 2:41

<https://www.youtube.com/watch?v=YaDL9N27zm0>

WHEN TO WATCH

After the kitchen-science paragraph. Listen for the special mineral that builds bones.

Note: From Food Hero, Oregon State University Extension. It ends with a simple drinkable-yogurt recipe.

KEY TERMS

calcium

A mineral that makes bones and teeth hard and strong. Almost all the calcium in your body is in your bones and teeth.

dairy

Milk and foods made from milk, such as yogurt and cheese. Calcium-fortified soy milk counts in the dairy group too.

vitamin D

A vitamin that helps your body take in calcium from food. Your skin makes it in sunlight, and it is added to milk.

fortified

Having an extra vitamin or mineral added, such as vitamin D added to milk.

CORE IDEAS

The story. About a hundred years ago, many children in cities, where the air was smoky and the winters dark, had soft, weak bones. Doctors knew that sunshine and cod-liver oil helped, but no one knew why. At the University of Wisconsin, a scientist named **Harry Steenbock** wondered if sunlight did something to food, too. In 1923 he shone ultraviolet light (the invisible part of sunlight) on rat food, and found that the food then had something new in it that built strong bones. That something was **vitamin D**.

How he figured it out. Steenbock tested his idea carefully. Animals fed ordinary food grew weak bones; animals fed food that had been under the light grew strong bones, even without sunshine themselves. He patented his discovery and gave the money it earned to the University of Wisconsin for more research. By the 1930s, companies were adding vitamin D to milk, and soft-bone disease became rare in America. Today almost all milk sold in the United States has vitamin D added.

The kitchen science. Your bones are alive and growing. They are made hard by **calcium**, a mineral. Almost all of the calcium in your body is in your bones and teeth. To use the calcium you eat, your body needs **vitamin D**, which your skin makes in sunlight and which is added to milk. Milk, yogurt and cheese are full of calcium; so are calcium-fortified soy milk, canned salmon, broccoli, beans and some greens. Running, jumping and playing outdoors help bones grow strong too.

Let's cook. You will make a creamy honey-yogurt dip and a rainbow of fruit to dip in it. The skill to do well is **cutting fruit with the claw, with an adult right beside you**: the adult cuts and cores the hard apples into quarters, and you slice soft fruits and the apple quarters, flat side down.

PICTURE STUDY



Woman Milking a Cow, Jean-François Millet, between 1854 and 1860 · Oil on canvas

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

Jean-François Millet grew up on a farm in France and loved to draw country people at their daily work. Here a woman milks her cow right in the field. For most of history, families got their milk this way, fresh each day.

Look closely

- Find the pail under the cow. Where is the milk going?
- Look at how the woman kneels close beside the cow. Why do you think she works so close?
- Look at the cow. Is it calm or restless? How can you tell?
- Look at the sky. What time of day do you think it is?

Talk about it

1. This milk was not chilled or pasteurized. How is the milk you drink kept safe today?
2. What foods can be made from this pail of milk?
3. Why do you think Millet chose to draw such an ordinary job?

Safety first. An adult cuts the hard apples into quarters and removes the cores; you slice soft fruits and apple quarters with the claw grip, with the adult right beside you, on a board that cannot slide. Wash all fruit under running water first. Honey is never given to babies under one year old.

KITCHEN PROJECT

Honey-Yogurt Dip with a Fruit Rainbow

You will make a yogurt dip, cut a rainbow of fruit, and find out which foods in your kitchen have the most calcium by reading their labels.

You will need

- A small serrated knife or paring knife, a cutting board and a damp towel
- A colander
- A mixing bowl and a whisk or spoon
- Measuring cups and spoons
- A large plate or platter
- Three or four food packages with Nutrition Facts labels (milk, yogurt, cheese, cereal)

HONEY-YOGURT DIP WITH FRESH FRUIT

Serves 4–6 • Prep 20 min

Ingredients

- 1½ cups plain Greek yogurt or regular plain yogurt
- 2 tablespoons honey (or maple syrup)
- ½ teaspoon vanilla extract
- ¼ teaspoon ground cinnamon
- 2 apples
- 1 cup strawberries
- 2 bananas
- 1 cup grapes
- 1 orange or 2 clementines

Method

1. Wash your hands. Stir the yogurt, honey, vanilla and cinnamon together in the bowl until smooth. Taste with a clean spoon and add a little more honey if you like. Cover and chill.

2. Wash all the fruit under cool running water and pat it dry.
3. The adult cuts the apples into quarters and cuts out the cores. With the adult right beside you, lay each quarter flat side down and slice it with the claw grip.
4. Pull the green tops off the strawberries and cut them in half. Peel the bananas and slice them into thick coins. Pull the grapes off their stems. Peel the orange and pull it into sections.
5. Arrange the fruit on the platter in rainbow stripes: red, orange, yellow, green, purple. Put the dip in the middle.
6. Serve within 2 hours, and put leftover dip back in the refrigerator. Squeeze a little lemon juice on cut apples if they will sit, so they do not turn brown.
7. Clean up: wash the knife carefully, the board and the bowl, and wipe the counter.

Allergy check: Contains milk. For milk-free, use a plain dairy-free yogurt made with added calcium (some are made from soy, a major allergen). Honey is not for babies under one year.

Steps

1. **Label hunt.** Find the calcium line on three or four Nutrition Facts labels. Write each food and its calcium. Which has the most?
2. Make the dip and cut the fruit as the recipe says, with the adult right beside you.
3. **Count the groups.** Which food groups are on your platter? (Fruit and dairy.) What could you add to make a whole snack plate with a grain too? (Whole-grain crackers.)
4. **Taste test.** Taste each fruit plain and then with dip. Make a chart: which fruit was best with the dip? Ask your family to choose a favorite.
5. **Improve it.** Plan one change: a different fruit, less honey, or a spoonful of peanut or sunflower butter in the dip.
6. **Outside time.** Take your snack outdoors if the weather is nice. Sunshine and play help bones too!
7. Clean up: wash, dry and put everything away.

Tips

- Greek yogurt makes a thicker dip; regular yogurt makes a thinner one for drizzling.
- Soft fruits like bananas and strawberries are the easiest to start with.
- The cinnamon and vanilla make the dip taste sweeter without adding more sugar.

Check your work

- ☐ I can explain what calcium and vitamin D do for bones.
- ☐ I can tell how Harry Steenbock found that light could add vitamin D to food.
- ☐ I made a yogurt dip and cut fruit safely with the claw grip and an adult beside me.

COOK'S NOTEBOOK

1. Draw a bone and label it “calcium makes it hard.” Draw a sun and a glass of milk with arrows to the bone labeled “vitamin D helps.”
2. Make a list of six foods with calcium, from the dairy group and from other groups.
3. Write your label-hunt results and copy the dip recipe in your own words.

From history. Steenbock could have kept the money from his discovery, but he gave the patent to a new foundation, the Wisconsin Alumni Research Foundation, which used it to pay for more university research. Many later discoveries were paid for by money that first came from adding vitamin D to food.

COMMON MISTAKES

- Thinking only milk has calcium. Yogurt, cheese, fortified soy milk, canned salmon, beans and some greens have it too.
- Trying to cut a whole round apple without an adult making the first cuts.
- Leaving yogurt dip out on the table all afternoon. It is perishable; follow the two-hour rule.

Make it a game • Calcium Label Hunt. Dash through the kitchen to find five foods or drinks with calcium or vitamin D listed on the label. Read the percent aloud for each one. Score a point per food, plus one bonus point for a fortified food. Then tell how Harry Steenbock found that sunlight could add vitamin D to food.

2.4 A BALANCED LUNCH

OBJECTIVES

- Tell how the dabbawalas of Mumbai deliver homemade lunches across a huge city every day.
- Pack a balanced lunch with a grain, a protein, a vegetable, a fruit and dairy.
- Keep a packed lunch cold and safe with ice packs until it is eaten.

Warm-up. Empty a lunch box (or a paper bag) on the table. Ask: what makes a lunch good to eat at noon? Make a quick list: it has to taste good, fill you up, stay fresh, and... what else? Think about what happens to cheese or turkey sitting in a warm backpack all morning.

WATCH

Healthy School Lunches Don't Have to Be Complicated | Simple Bento Box Ideas

MOMables - Laura Fuentes · 2:27

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

WHEN TO WATCH

Before you plan your lunch. Write down two ideas from the video you want to try.

Note: A cooking teacher shows how to fill each part of a lunch box: protein, grain, fruit, vegetables and a dip. Some links in the description are to her own books and products.

KEY TERMS

dabbawala

A lunch-box carrier in Mumbai, India, who picks up hot homemade lunches from homes and delivers them to workers in the city.

ice pack

A frozen gel pack that keeps a lunch box cold. Two ice packs keep perishable food at a safe temperature.

insulated

Made with a layer that slows down heat moving in or out, like a lunch box that keeps cold food cold.

perishable

Food that spoils quickly unless kept cold, such as meat, cheese, yogurt and cut fruit.

CORE IDEAS

The story. In the huge city of Mumbai, India, many workers eat lunches cooked at home that very morning, even though they work miles away. Since about 1890, men called **dabbawalas** (“box carriers”) have picked up these lunches in round metal tiffin boxes from homes all over the city. They carry them by bicycle, cart and train to offices and shops, deliver them by lunchtime, and bring the empty boxes back home in the afternoon. Today there are about 5,000 dabbawalas, and they deliver around 200,000 lunches a day.

How they figured it out. How do they get every box to the right person without mistakes? Many dabbawalas did not go to school for long, so they invented a simple code of colors, letters and numbers painted on each lid. The code tells where the box came from, which train station it goes through, and which building and floor it goes to. Boxes are sorted and handed from one dabbawala to the next like a relay race. Visitors who have studied their system have been amazed at how rarely a lunch goes to the wrong place.

The kitchen science. A balanced lunch has foods from several groups: a **grain** for energy, a **protein** for building, **vegetables** and **fruit** for vitamins and fiber, and **dairy** for calcium. A packed lunch also has to stay safe for hours. Perishable foods like turkey, cheese and yogurt need to stay at **40 °F or colder**. An insulated lunch box with **two ice packs** keeps them cold. Foods like crackers, whole fruit and peanut butter do not need to be kept cold.

Let’s cook. You will pack a homemade snack-box lunch with something from every group, then pack it for tomorrow. The skills to do well are **cutting cheese cubes and vegetable sticks with the claw**, with an adult right beside you, and **packing it cold**.

PICTURE STUDY



Students Help Prepare Lunch for the School Cafeteria, Marjory Collins, for the U.S. Office of War Information, March 1942 · Black-and-white photograph · Library of Congress, Washington, D.C.

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

In 1942 a government photographer visited the Armstrong Technical High School in Washington, D.C. In this photograph, the students themselves are preparing lunch for the school cafeteria in a big, shining kitchen.

Look closely

- Find the students' hands. What jobs are they doing?
- Look for their white uniforms and caps. Why would cooks wear them?
- Find the big pots hanging up and the steel tables. How is this kitchen different from yours?
- Look at the room. Is it clean and orderly? How can you tell?

Talk about it

1. How is helping to make a school lunch like what you are doing in this course?
2. What would these students need to keep the food safe before lunchtime?
3. Would you like to help cook a lunch for your whole class or family? What would you make?

Safety first. Cut cheese and vegetables with the claw grip, with an adult right beside you, on a board that cannot slide. Wash fruit and vegetables first. Pack perishable foods with two ice packs in an insulated lunch box, and keep the lunch in the refrigerator until you leave.

KITCHEN PROJECT

Pack a Five-Group Snack-Box Lunch

You will make a homemade “snack box” lunch with all five food groups, then test how well an ice pack keeps it cold by checking the temperature.

You will need

- An insulated lunch box or bag and two ice packs
- A divided container or several small containers
- A small serrated knife, a cutting board and a damp towel
- An instant-read thermometer
- A colander

FIVE-GROUP SNACK-BOX LUNCH

Serves 1 lunch (multiply for each person) • Prep 15 min

Ingredients

- **Grain:** 8 whole-grain crackers or $\frac{1}{2}$ whole-wheat pita
- **Protein:** 2 ounces sliced turkey or ham, rolled up, or 1 hard-cooked egg, or $\frac{1}{4}$ cup hummus
- **Dairy:** 1 ounce cheddar cheese (cut into cubes) or a small cup of yogurt
- **Vegetable:** 1 small carrot or $\frac{1}{2}$ cucumber or $\frac{1}{2}$ bell pepper, cut into sticks, or a handful of snap peas
- **Fruit:** a small apple, a clementine, a handful of grapes or berries
- Water to drink

Method

1. Wash your hands and wash the fruit and vegetables under running water.
2. With an adult right beside you, cut the cheese into small cubes using the claw grip. Cut the cucumber or pepper into sticks (the adult peels and halves a carrot, then you cut it into sticks).
3. Roll each slice of turkey into a little tube.

4. Fill each part of the container with a different group. Keep wet foods (like cucumbers) apart from crackers so the crackers stay crisp.
5. Close the container. Put it in the insulated lunch box between two frozen ice packs.
6. Keep the lunch box in the refrigerator until you leave in the morning.
7. Clean up: wash the board and knife, and put the turkey and cheese away right away.

Allergy check: Contains wheat (crackers), milk (cheese or yogurt); hummus contains sesame; eggs if you choose an egg. Swaps: gluten-free crackers or rice cakes; dairy-free cheese; turkey instead of hummus or eggs.

Steps

1. **Plan it.** Draw five boxes labeled grain, protein, dairy, vegetable and fruit. Write what you will put in each.
2. Pack the lunch as the recipe says, with an adult beside you for the cutting.
3. **Cold test.** Pack two lunches if you can: one with two ice packs and one with no ice pack. Leave both on the counter for 4 hours (like a morning at school). Then check the temperature of the cheese in each with the thermometer. Which stayed at 40 °F or below? (Do not eat the warm one: it has been in the danger zone.)
4. **Lunchtime.** Eat your packed lunch the next day. Did everything stay fresh and crisp?
5. **Taste test and improve it.** Rate your lunch from 1 to 5. What would you change: more crunch, a dip, a different fruit?
6. Clean up: wash the containers and ice packs and put the ice packs back in the freezer for next time.

Tips

- Freeze a water bottle overnight; it works as an ice pack and is cold to drink by lunch.
- Pack lunches the night before, and keep them in the refrigerator.
- Wrap crackers separately if your vegetables are juicy.

Check your work

- ☐ I can tell how the dabbawalas of Mumbai deliver lunches.
- ☐ I packed a lunch with all five food groups.
- ☐ I can explain why perishable food needs two ice packs and tested it with a thermometer.

COOK'S NOTEBOOK

1. Draw a dabbawala's round tiffin box and invent your own color code for where it should go.
2. Draw your packed lunch from above and label each food group.
3. Write your cold-test results: the temperature with ice packs and without.

From history. Before lunch boxes, American workers carried a “dinner pail,” a metal pail with a lid, and children often walked home at noon for the midday meal. Metal lunch boxes for schoolchildren became popular in the 1930s and 1950s, often painted with pictures.

COMMON MISTAKES

- Packing turkey, cheese or yogurt with no ice pack. By lunchtime it can sit in the danger zone for hours.
- Packing only crackers and a treat. A balanced lunch has several groups.
- Putting wet foods next to crackers, which turn soggy.

Make it a game • Lunchbox Delivery Codes. The dabbawalas deliver thousands of lunches using codes. Make five paper lunch bags with drawn food and a color code on each. Put five chairs around the house as offices with the same colors. Deliver every lunch to the right chair in sixty seconds. At each stop, name the food groups in that lunch.

UNIT 2

FOOD GROUPS & THE BALANCED MEAL

When God made the world, He filled it with good things to eat: grains and beans, fruits and vegetables, and animals that give milk, eggs and meat (Genesis 1:29; Psalm 104:14). Each kind of food does a different job in your body. In this unit you will learn the five food groups on **MyPlate** and build a balanced plate in a burrito bowl.

You will meet **George Washington Carver**, the plant scientist who taught farm families to grow and cook sweet potatoes and peanuts, and you will bake sweet-potato fries. You will learn how **calcium** and **vitamin D** build strong bones, and you will finish by packing a balanced lunch with something from every group, kept cold and safe until lunchtime.

PREREQUISITES

- Uses the claw and bridge grips with an adult beside (Lesson 1.2)
- Knows Clean, Separate, Cook, Chill and the two-hour rule (Unit 1)
- Cooks at the stove only with an adult beside (Unit 1)

MASTERY CHECKLIST

- ☐ I can name the five food groups on MyPlate and give two foods from each.
- ☐ I can build a balanced plate: half fruits and vegetables, with a grain, a protein and dairy.
- ☐ I can tell how George Washington Carver helped farm families with sweet potatoes and peanuts.
- ☐ I can explain what calcium and vitamin D do for bones and name foods that give them.
- ☐ I can pack a balanced lunch that stays cold and safe until lunchtime.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **MyPlate Kids' Place (USDA):** Free; search for it at MyPlate.gov. Activity sheets, a printable MyPlate and simple tips for kids from the U.S. Department of Agriculture. Good for Lessons 2.1 and 2.4.
- **Food Hero (Oregon State University Extension):** Free. Kid-friendly recipes, MyPlate videos and tasting ideas from a university extension program.
- **A reusable lunch box with two small ice packs:** For Lesson 2.4 and the unit challenge. Two ice packs keep perishable food cold until lunchtime.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

2.1	MyPlate Builds a Meal	2 sessions of 45–60 minutes
2.2	George Washington Carver and the Sweet Potato	2 sessions of 45–60 minutes
2.3	Calcium and Vitamin D for Bones	2 sessions of 45–60 minutes
2.4	A Balanced Lunch	2 sessions of 45–60 minutes

UNIT 2 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
Name the five food groups on MyPlate.
2. **5 pts**
How much of a MyPlate plate should be fruits and vegetables?
3. **5 pts**
What does each of these give your body: grains, protein foods, dairy?
4. **5 pts**
How did George Washington Carver help farm families in Alabama?

5. (5 pts)

Why are sweet potatoes orange, and what does that do for your body?

6. (5 pts)

Predict: you crowd sweet-potato fries close together on a pan. How will they turn out, and why?

7. (5 pts)

What do calcium and vitamin D each do for bones?

8. (5 pts)

What did Harry Steenbock discover in 1923?

9. (5 pts)

Predict: a turkey-and-cheese lunch sits in a warm backpack for 4 hours with no ice pack. Is it safe to eat? Why?

10. (5 pts)

Name one food from each group that you could pack in a balanced lunch.

ANSWER KEY

1. Fruits, vegetables, grains, protein foods and dairy.
2. Half the plate, with a little more vegetables than fruit.
3. Grains give energy; protein foods build muscles and the body; dairy gives calcium for strong bones and teeth.
4. He taught them crop rotation (planting peanuts or sweet potatoes after cotton to rest the soil) and wrote free bulletins on how to grow and cook these crops.
5. They are full of beta-carotene, which your body turns into vitamin A for your eyes and for fighting sickness.
6. They will be soft and soggy instead of crisp, because the steam from each fry gets trapped and they steam instead of roast.
7. Calcium makes bones and teeth hard and strong. Vitamin D helps your body take in the calcium.
8. That shining ultraviolet light (like sunlight) on food added vitamin D to it, which led to vitamin D being added to milk.
9. No. It has been in the danger zone (40–140 °F) too long, so bacteria could have grown. Pack it with two ice packs.
10. Answers vary. Example: whole-grain crackers (grain), turkey (protein), cheese (dairy), carrot sticks (vegetable), grapes (fruit).

UNIT CHALLENGE: THREE BALANCED LUNCHES

Plan, pack and eat three balanced lunches this week, one on each of three different days. Each lunch must have something from all five food groups and be packed with two ice packs.

Before packing, draw a MyPlate check for each lunch and fill in the five groups. After eating, write one sentence about how it tasted and whether it stayed cold and fresh. Take a photo of each packed lunch.

LOOK FOR	WHAT IT MEANS
Five groups	Each of the three lunches has a grain, protein, dairy, vegetable and fruit, shown on a MyPlate check.
Kept safe	Perishable foods were packed cold with two ice packs and kept in the refrigerator until leaving.
Knife and kitchen safety	Cut foods with the claw grip with an adult beside, and cleaned up each time.
Records	Plans, photos and a sentence about each lunch are in the notebook.
Improvement	Each lunch shows at least one change learned from the one before.

UNIT 3

TASTE, SMELL & YOUR TASTE BUDS

“O taste and see that the LORD is good” (Psalm 34:8). God gave you a tongue covered with thousands of tiny taste buds and a nose that can tell apart a great many smells. In this unit you will find out how they work together. You will taste the five basic tastes (**sweet, salty, sour, bitter and umami**) on a tasting tray, learn why your nose does most of the work of flavor, and hear how Helen Keller, who could not see or hear, knew her world through smell.

You will also learn why a food you did not like at first can become a favorite after you taste it again and again, and you will explore **texture**: crunchy, creamy, chewy and crisp. You will bake a cinnamon apple, roast carrots two ways, and make oven-baked potato chips, and you will practice trying new foods with a thankful heart.

PREREQUISITES

- Uses the claw grip with an adult beside (Lesson 1.2)
- Uses the oven with an adult beside and stands back when the door opens (Lesson 2.2)
- Knows to check every taste test for food allergies first (Unit 1)

MASTERY CHECKLIST

- ☐ I can name the five basic tastes and a food for each.
- ☐ I can explain what taste buds are and that they are replaced every week or two.
- ☐ I can explain that all tastes are sensed all over the tongue, and that most of flavor comes from smell.
- ☐ I can tell why it can take 8 to 15 tries to like a new food, and I keep a “try it again” chart.
- ☐ I can describe food with texture words and explain why chips are crunchy and why they go stale.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A small hand mirror and a flashlight:** For looking at the bumps on your tongue in Lesson 3.1.
- **Small paper cups and toothpicks for tasting trays:** Handy for the tasting trays and the unit challenge. Any small bowls work too.
- **A sleep mask or clean scarf for blindfolded taste tests:** Optional, for Lessons 3.2 and the unit challenge. Some children prefer simply to close their eyes.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

3.1 Thousands of Taste Buds	2 sessions of 45–60 minutes
3.2 Smell and Memory	2 sessions of 45–60 minutes
3.3 Getting Used to New Foods	2 sessions of 45–60 minutes
3.4 Texture and Crunch	2 sessions of 45–60 minutes

UNIT 3 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

Name the five basic tastes and a food for each.

2. **5 pts**

What are taste buds, and how often are taste cells replaced?

3. **5 pts**

Is the tongue map (sweet at the tip, bitter at the back) true? Explain.

4. **5 pts**

Predict: you pinch your nose and eat a cherry jelly bean. What will you taste?
What will happen when you let go?

5. (5 pts)

How did Helen Keller use her sense of smell?

6. (5 pts)

Why can a vegetable like broccoli taste too strong to a child but fine to an adult?

7. (5 pts)

About how many tries can it take to learn to like a new food?

8. (5 pts)

Why do roasted carrots taste sweeter than raw ones?

9. (5 pts)

Predict: you leave a bowl of potato chips uncovered on the counter overnight.

What will happen, and why?

10. (5 pts)

What did historians find when they checked the George Crum potato-chip story?

ANSWER KEY

1. Sweet (strawberries), salty (pretzels), sour (lemons), bitter (radishes or grapefruit), umami (Parmesan cheese or tomatoes). Other examples are fine.
2. Tiny clusters of taste cells, mostly on the tongue, that send taste messages to the brain. The cells are replaced about every one to two weeks.
3. No. Every part of the tongue that has taste buds can sense all five tastes.
4. With your nose pinched you will taste only sweet (and maybe sour). When you let go, the smell rises into your nose and you suddenly taste cherry flavor.
5. She knew people's work by the smells on their clothes, smelled storms coming, knew places by their smells, and found that smells brought back memories.
6. Children usually taste bitterness more strongly than adults. Tastes change as we grow and as we keep tasting a food.
7. About 8 to 15 small tastes.
8. In the hot oven some of their water dries away and their natural sugars caramelize (brown).
9. They will go stale and soft, because they soak up water from the air.
10. Older cookbooks, such as Kitchiner's *The Cook's Oracle* (1817) and Mary Randolph's *The Virginia House-Wife* (1824), already had recipes for thin fried potato slices, so Crum probably did not invent the chip, though Saratoga made chips famous.

UNIT CHALLENGE: A FAMILY BLIND TASTE TEST

Choose one food and prepare it three ways, such as apples raw, baked and as applesauce, or potatoes baked, mashed and as oven chips. With an adult beside you for any knife or oven step, make small samples and label them A, B and C.

Give each family member a blind taste test (eyes closed or a blindfold, and check allergies first). Ask them to rate each sample from 1 to 5 for taste and to give one texture word. Make a results chart and write which way your family liked best and why. Then write a “try it again” plan for one vegetable someone in the family does not like yet.

LOOK FOR	WHAT IT MEANS
Three ways	The same food is prepared three different ways, safely, with an adult beside for knife and oven steps.
Fair test	Samples are labeled with letters, tasters do not see them, and everyone tastes all three.
Results chart	A clear chart with each person’s ratings and texture words, and a sentence about which way won.
Try-it-again plan	A plan to taste one disliked vegetable at least 8 times, cooked in a way that might help.
Cleanup and thankfulness	The kitchen is cleaned up, and the student thanked the tasters and gave thanks for the food.

3.1 THOUSANDS OF TASTE BUDS

OBJECTIVES

- Explain what taste buds are, where they are, and how often they are replaced.
- Name the five basic tastes (sweet, salty, sour, bitter, umami) and a food for each.
- Set up a five-tastes tasting tray, record each taste on a chart, and make a tomato-and-cheese umami toast.

Warm-up. Look at your tongue in a mirror with a flashlight. Do you see little bumps? Now touch the tip of your tongue to a few grains of sugar, then to a few grains of salt. Did you taste them both at the tip? Guess: how many taste buds do you think are in your mouth: ten, a hundred, or thousands?

WATCH

How Do We Taste our Food? | The Sense of Taste | What Are Taste Buds? | The Dr. Binocs Show

Peekaboo Kidz · 6:15

<https://www.youtube.com/watch?v=imkwAY2PtLw>

WHEN TO WATCH

After the kitchen-science paragraph. Pause when Dr. Binocs shows the colored tongue and remember what you learned: every part of the tongue can taste every taste.

Note: A cartoon explanation of taste buds, taste cells and the five tastes. It briefly shows the old colored tongue map and then explains that all areas can detect all tastes, with some spots a little more sensitive.

BACKUP VIDEO

Your Tongue: The Taste-Maker!

SciShow Kids · 3:52

<https://www.youtube.com/watch?v=C4rdqXXzPGU>

A second look at the tongue, its bumps and its taste buds.

KEY TERMS

papillae

The little bumps on your tongue. Many of them hold taste buds.

taste bud

A tiny cluster of taste cells, mostly on the tongue, that sends messages about taste to your brain.

umami

The savory, brothy taste of foods like cheese, tomatoes, mushrooms and meat. Say it “oo-MAH-mee.”

bitter

A sharp taste like grapefruit peel, radishes or dark leafy greens. Children usually taste bitterness more strongly than adults.

CORE IDEAS

The story. People have always known they taste with their tongues, but no one knew exactly how. In 1867 two scientists, Gustav Schwalbe in Germany and Christian Lovén in Sweden, each looked very closely at the tongue under a microscope. Working separately, they both found tiny, onion-shaped clusters of cells tucked into the sides of the tongue’s bumps. These were the **taste buds**.

How they figured it out. The scientists sliced very thin pieces of tongue and looked at them through their microscopes, layer by layer. They saw that each taste bud is made of many long cells packed together like the sections of an orange, with a tiny opening at the top called a taste pore. Food dissolved in spit flows into the pore and touches the cells. Later scientists learned that the taste cells send messages along nerves to the brain, and that every part of the tongue that has taste buds can sense every taste. The old “tongue map” you may see in books, with sweet only at the tip and bitter only at the back, is a mistake.

The kitchen science. You have somewhere between about 2,000 and 10,000 taste buds, mostly on your tongue, and some on the roof and back of your mouth. Each one holds 50 to 100 taste cells. Your taste cells wear out and are replaced about every one to two weeks, so you are always growing new ones! Taste buds sense five basic tastes: **sweet** (fruit, honey), **salty** (pretzels), **sour** (lemons), **bitter** (grapefruit, radishes) and **umami**, the savory taste of cheese, tomatoes and mushrooms. A good cook balances these tastes in a dish.

Let's cook. You will set up a five-tastes tasting tray and then make a warm tomato-and-cheese toast, which is full of umami. The skills to do well are **tasting slowly and describing carefully**, and slicing a tomato with the claw grip, **with an adult right beside you**. The adult runs the toaster oven or oven.

PICTURE STUDY



Still Life with Oranges, Jars, and Boxes of Sweets, Luis Meléndez, about 1760–1765 · Oil on canvas ·

National Gallery of Art, Washington, D.C.

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

The Spanish painter Luis Meléndez painted food so carefully that you can almost taste it. Here are round oranges, a jar of preserves covered with paper and tied with string, and wooden boxes that held candied fruit, a special treat in his time.

Look closely

- Find the oranges. Which tastes might an orange have: sweet, sour, bitter, or more than one?
- Find the jar with paper tied over the top. What might be inside, and why is it covered?
- Find the wooden boxes. They held sweets made from fruit cooked in sugar. Which taste would they have most?
- Look at the orange peels and leaves. How did the artist make them look bumpy and shiny?

Talk about it

1. If you could taste one thing in this painting, which would you choose and what taste do you expect?

2. Orange peel tastes bitter, but the inside tastes sweet and sour. Can one food have many tastes at once?
3. The sweets in the boxes were treats kept for special days. Why might people have kept them for special times?

Safety first. Check every food on the tasting tray against your family's allergies first. Use clean spoons or toothpicks, one for each taste, and do not double-dip. Slice the tomato with the claw grip with an adult right beside you; the adult runs the toaster oven or oven and uses oven mitts.

KITCHEN PROJECT

Five-Tastes Tray and Umami Tomato Toast

You will taste five small samples, one for each basic taste, and record what you notice. Then you will make a warm cheese and tomato toast and decide which tastes you find in it.

You will need

- Five small cups or a divided plate and clean toothpicks or spoons
- A glass of water for sips between tastes
- A small serrated knife, a cutting board and a damp towel
- A baking sheet, oven mitts and a spatula
- A chart in your notebook with five columns

FIVE-TASTES TRAY AND UMAMI TOMATO TOAST

Serves 4 · Prep 20 min · Cook 5–7 min

Ingredients

- **Tasting tray:** sweet: 4 strawberry halves or a few raisins; salty: 8 small pretzels; sour: 4 thin lemon wedges; bitter: a few radish slices or grapefruit sections; umami: 4 small pieces of Parmesan cheese
- **Toast:** 4 slices whole-wheat bread
- 2 ripe tomatoes
- 1 cup grated mozzarella cheese
- 2 tablespoons grated Parmesan cheese
- 1 tablespoon olive oil, a pinch of salt and ½ teaspoon dried oregano or basil

Method

1. Wash your hands and wash the fruit and vegetables. Put each tasting food in its own cup and label the cups 1 to 5 (not with the taste names).
2. An adult heats the oven or toaster oven to 425 °F (or sets the broiler, with the rack 6 inches from the top).

3. With an adult right beside you, slice the tomatoes into thin rounds with the claw grip. Lay the bread on the baking sheet.
4. Brush or drizzle each slice of bread with a little olive oil. Cover with tomato slices, sprinkle with salt and oregano, then mozzarella and Parmesan.
5. The adult bakes the toast 5 to 7 minutes (2 to 3 minutes under a broiler, watching closely) until the cheese melts and bubbles.
6. The adult takes the pan out with oven mitts. Let the toast cool 2 minutes before you pick it up; melted cheese is very hot.
7. Clean up: wash the board, knife and cups, and wipe the counter.

Allergy check: Contains wheat and milk. For wheat-free, use gluten-free bread; for milk-free, use a dairy-free cheese and add sliced mushrooms for umami. Check the tasting tray for allergies (pretzels contain wheat).

Steps

1. **Tasting tray.** Taste the five samples one at a time, taking a sip of water between each. For each one, write the cup number, the taste you think it is, and a word to describe it (mild, strong, sharp, mellow).
2. **All over the tongue.** Dab a tiny bit of lemon juice with a clean cotton swab on the tip, the sides and the middle of your tongue. Did you taste sour in every spot? Write what happened.
3. Make the tomato toast as the recipe says.
4. **Find the tastes.** Take a bite of the toast. Which tastes can you find in it? (Salty, sour from the tomato, umami from the cheese and tomato, a little sweet.)
5. **Family rating.** Ask each person to rate the toast from 1 to 5 and name their favorite taste on the tray.
6. **Improve it.** Plan one change: a different cheese, a few mushrooms, or fresh basil leaves.
7. Clean up: wash, dry and put everything away.

Tips

- Tasting works best when your mouth is fresh. Sip water between tastes.
- Start with the mildest taste (sweet) and end with the strongest (bitter).
- If a taste is too strong, it is fine to spit it politely into a napkin.

Check your work

- ☐ I can name the five basic tastes and a food for each.
- ☐ I can explain what taste buds are and that the tongue map is a mistake.
- ☐ I tasted all five samples, recorded them, and made umami toast with an adult beside me.

COOK'S NOTEBOOK

1. Draw a big tongue with lots of bumps. Draw a close-up of one taste bud like an onion, with its taste pore at the top.
2. Copy your five-tastes chart and circle your favorite taste.
3. Copy the umami toast recipe in your own words and write which tastes you found in it.

COMMON MISTAKES

- Believing the tongue map. All five tastes can be sensed on every part of the tongue that has taste buds.
- Thinking the bumps you see are taste buds. The bumps are papillae; most taste buds are hidden in their sides.
- Double-dipping a spoon into a shared tasting cup.

Make it a game • Five Tastes Rapid Fire. Your grown-up calls a food and you have three seconds to name its taste: sweet, salty, sour, bitter or umami. Then switch. Foods like tomatoes, lemons, honey and pretzels are good ones. Score a point for each right answer. Then guess how often taste buds are replaced, and check your answer.

Scripture. “O taste and see that the LORD is good: blessed is the man that trusteth in him.” (Psalm 34:8, KJV)

The psalmist uses tasting to describe knowing God. Just as you learn what a food is like by tasting it, we come to know God’s goodness by trusting Him.

3.2 SMELL AND MEMORY

OBJECTIVES

- Tell how Helen Keller used her sense of smell to know people, places and weather.
- Explain that most of what we call flavor comes from smell, using the nose-pinch test.
- Bake cinnamon-sugar baked apples with an adult beside you and record the smells as they bake.

Warm-up. Close your eyes. An adult holds a few things under your nose one at a time: a cinnamon stick, a slice of orange, an onion, a sprig of mint, a spoonful of peanut butter (check allergies). Can you name each one by smell alone? Does any smell remind you of a place or a day you remember?

WATCH

How Your Nose Works

Nemours KidsHealth • 4:22

https://www.youtube.com/watch?v=hzOSzX_HXE4

WHEN TO WATCH

After the kitchen-science paragraph. Listen for where the smell sensors are and how the message travels to your brain.

Note: From Nemours KidsHealth, a children's health system. A cartoon journey through the nose.

BACKUP VIDEO

Five Senses: The Sense of Smell | Educational Videos for Kids

Happy Learning English • 3:32

<https://www.youtube.com/watch?v=kT7T1tcJ7gA>

A simple review of the sense of smell.

KEY TERMS

olfactory

Having to do with the sense of smell.
Say it “ol-FAK-tor-ee.”

aroma

A smell, especially a pleasant smell from food.

flavor

Everything you sense when you eat: taste from your tongue, smell from your nose, and texture and temperature from your mouth, all together.

smell receptor

A tiny sensor high inside your nose that catches smell molecules and sends a message to your brain.

CORE IDEAS

The story. Helen Keller was born in Alabama in 1880. When she was not yet two years old, an illness took away her sight and her hearing. When she was six, a teacher named Anne Sullivan came to live with her family and taught her words by tracing letters into her hand. Helen grew up to read, write books, and graduate from college. In her book *The World I Live In* (1908), she wrote about how much she learned through her nose.

How she figured it out. Because Helen could not see or hear, she paid close attention to smells. She wrote that she could often tell what work people did by the smells on their clothes: wood from a carpenter, iron from a blacksmith, the kitchen from a cook. She said she could smell a storm coming before it arrived, and that she knew a country house by the smells of hay, gardens and the barn. She found that a smell could carry her back to a memory of years before. Helen Keller learned that the nose is not a small sense at all.

The kitchen science. High inside your nose is a small patch with millions of **smell receptors**, of about 400 different kinds. When you smell cinnamon, tiny bits of it float through the air into your nose and fit into certain receptors, like keys in locks. When you chew, smells also rise from the back of your mouth up into your nose. Your brain mixes those smells with the five tastes from your tongue and calls the whole thing **flavor**. That is why food tastes flat when you have a stuffy nose: you can still taste sweet or salty, but most of the flavor is gone. Smells also travel to the parts of the brain that store memories, which is why a smell can remind you so quickly of Grandma's kitchen.

Let's cook. You will bake apples filled with oats, cinnamon and a little brown sugar. The skill to do well is **noticing aromas**: you will sniff and record how the kitchen smells at the start, the middle and the end of baking. The adult cores the apples and handles the hot oven; you fill them and watch through the oven window.

PICTURE STUDY



Helen Keller, Unknown photographer, about 1904 · Photograph

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

This photograph shows Helen Keller as a young woman, about the time she graduated from Radcliffe College. She could not see the camera or hear the photographer, yet she wrote that she knew a great deal about the world through touch and smell.

Look closely

- Look at Helen's face. Does she look calm, worried or thoughtful?
- Look at her eyes. Where is she looking? What does that tell you?
- Look at her clothes and hair. What can you tell about the time she lived in?
- Close your eyes and imagine you are Helen in this room. What might you smell?

Talk about it

1. Helen said she could tell what work people did by their smell. What smell would your family's kitchen have on your clothes after baking today?
2. Why might a person who cannot see or hear pay extra attention to smells?
3. What smell reminds you of a happy memory?

Safety first. Check the smell-test foods for allergies first, and only sniff gently; never sniff anything that is not food, such as cleaners. The adult cores the apples with a sharp knife or corer and puts the pan in and out of the hot oven with oven mitts. Baked apples are very hot inside; let them cool 10 minutes.

KITCHEN PROJECT

The Nose Knows: Cinnamon Baked Apples

First you will do the nose-pinch test to see how much your nose helps you taste. Then you will bake cinnamon apples and keep a smell log while they bake.

You will need

- An 8- or 9-inch square baking dish
- An apple corer or melon baller (for the adult)
- A small bowl, a fork and measuring cups and spoons
- Oven mitts
- Jelly beans of several flavors, or small cubes of apple and pear, for the nose-pinch test
- A timer

CINNAMON-SUGAR BAKED APPLES

Serves 4 • Prep 15 min • Bake 35–45 min

Ingredients

- 4 firm baking apples, such as Honeycrisp, Gala or Granny Smith
- $\frac{1}{3}$ cup old-fashioned rolled oats
- 3 tablespoons brown sugar
- 1 teaspoon ground cinnamon
- 2 tablespoons butter, softened
- 2 tablespoons raisins or chopped walnuts (optional)
- $\frac{1}{2}$ cup water
- Plain yogurt for serving (optional)

Method

1. An adult heats the oven to 375 °F.
2. Wash your hands and wash the apples. The adult cuts out the core of each apple from the top, leaving the bottom $\frac{1}{2}$ inch whole so the filling stays in.

3. In the bowl, mash the oats, brown sugar, cinnamon and butter together with a fork until crumbly. Stir in the raisins or nuts, if using.
4. Stand the apples in the baking dish. Spoon the filling into each apple, pressing it down with the back of the spoon.
5. Pour the water into the bottom of the dish. The adult puts the dish in the oven.
6. Bake 35 to 45 minutes, until the apples are soft when the adult pokes one with a knife.
7. The adult takes the dish out with oven mitts. Cool 10 minutes, then serve with a spoonful of yogurt and some of the syrup from the dish.
8. Clean up: soak the baking dish in hot, soapy water, and wipe the counters.

Allergy check: Contains milk (butter, yogurt); tree nuts if you add walnuts. For milk-free, use a plant-based butter or 1 tablespoon of coconut oil and skip the yogurt. Oats are often processed with wheat; use certified gluten-free oats if needed.

Steps

1. **Nose-pinch test.** Close your eyes and pinch your nose. An adult gives you a jelly bean (or a cube of apple or pear). Chew it with your nose pinched and guess the flavor. Then let go of your nose and keep chewing. What changed? Try three flavors and record your guesses.
2. Make the baked apples as the recipe says.
3. **Smell log.** Write what the kitchen smells like at 0, 15, 30 minutes and when the apples come out. Use describing words: sweet, warm, spicy, toasty, fruity.
4. **Taste test.** Eat a bite with your nose pinched, then without. Rate the apple from 1 to 5.
5. **Memory question.** Ask a grown-up in your family: what food smell reminds you of when you were a child? Write their answer.
6. **Improve it.** Plan one change: a different apple, more or less cinnamon, or a pinch of nutmeg.
7. Clean up: wash, dry and put everything away.

Tips

- Firm apples hold their shape; soft apples like McIntosh may collapse into applesauce (still tasty!).
- The water in the dish keeps the apples from scorching and makes a little syrup.
- Smell the cinnamon in the jar before and after baking. Heat makes aromas stronger.

Check your work

- ☐ I can tell how Helen Keller used her sense of smell.
- ☐ I can explain why most of flavor comes from smell, using my nose-pinch test.
- ☐ I baked apples with an adult beside me and kept a smell log.

COOK'S NOTEBOOK

1. Draw a side view of a head. Draw the smell path from a baked apple into the nose and up to the brain, and the path from the back of the mouth up into the nose.
2. Write your nose-pinch test results in a chart: flavor, guess with nose pinched, guess with nose open.
3. Copy the baked apple recipe and your smell log in your own words.

COMMON MISTAKES

- Thinking taste and flavor are the same thing. Taste is the five tastes on the tongue; flavor is taste plus smell plus texture.
- Sniffing hard at spices like pepper or chili powder. Sniff gently by waving the smell toward your nose.
- Biting into a baked apple straight from the oven. The inside stays very hot.

Make it a game • Scent Memory Match. Put three different spices in pairs of closed jars, six jars in all. Mix them up and close your eyes. Sniff two jars at a time and try to match the pairs by smell alone. Count your matches. Then tell your grown-up a smell that brings back a memory, and why smell and memory are linked.

3.3 GETTING USED TO NEW FOODS

OBJECTIVES

- Explain why children often taste bitter foods more strongly, and why tastes change as we grow.
- Explain why it can take 8 to 15 tries to learn to like a new food.
- Roast carrots two ways with an adult beside you and start a “try it again” chart.

Warm-up. Think of a food you did not like when you were little but like now. Ask a parent or grandparent the same question. Why do you think tastes change? Make a list of three foods you are not sure about yet.

WATCH

How to Make Honey Roasted Carrots | The Stay At Home Chef

The Stay At Home Chef • 2:07

<https://www.youtube.com/watch?v=zDs9ggY-QUQ>

WHEN TO WATCH

Before you cook. Watch how the cook cuts the carrots into pieces of the same size and spreads them out on the pan.

Note: A short recipe demonstration. The cook uses a large knife on whole carrots; in this lesson an adult makes the first cuts and the student cuts the halves with the claw grip.

KEY TERMS

exposure

One time of meeting a food: seeing it, smelling it or tasting it.

roast

To cook food in a hot oven, so the outside browns and the inside turns tender.

acquired taste

A food that most people learn to enjoy only after tasting it a number of times.

caramelize

To brown the natural sugars in food with heat, which makes it taste sweeter and richer.

CORE IDEAS

The story. Leann Birch was a scientist who spent her life studying how children learn to like foods. In the 1980s she and her team gave preschool children small tastes of foods that were new to them, again and again over many days. They kept careful charts of which foods the children chose and how much they liked them.

How she figured it out. Birch found that the more times children tasted a new food, the more they liked it. Many children did not like a food the first or second time, but after many small tastes, it often became one they enjoyed. Later scientists found that it can take **8 to 15 tastes** before a new food feels familiar and good. They also found that being pushed or bribed to eat it did not help nearly as much as calm, friendly tries at the family table.

The kitchen science. God made children's taste buds especially sharp, and children usually taste **bitterness** more strongly than adults. That is one reason broccoli, spinach and radishes can seem too strong at first. As you grow, and as you keep tasting, these foods often seem milder and more interesting. Cooking can help, too. When carrots **roast** in a hot oven, some of their water dries away and their natural sugars **caramelize**, so they taste sweeter and nuttier than raw carrots. When people grow very old, taste and smell often grow weaker again.

Let's cook. You will roast carrots two ways, plain with herbs and with a little honey, and compare them with raw carrots. The skill to do well is **cutting evenly**: the adult cuts each carrot in half the long way so it lies flat, and you cut the halves into pieces with the claw grip, **with the adult right beside you**. Then you will start a chart for trying a new food many times, thankfully and politely.

PICTURE STUDY



A Still Life with Cabbage, Carrots, Parsnips and Apples, Jan van Kessel the Younger, about 1650 · Oil on canvas

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

This Dutch painter set out the vegetables and fruit of a cold-weather kitchen: cabbages, carrots, parsnips and apples. These foods could be stored for months in a cool cellar. Look at all the shapes and colors.

Look closely

- Find the carrots. How are they different from the carrots you buy today?
- Find the parsnips. They look like pale carrots. Have you ever tasted one?
- Find the red cabbage and the cauliflower. Which do you think tastes more bitter raw?
- Find the apples. How many can you count?

Talk about it

1. Which of these foods would you be willing to try for the first time?
2. How could roasting change the taste of the carrots and parsnips?
3. In the 1600s, families ate these vegetables all winter long. Why do you think they learned to like them?

Safety first. An adult cuts the hard, round carrots in half the long way first; you cut the flat halves with the claw grip, with the adult right beside you. The oven is very hot: the adult puts the pans in and out with oven mitts, and you stand back. Honey is never given to babies under one year old.

KITCHEN PROJECT

Carrots Three Ways and a “Try It Again” Chart

You will taste carrots raw, roasted with herbs, and roasted with honey, and decide which you like best. Then you will pick a new vegetable to try many times this month.

You will need

- Two rimmed baking sheets and parchment paper
- A vegetable peeler
- A small serrated knife or paring knife, a cutting board and a damp towel
- Two bowls, measuring spoons and a spatula
- Oven mitts and a timer

OVEN-ROASTED CARROTS, TWO WAYS

Serves 4–6 • Prep 20 min • Roast 20–25 min

Ingredients

- 2 pounds carrots (about 12 medium)
- 3 tablespoons olive oil, divided
- ½ teaspoon salt, divided, and a pinch of black pepper
- **Herb pan:** ½ teaspoon dried thyme or 1 tablespoon chopped fresh parsley
- **Honey pan:** 1 tablespoon honey or maple syrup and a pinch of cinnamon

Method

1. An adult heats the oven to 425 °F and lines both pans with parchment paper.
2. Wash your hands and scrub or peel the carrots. Save one raw carrot for the taste test.
3. The adult cuts each carrot in half the long way. With the adult right beside you, lay the halves flat and cut them into 2-inch pieces with the claw grip. Try to make them all about the same size.

4. Put half the carrots in each bowl. Add 1½ tablespoons oil and ¼ teaspoon salt to each bowl. Add the thyme to one bowl and the honey and cinnamon to the other. Toss well.
5. Spread each bowl onto its own pan in one layer, with space between pieces. Label the pans “herb” and “honey.”
6. The adult roasts both pans 20 to 25 minutes, until the carrots are tender and browned at the edges. Halfway through, the adult takes out the pans and you stir the carrots with a spatula while the pans sit on the stovetop.
7. Cool 5 minutes. Clean up while they cool.

Allergy check: Contains none of the nine major allergens. Honey is not for babies under one year; use maple syrup instead.

Steps

1. **Raw first.** Taste a raw carrot stick. Write three words about it (crunchy, sweet, earthy...).
2. Roast the carrots two ways as the recipe says.
3. **Three-way taste test.** Taste raw, herb-roasted and honey-roasted carrots. Rate each from 1 to 5 for sweetness and for how much you like it. Ask your family to rate them too.
4. **What changed?** Compare the roasted and raw carrots. Which is softer? Which is sweeter? Write one sentence explaining why, using the word *caramelize*.
5. **Try it again chart.** Choose one vegetable you do not like yet. Make a chart with 10 boxes. Each time you taste it (a small, polite bite) this month, color a box and write one word about it. Give thanks for it before you try.
6. **Improve it.** Plan one change: a different herb, adding parsnips, or cutting smaller pieces.
7. Clean up: wash, dry and put everything away.

Tips

- Small, polite tastes count. You do not have to eat a whole serving to learn to like a food.
- Try new foods next to a food you already like.

- Roasting works on many vegetables: broccoli, cauliflower, green beans and Brussels sprouts.

Check your work

- ☐ I can explain why children often taste bitterness more strongly and why tastes change.
- ☐ I can explain why it can take 8 to 15 tries to like a new food.
- ☐ I roasted carrots two ways with an adult beside me and started a “try it again” chart.

COOK’S NOTEBOOK

1. Draw three carrot pieces: raw, herb-roasted and honey-roasted. Label each with your rating.
2. Draw your “try it again” chart with 10 boxes, and fill in the first one.
3. Copy the roasted carrot recipe in your own words.

From history. Most carrots long ago were purple, yellow or white. Orange carrots became common in the Netherlands in the 1600s, around the time this picture was painted, and they spread around the world. Today you can still buy purple and yellow carrots at many markets.

COMMON MISTAKES

- Deciding you dislike a food after one bite. It often takes 8 to 15 tries.
- Saying “Yuck!” at the table. A thankful “No, thank you” or “I’ll try a small bite” is kinder to the cook.
- Cutting carrot pieces in many sizes, so the thin ones burn and the thick ones stay hard.

Make it a game • Persuade the Picky Eater. Your grown-up plays a picky eater who refuses bitter vegetables. You have one minute to persuade with facts: children taste bitter more strongly, tastes change as we grow, it takes 8 to 15 tries to learn to like a food, and roasting makes foods sweeter. Score a point for each fact you use.

3.4 TEXTURE AND CRUNCH

OBJECTIVES

- Tell the legend of George Crum and the Saratoga potato chip, and what history really shows.
- Describe foods with texture words and explain why chips are crunchy and why they go stale.
- Bake oven potato chips with an adult beside you and test them for crunch.

Warm-up. Gather five foods with different textures: a cracker, a slice of banana, a raisin, a spoonful of yogurt and a piece of apple. Close your eyes and eat each one. Without looking, describe each one with one texture word: crunchy, creamy, chewy, soft, crisp, juicy or smooth.

WATCH

Homemade Baked Potato Chips

Home Cooking Adventure · 1:44

<https://www.youtube.com/watch?v=FvKuG1SggGk>

WHEN TO WATCH

Before you cook. Notice how thin the slices are and how they are spread out on the pan in one layer.

Note: A short, quiet recipe video with on-screen captions. The cook uses a mandoline slicer; in this lesson only the adult uses a mandoline.

BACKUP VIDEO

How to Make Homemade Potato Chips

America's Test Kitchen · 2:59

<https://www.youtube.com/watch?v=iWjfukK7yHk>

To see how the old Saratoga-style chips are fried, and why the slices are rinsed and soaked to wash off starch.

KEY TERMS

texture

How food feels in your mouth: crunchy, creamy, chewy, smooth, crisp and so on.

crisp

Dry and firm, so it snaps and crunches when you bite it.

stale

No longer fresh. Crisp foods go stale by soaking up water from the air and turning soft.

evaporate

To change from a liquid into a gas. In the oven, water in the potato slices evaporates and leaves them dry and crisp.

CORE IDEAS

The story. A famous story says the potato chip was invented in 1853 at Moon's Lake House, a restaurant in Saratoga Springs, New York. The cook, George Crum, was serving fried potatoes. The story says a customer kept sending them back because they were too thick and soggy, so Crum sliced the potatoes paper-thin and fried them until they crackled. The customer loved them, and "Saratoga chips" became famous.

How they figured it out. Historians love a good story, but they also check the facts. When they looked at old cookbooks, they found recipes for thin, fried potato slices long before 1853. An English cookbook by William Kitchiner, *The Cook's Oracle* (1817), told cooks to fry potatoes "in slices or shavings," and the American cookbook *The Virginia House-Wife* by Mary Randolph (1824) had a similar recipe. So George Crum probably did not invent the chip. But Saratoga Springs did make chips famous, and Crum later opened his own restaurant there.

The kitchen science. A raw potato is full of water, which makes it firm and juicy. When a thin slice cooks in a hot oven, the water **evaporates** as steam. Without its water, the potato's starch turns hard and glassy, so the chip is **crisp** and breaks with a crunch. Thin slices dry out fast and crisp; thick slices stay soft inside. If you leave chips open on the counter, they soak up water from the air and go **stale**: soft and bendy. That is why chip bags are sealed, and why crackers are stored in airtight containers.

Let's cook. You will bake potato chips in the oven. Very thin slices need a very sharp tool, so **an adult slices the potatoes** (with a mandoline or a sharp knife). Your job is

to dry the slices, oil and season them, lay them in one layer, and watch them closely through the oven window. The skill to do well is **spreading every slice flat with no overlaps**, so each one crisps.

PICTURE STUDY



Basket of Potatoes, Vincent van Gogh, September 1885 · Oil on canvas · Van Gogh Museum, Amsterdam

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

Vincent van Gogh painted many pictures of potatoes when he lived among farm families in the Netherlands. He used thick, earthy brown and green paint. Look at how he made the potatoes look heavy and solid.

Look closely

- Find the basket. How did the painter show the woven pattern?
- Look at one potato. Is its skin smooth or bumpy? How can you tell?
- Look at the colors. Why do you think he used dark browns and greens?
- Count the potatoes outside the basket.

Talk about it

1. How would these potatoes feel in your hand? How would that change if they were sliced thin and baked?
2. Name three different textures you can make from potatoes (mashed, baked, chips...).
3. Why do you think Van Gogh chose to paint something as plain as a basket of potatoes?

Safety first. Only an adult uses a mandoline or a sharp knife to make the very thin slices; mandoline blades are extremely sharp. The oven is very hot: the adult puts the pans in and out with oven mitts. Thin chips burn quickly, so check them often through the oven window.

Crunch Lab: Oven-Baked Potato Chips

You will bake potato chips, test thin and thick slices for crunch, and do a stale test to see what air does to crisp food.

You will need

- Two rimmed baking sheets and parchment paper
- A mandoline or sharp knife (for the adult only)
- A large bowl of cold water and a colander
- Clean kitchen towels or paper towels
- Measuring spoons, a pastry brush or clean hands
- Oven mitts, a spatula and a timer
- Two zip-top bags

OVEN-BAKED POTATO CHIPS

Serves 4 · Prep 20 min · Bake 15–25 min per pan

Ingredients

- 2 medium russet or Yukon Gold potatoes, scrubbed
- 2 tablespoons olive oil or vegetable oil
- ½ teaspoon salt
- Optional seasonings: ¼ teaspoon garlic powder, paprika or dried dill

Method

1. An adult heats the oven to 400 °F and lines the pans with parchment paper.
2. Wash your hands and scrub the potatoes under running water.
3. An adult slices the potatoes very thin, about ⅛ inch (as thin as two coins), using a mandoline or a sharp knife.
4. Put the slices in a bowl of cold water and swish them for 1 minute to wash off loose starch. Drain them in the colander.

5. Lay the slices on a towel and pat them very dry. Dry slices crisp; wet slices steam.
6. Toss the slices in a dry bowl with the oil, salt and seasonings. Lay them on the pans in one layer, not touching.
7. The adult bakes them 15 to 25 minutes, turning the pan halfway, until golden with brown edges. Watch closely at the end: they go from golden to burnt quickly. The adult takes out any chips that brown first.
8. Cool the chips on the pan for 5 minutes; they crisp up as they cool.
Clean up while they cool.

Allergy check: Contains none of the nine major allergens.

Steps

1. **Thin and thick test.** Ask the adult to cut 5 slices thick (about $\frac{1}{4}$ inch). Put them on a corner of the pan. Predict: which will be crunchier?
2. Bake the chips as the recipe says.
3. **Crunch test.** Snap a thin chip and a thick chip near your ear. Which one makes a louder crunch? Write what you hear and feel.
4. **Stale test.** Put 3 chips in a sealed zip-top bag and leave 3 chips on an open plate overnight. The next day, snap one from each. What happened? Why?
5. **Taste test.** Rate the chips from 1 to 5 for crunch and flavor. Ask your family to rate them.
6. **Improve it.** Plan one change: thinner slices, a different seasoning, or a lower oven temperature with a longer time.
7. Clean up: wash, dry and put everything away; the adult cleans the mandoline.

Tips

- Drying the slices well is the secret to crispness.
- Chips near the edges of the pan brown first. Move them to the middle or take them out early.
- Store any leftover chips in an airtight container.

Check your work

- ☐ I can tell the Saratoga chip legend and what old cookbooks show.

- ☐ I can explain why chips are crunchy and why they go stale.
- ☐ I made oven chips safely, with an adult doing the thin slicing and the hot oven.

COOK'S NOTEBOOK

1. Make a texture word bank: write ten texture words and draw a food next to each.
2. Draw a potato slice before and after baking. Draw steam arrows leaving it.
3. Write the results of your crunch test and stale test and copy the recipe in your own words.

From history. Potato chips were first sold mostly in barrels or paper bags at shops, and they went stale fast. In the 1920s and 1930s, makers began sealing chips in waxed paper bags, and later in airtight bags filled with a little extra gas, so chips could stay crisp for weeks.

COMMON MISTAKES

- Putting wet slices in the oven. They steam and turn chewy instead of crisp.
- Overlapping the slices on the pan, so they stick together and stay soft.
- Using a mandoline yourself. Its blade is sharp enough to cut fingers badly; this is always an adult job.
- Leaving chips or crackers open to the air. They go stale.

Make it a game • Chip Story Truths. Write three statements about potato chips: two true, one false. Use the George Crum story, what history really shows, and why chips go stale. Your grown-up guesses the tall tale, then writes three of their own. Score a point for each right guess. Use the words crisp and evaporate in your statements.

UNIT 3

TASTE, SMELL & YOUR TASTE BUDS

“O taste and see that the LORD is good” (Psalm 34:8). God gave you a tongue covered with thousands of tiny taste buds and a nose that can tell apart a great many smells. In this unit you will find out how they work together. You will taste the five basic tastes (**sweet, salty, sour, bitter and umami**) on a tasting tray, learn why your nose does most of the work of flavor, and hear how Helen Keller, who could not see or hear, knew her world through smell.

You will also learn why a food you did not like at first can become a favorite after you taste it again and again, and you will explore **texture**: crunchy, creamy, chewy and crisp. You will bake a cinnamon apple, roast carrots two ways, and make oven-baked potato chips, and you will practice trying new foods with a thankful heart.

PREREQUISITES

- Uses the claw grip with an adult beside (Lesson 1.2)
- Uses the oven with an adult beside and stands back when the door opens (Lesson 2.2)
- Knows to check every taste test for food allergies first (Unit 1)

MASTERY CHECKLIST

- ☐ I can name the five basic tastes and a food for each.
- ☐ I can explain what taste buds are and that they are replaced every week or two.
- ☐ I can explain that all tastes are sensed all over the tongue, and that most of flavor comes from smell.
- ☐ I can tell why it can take 8 to 15 tries to like a new food, and I keep a “try it again” chart.
- ☐ I can describe food with texture words and explain why chips are crunchy and why they go stale.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A small hand mirror and a flashlight:** For looking at the bumps on your tongue in Lesson 3.1.
- **Small paper cups and toothpicks for tasting trays:** Handy for the tasting trays and the unit challenge. Any small bowls work too.
- **A sleep mask or clean scarf for blindfolded taste tests:** Optional, for Lessons 3.2 and the unit challenge. Some children prefer simply to close their eyes.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

3.1 Thousands of Taste Buds	2 sessions of 45–60 minutes
3.2 Smell and Memory	2 sessions of 45–60 minutes
3.3 Getting Used to New Foods	2 sessions of 45–60 minutes
3.4 Texture and Crunch	2 sessions of 45–60 minutes

UNIT 3 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

Name the five basic tastes and a food for each.

2. **5 pts**

What are taste buds, and how often are taste cells replaced?

3. **5 pts**

Is the tongue map (sweet at the tip, bitter at the back) true? Explain.

4. **5 pts**

Predict: you pinch your nose and eat a cherry jelly bean. What will you taste?
What will happen when you let go?

5. (5 pts)

How did Helen Keller use her sense of smell?

6. (5 pts)

Why can a vegetable like broccoli taste too strong to a child but fine to an adult?

7. (5 pts)

About how many tries can it take to learn to like a new food?

8. (5 pts)

Why do roasted carrots taste sweeter than raw ones?

9. (5 pts)

Predict: you leave a bowl of potato chips uncovered on the counter overnight.

What will happen, and why?

10. (5 pts)

What did historians find when they checked the George Crum potato-chip story?

ANSWER KEY

1. Sweet (strawberries), salty (pretzels), sour (lemons), bitter (radishes or grapefruit), umami (Parmesan cheese or tomatoes). Other examples are fine.
2. Tiny clusters of taste cells, mostly on the tongue, that send taste messages to the brain. The cells are replaced about every one to two weeks.
3. No. Every part of the tongue that has taste buds can sense all five tastes.
4. With your nose pinched you will taste only sweet (and maybe sour). When you let go, the smell rises into your nose and you suddenly taste cherry flavor.
5. She knew people's work by the smells on their clothes, smelled storms coming, knew places by their smells, and found that smells brought back memories.
6. Children usually taste bitterness more strongly than adults. Tastes change as we grow and as we keep tasting a food.
7. About 8 to 15 small tastes.
8. In the hot oven some of their water dries away and their natural sugars caramelize (brown).
9. They will go stale and soft, because they soak up water from the air.
10. Older cookbooks, such as Kitchiner's *The Cook's Oracle* (1817) and Mary Randolph's *The Virginia House-Wife* (1824), already had recipes for thin fried potato slices, so Crum probably did not invent the chip, though Saratoga made chips famous.

UNIT CHALLENGE: A FAMILY BLIND TASTE TEST

Choose one food and prepare it three ways, such as apples raw, baked and as applesauce, or potatoes baked, mashed and as oven chips. With an adult beside you for any knife or oven step, make small samples and label them A, B and C.

Give each family member a blind taste test (eyes closed or a blindfold, and check allergies first). Ask them to rate each sample from 1 to 5 for taste and to give one texture word. Make a results chart and write which way your family liked best and why. Then write a “try it again” plan for one vegetable someone in the family does not like yet.

LOOK FOR	WHAT IT MEANS
Three ways	The same food is prepared three different ways, safely, with an adult beside for knife and oven steps.
Fair test	Samples are labeled with letters, tasters do not see them, and everyone tastes all three.
Results chart	A clear chart with each person’s ratings and texture words, and a sentence about which way won.
Try-it-again plan	A plan to taste one disliked vegetable at least 8 times, cooked in a way that might help.
Cleanup and thankfulness	The kitchen is cleaned up, and the student thanked the tasters and gave thanks for the food.

UNIT 4

HEAT & COLD

Cooking is mostly about moving heat: into food to cook it, and out of food to keep it fresh. In this unit you will meet **Frederic Tudor**, the “Ice King,” who shipped blocks of frozen pond water from Boston to hot islands far away, and **James Dewar**, whose vacuum flask became the thermos that keeps soup hot in a lunch box.

You will learn the difference between **boiling**, **simmering** and **poaching**, and see how an oven bakes with **heat all around**. Along the way you will learn the three ways heat moves (conduction, convection and radiation), make fruit slushies, cook a pot of soup for a thermos, poach eggs, and bake a pan of golden cornbread.

PREREQUISITES

- Cooks at the stove only with an adult beside, handles turned in (Unit 1)
- Knows the danger zone, 40–140 °F, and the two-hour rule (Unit 1)
- Reads a food thermometer (Lesson 1.3)
- Cuts soft foods with the claw grip with an adult beside (Lesson 1.2)

MASTERY CHECKLIST

- ☐ I can tell the story of Frederic Tudor and explain how sawdust and icehouses kept ice from melting.
- ☐ I can explain how a thermos keeps hot food hot and cold food cold.
- ☐ I can tell boiling, simmering and poaching apart by their bubbles and temperatures.
- ☐ I can name the three ways heat moves (conduction, convection, radiation) and find each one in my kitchen.
- ☐ I can cook soup, poach eggs and bake cornbread safely with an adult beside me.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A small insulated food jar (thermos):** For Lesson 4.2 and the unit challenge. Any wide-mouth insulated jar for soup works.
- **An instant-read food thermometer:** Used in every lesson of this unit to measure ice, soup, simmering water and cornbread.
- **National Center for Home Food Preservation:** Free. Tested advice on freezing and preserving food from the University of Georgia, for parents who want to learn more about keeping food cold and safe.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

4.1 Frederic Tudor, the Ice King	2 sessions of 45–60 minutes
4.2 The Thermos and a Bowl of Hot Soup	2 sessions of 45–60 minutes
4.3 Boiling, Simmering and Poaching	2 sessions of 45–60 minutes
4.4 Baking: Heat All Around	2 sessions of 45–60 minutes

UNIT 4 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
What was Frederic Tudor's idea, and why did he lose money at first?
2. **5 pts**
Why does sawdust keep ice from melting?
3. **5 pts**
Name the three ways heat moves and give a kitchen example of each.
4. **5 pts**
How does a thermos keep soup hot?

5. **5 pts**

How hot should soup be when it goes in a thermos, and how hot should it stay until lunch?

6. **5 pts**

At what temperature does water boil at sea level, in °F and °C?

7. **5 pts**

Predict: a pot of water is boiling hard. You turn the burner up to high. Will the water get hotter than 212 °F? Why?

8. **5 pts**

How can you tell boiling, simmering and poaching apart by looking?

9. **5 pts**

Predict: what will happen when baking powder in cornbread batter gets wet and hot?

10. **5 pts**

How did Squanto help the Plymouth settlers?

ANSWER KEY

1. To cut ice from New England ponds and ship it to hot places like Martinique. At first he had nowhere to store it, people did not know how to use it, and much of it melted.
2. It is insulation: it is full of tiny pockets of still air, which slows heat moving from the warm air into the ice.
3. Conduction (a hot pan heating its handle), convection (hot air flowing in an oven or water rising in a pot), radiation (warmth from a toaster's glow).
4. The vacuum between its two walls stops conduction and convection, the shiny walls bounce back radiated heat, and the stopper keeps hot air in.
5. Steaming hot, 165 °F, when packed; it should stay at 140 °F or hotter.
6. 212 °F and 100 °C.
7. No. Once water boils, extra heat turns more water into steam, so it only boils faster; the temperature stays at about 212 °F.
8. Boiling has big bubbles breaking all over; simmering has small, gentle bubbles here and there; poaching water barely moves, with only a few tiny bubbles.
9. It will make bubbles of carbon dioxide gas that make the batter rise; then the heat sets the batter around the bubbles.
10. He showed them how to plant corn in hills with fish to feed the soil, so they had a good harvest in 1621.

UNIT CHALLENGE: KEEP IT HOT, KEEP IT COLD

Run a hot-and-cold experiment and turn it into a meal. With an adult beside you at the stove, cook a pot of soup (Lesson 4.2's or a family recipe). Pack one serving in a warmed thermos, one in an ordinary covered container, and one in a bowl on the counter. In the same way, pack a cold yogurt cup in a lunch box with two ice packs and another with none.

Check every temperature after 4 hours and record them in a table. Which stayed safe (hot at 140 °F or above, cold at 40 °F or below)? Eat only the ones that stayed safe.

Write a paragraph explaining your results using the words conduction, convection, radiation and insulation.

LOOK FOR	WHAT IT MEANS
Safe cooking	The soup was cooked with an adult beside, packed steaming hot, and anything that fell into the danger zone was not eaten.
Fair test	Same amounts, same starting temperatures, and the same time for every container.
Records	A clear table of temperatures with times, and a simple bar graph or chart.
Science explanation	Correctly explains the results with the words conduction, convection, radiation and insulation.
Cleanup and improvement	The kitchen was cleaned, and one idea for keeping lunch hot or cold better next time is written down.

4.1 FREDERIC TUDOR, THE ICE KING

OBJECTIVES

- Tell how Frederic Tudor shipped ice from New England to the Caribbean starting in 1806.
- Explain how sawdust, icehouses and big blocks kept ice from melting, using the word insulation.
- Make fruit slushies with an adult nearby at the blender, and run an ice-melting test.

Warm-up. Put one ice cube on a plate and another ice cube wrapped in a folded dish towel next to it. Guess: which one will melt first? Leave them while you read the story, and check them at the end.

WATCH

The Hidden History of Ice Harvesting in New England

Boston University • 4:48

<https://www.youtube.com/watch?v=6QjX50ofbrM>

WHEN TO WATCH

After the story. Look for the old pictures of men cutting ice on the ponds and the ships that carried it.

Note: A history professor from Boston University tells how New England ice was harvested and shipped around the world, with old photographs and prints.

KEY TERMS

insulation

A material that slows down heat moving from one place to another, like sawdust around ice or the walls of a cooler.

icehouse

A thick-walled building, often partly underground, where blocks of ice were packed in sawdust or straw to keep them frozen for months.

melt

To change from a solid to a liquid when heat moves in, as ice turns into water at 32 °F.

ice harvest

Cutting thick blocks of ice from frozen ponds and lakes in winter to store and sell.

CORE IDEAS

The story. In 1805 a young man in Boston named Frederic Tudor had an idea that made people laugh. In New England, the ponds froze thick every winter. In the hot islands of the Caribbean, there was no ice at all. Why not cut ice from the ponds and sail it south? In February 1806 Tudor loaded a ship called the *Favorite* with ice and sent it to the island of Martinique. The ice arrived, but Tudor had nowhere to store it, few people knew what to do with it, and much of it melted. He lost money that year and for many years after.

How he figured it out. Tudor did not give up. He tested ways to keep ice from melting. He packed the blocks tightly together and surrounded them with **sawdust**, which was cheap and plentiful at sawmills. He built thick-walled **icehouses** in the ports where he sold ice. In 1825 his partner Nathaniel Wyeth invented a horse-drawn ice cutter that scored the ice into neat, even blocks, so they packed together with no gaps. Tudor taught people to cool drinks and keep food with ice. In time his ships carried New England ice all the way to India, and people called him the “Ice King.”

The kitchen science. Heat always moves from something warmer to something colder. Ice melts when heat from warm air moves into it. **Insulation** slows that heat down. Sawdust works because it is full of tiny pockets of trapped air, and still air does not carry heat well. Big blocks packed close together melt more slowly than small, loose pieces, because less of their surface touches the warm air. Your refrigerator, your freezer and a picnic cooler all use insulation in their walls for the same reason.

Let’s cook. You will make icy fruit slushies in a blender and run an ice-melting test. The skill to do well is **using the blender safely**: the lid goes on before you press the button, your hands stay out of the jar, and **an adult stays right beside you** and unplugs the blender before anyone reaches in.

PICTURE STUDY



Knickerbocker Co. Cutting Ice, Rockland Lake, Unknown artist, published by the Knickerbocker Ice Company, 1846 · Lithograph · Library of Congress, Washington, D.C.

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

This print shows ice harvesters at work on Rockland Lake in New York in 1846. Men and horses cut the frozen lake into blocks and moved them toward the big icehouses on the shore. Ice from here was shipped down the Hudson River to New York City.

Look closely

- Find the horses. What are they pulling across the ice?
- Find the straight lines and the open water channels. How do you think the blocks were moved to shore?
- Find the long wooden buildings. What were they for?
- Look at the men's clothes and tools. How cold do you think it was?

Talk about it

1. Why did the workers cut the ice into even rectangles instead of chunks of any shape?
2. How did the icehouses keep the ice frozen through the summer?
3. Before refrigerators, how would a family use a block of this ice in the kitchen?

Safety first. The blender blade is very sharp. Put the lid on before blending, keep your hands and spoons out of the jar while it runs, and have the adult unplug it before anyone scrapes it out. Stay off frozen ponds and lakes unless an adult says the ice is safe.

Ice King Slushies and the Ice-Melting Test

You will test which wrapping keeps ice frozen longest, just as Frederic Tudor did, and then blend cold fruit slushies for your family.

You will need

- A blender
- Measuring cups and spoons
- 4 short glasses and spoons
- For the test: 4 ice cubes, 4 small plates, a dish towel, newspaper, a sock filled with sawdust, rice or cotton balls, and a timer
- A thermometer

FROZEN FRUIT SLUSHIES

Serves 4 (about 1 cup each) • Prep 10 min

Ingredients

- 2 cups frozen fruit, such as strawberries, mango, pineapple or peaches
- 1 cup 100% fruit juice (orange or apple) or cold water
- 1 cup ice cubes
- 1 tablespoon honey or a squeeze of lemon or lime juice (optional)

Method

1. Wash your hands. Measure the frozen fruit, juice and ice into the blender jar. Add the honey or lemon if you like.
2. Put the lid on tightly. With an adult beside you, blend on low for 10 seconds, then on high for 30 to 60 seconds, until smooth and slushy.
3. If it is too thick to blend, the adult stops and unplugs the blender, and you add 2 more tablespoons of juice. Put the lid back on and blend again.
4. Pour into glasses and serve right away with spoons.
5. Clean up: the adult unplugs the blender. Fill the jar halfway with warm water and a drop of soap, put the lid on and blend 10 seconds, then

rinse.

Allergy check: Contains none of the nine major allergens. Honey is not for babies under one year.

Steps

1. **Ice-melting test.** Put one ice cube on each of four plates: one bare, one wrapped in a dish towel, one wrapped in newspaper, and one buried in a sock of sawdust, rice or cotton balls. Predict which will last longest.
2. Check every 15 minutes. Write how much of each cube is left. Which wrapping worked best? Which was most like Tudor's sawdust?
3. Make the slushies as the recipe says, with an adult beside you at the blender.
4. **Temperature check.** Put the thermometer in your slushy. Write the temperature. Is it colder or warmer than the freezing point of water, 32 °F?
5. **Taste test.** Rate your slushy from 1 to 5. Try a second batch with a different fruit and compare.
6. **Improve it.** Plan one change: more fruit and less ice for a stronger flavor, or a mix of two fruits.
7. Clean up: wash, dry and put everything away, and wipe up melted ice.

Tips

- Frozen fruit makes a thick, cold slushy without needing much ice.
- If you have no blender, crush ice in a zip-top bag wrapped in a towel by tapping it with a rolling pin, then pour juice over it.
- Drink slowly. Very cold drinks can give you a "brain freeze."

Check your work

- ☐ I can tell how Frederic Tudor shipped and stored ice.
- ☐ I can explain how insulation keeps ice from melting.
- ☐ I made slushies safely with an adult beside me at the blender and ran an ice test.

COOK'S NOTEBOOK

1. Draw Tudor's ship sailing from Boston to Martinique with blocks of ice packed in sawdust in the hold.
2. Make a chart of your ice-melting test: wrapping, time, how much was left.

3. Copy the slushy recipe in your own words and draw your glass.

From history. The writer Henry D. Thoreau lived beside Walden Pond in Massachusetts in 1846 and 1847. In winter he watched a crew of a hundred men cut ice from the pond, and he wrote that the ice of Walden might be carried far across the sea. Some of it may have sailed on Tudor's ships.

COMMON MISTAKES

- Reaching into a blender or scraping it with a spoon while it is plugged in.
- Thinking a blanket or towel makes things warm. It only slows heat moving in or out; that is why a towel kept the ice frozen longer.
- Leaving the freezer door open while you take out the fruit. Cold air spills out and warm air rushes in.

Make it a game • Ice King Melt Duel. Put an ice cube in each of three cups. Leave one bare, wrap one in a wool sock, and wrap one in foil. Predict the order they will melt and how many minutes each will last. Write it down. Check every five minutes. Closest guess wins. Use the word insulation to explain the results.

Scripture. "He casteth forth his ice like morsels: who can stand before his cold?" (Psalm 147:17, KJV)

"Morsels" are small pieces, like bits of bread. Frederic Tudor shipped pieces of God's winter ice to people who had never seen it.

4.2 THE THERMOS AND A BOWL OF HOT SOUP

OBJECTIVES

- Tell how James Dewar invented the vacuum flask in 1892 and how it became the Thermos.
- Explain how a thermos slows conduction, convection and radiation.
- Cook a pot of chicken noodle soup with an adult beside you and keep it hot in a thermos for lunch.

Warm-up. Fill a mug and a thermos with the same hot tap water. Put the thermometer in each and write the temperatures. Close the thermos. Guess: which one will be hotter after an hour? Leave them while you read.

WATCH

HOTS Questions | Heat | How Does A Thermos Flask Work?

ExperiHub · 3:57

<https://www.youtube.com/watch?v=iv5EblrWgh4>

WHEN TO WATCH

After the kitchen-science paragraph. Point to each part of the flask on the screen: the two walls, the vacuum, the shiny lining and the stopper.

Note: A short animated explanation with labeled diagrams, made for school science classes.

KEY TERMS

vacuum

A space with almost no air in it. Heat cannot travel through it by conduction or convection.

convection

Heat moving by flowing air or liquid, such as hot water rising in a pot.

conduction

Heat moving through touching, such as from a hot pot into the handle.

radiation

Heat moving through space as invisible rays, such as the warmth you feel from the sun or a toaster.

CORE IDEAS

The story. In 1892 a Scottish scientist in London named James Dewar was working with gases so cold they had turned into liquids. He needed a way to keep them from warming up and boiling away. He made a glass bottle with two walls, one inside the other, and pumped the air out of the space between them. His bottle worked so well that it kept cold liquids cold for a long time. It also kept hot liquids hot.

How they figured it out. Dewar shared his invention with other scientists and did not try to sell it. But in 1904 two German glassblowers, Reinhold Burger and Albert Aschenbrenner, saw that families could use his flask too. They started a company to make strong flasks with metal cases for travelers, workers and explorers, and they held a contest to name it. The winning name was **Thermos**, from the Greek word for heat. Soon thermos bottles went on long journeys, and later into children's lunch boxes.

The kitchen science. Heat moves in three ways. **Conduction** is heat moving through things that touch. **Convection** is heat carried by moving air or water. **Radiation** is heat traveling as invisible rays. A thermos blocks all three. The **vacuum** between its walls has almost no air, so heat cannot conduct or flow across it. The walls are shiny, which bounces radiated heat back inside. The stopper keeps hot air from escaping out the top. For food safety, hot soup in a thermos should stay at **140 °F or hotter** until lunch, so start with steaming-hot soup in a thermos that has been warmed first.

Let's cook. You will cook a pot of chicken noodle soup and pack some in a thermos. **An adult stands beside you at the stove the whole time.** The skills to do well are **stirring a big pot safely** (handle turned in, long spoon, face back from the steam) and **cutting vegetables with the claw** while the adult cuts the hard onion in half first.

PICTURE STUDY



Girl Eating Soup, Albert Anker, 1898 · Oil on canvas

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

Albert Anker was a Swiss painter who loved to paint children in their homes and schools. Here a little girl is busy with her bowl of soup, with a chunk of bread beside it. She is paying careful attention to her spoon.

Look closely

- Find the bowl and the spoon. Is she eating quickly or carefully? Why might she be careful?
- Find the bread. Which food group is it in?
- Look at the glass. What do you think is in it?
- Look at her face. How do you think the soup tastes to her?

Talk about it

1. If this soup were packed in a thermos for school, how would it stay hot until lunch?
2. What would you put in a bowl of soup to make it a balanced meal?
3. Anker painted ordinary moments. Why do you think a bowl of soup was worth painting?

Safety first. An adult stands beside you at the stove. Turn the pot handle in, stir with a long spoon, keep your face back from the steam, and let the adult ladle the hot soup and pour boiling water into the thermos. Pack soup steaming hot (165 °F) so it stays above 140 °F until lunch, and eat it within 4 to 5 hours.

KITCHEN PROJECT

Chicken Noodle Soup for the Thermos

You will cook chicken noodle soup, pack it in a warmed thermos, and measure how hot it stays over the morning.

You will need

- A large pot with a lid and a long wooden spoon
- A small serrated knife or paring knife, a cutting board and a damp towel
- Measuring cups and spoons
- A ladle
- An insulated food jar (thermos) and a mug
- An instant-read thermometer and a timer

EASY CHICKEN NOODLE SOUP

Serves 6 • Prep 20 min • Cook 25 min

Ingredients

- 1 tablespoon olive oil or butter
- 1 medium onion
- 2 carrots, peeled
- 2 stalks celery
- 8 cups low-sodium chicken broth
- 1 teaspoon dried thyme and ½ teaspoon salt (taste and add more at the end)
- 2 cups (about 4 ounces) wide egg noodles
- 2 cups cooked chicken, pulled into bite-size pieces (from a rotisserie chicken or leftovers)
- 2 tablespoons chopped fresh parsley (optional)

Method

1. Wash your hands. The adult cuts the onion in half and peels it. With the adult beside you, chop the onion, carrots and celery into small pieces with the claw grip.

2. With the adult beside you, heat the oil in the pot over medium heat. Add the vegetables and stir often for 5 minutes, until the onion is soft.
3. Add the broth, thyme and salt. Turn the heat up and bring to a boil, then turn it down to a simmer and cook 10 minutes, until the carrots are tender.
4. Add the noodles and simmer 6 to 8 minutes (check the package time), stirring now and then.
5. Add the chicken and simmer 2 to 3 minutes more, until everything is hot. The adult checks that the soup is 165 °F. Stir in the parsley and taste for salt.
6. The adult ladles soup into bowls. Let it cool a few minutes before you eat.
7. Cool leftovers in shallow containers and refrigerate within 2 hours.
Clean up and wipe the stove when it is cool.

Allergy check: Contains wheat and eggs (egg noodles); milk if you use butter. For wheat- and egg-free soup, use rice or gluten-free pasta and olive oil.

Steps

1. **Thermos warm-up.** While the soup cooks, the adult fills the thermos with boiling water, closes it and lets it stand 5 minutes. Then the adult pours out the water.
2. Cook the soup as the recipe says, with the adult beside you.
3. **Fill and test.** The adult fills the warmed thermos with steaming soup (at least 165 °F) and closes it. Ladle the same amount into a mug and leave it uncovered.
4. **Temperature log.** Every hour for four hours, check the mug's temperature, and at the end open the thermos and check it once. Make a table. Which one stayed above 140 °F?
5. Eat the thermos soup for lunch. (Pour the cooled mug soup back into the pot only if less than 2 hours have passed; otherwise put it in the refrigerator.)
6. **Taste test and improve it.** Rate your soup from 1 to 5. Plan one change: different vegetables, more thyme, or rice instead of noodles.

7. Clean up: wash the pot, ladle and thermos, and leave the thermos open to dry.

Tips

- Opening the thermos to peek lets heat out. Check only at the end.
- Noodles keep soaking up broth. If you plan leftovers, cook the noodles separately and add them to each bowl.
- Fill the thermos almost to the top; less air inside means it stays hotter.

Check your work

- ☐ I can tell how James Dewar's flask became the Thermos.
- ☐ I can explain how a thermos stops conduction, convection and radiation.
- ☐ I cooked soup safely with an adult beside me and kept it hot in a thermos.

COOK'S NOTEBOOK

1. Draw a thermos cut in half. Label the inner wall, outer wall, vacuum, shiny lining and stopper.
2. Make a line graph of your temperature log: one line for the mug, one dot for the thermos.
3. Copy the soup recipe in your own words.

From history. Explorers carried thermos flasks on journeys to the North and South Poles, and pilots and mountain climbers took them too. In the early 1900s, advertisements bragged that a thermos had gone to the top of the world and to the bottom of it.

COMMON MISTAKES

- Putting warm soup in a cold thermos. The cold walls steal heat; warm the thermos first.
- Packing lukewarm soup. It should go in steaming hot so it stays above 140 °F until lunch.
- Leaning over a pot of boiling soup. Steam burns; keep your face back and open lids away from you.

Make it a game • Heat Charades. Act out the three ways heat moves. Conduction: tap your grown-up's hand and pass the heat along a line. Convection: swirl your arms around and around like hot soup. Radiation: spread your arms like the sun. Your grown-up guesses each type. Then explain how a thermos slows all three ways.

4.3 BOILING, SIMMERING AND POACHING

OBJECTIVES

- Tell how Anders Celsius made a temperature scale based on boiling and freezing water.
- Tell boiling, simmering and poaching apart by their bubbles and temperatures.
- Poach eggs until the whites and yolks are set, with an adult beside you at the stove, and serve them on toast.

Warm-up. With an adult, put a pot of water on the stove over medium heat. Watch closely, without leaning over it. When do you see the first tiny bubbles on the bottom? When do bubbles start to rise? When does it roll and bubble hard? Describe each stage in your own words.

WATCH

Jacques Pépin: How To Properly Poach An Egg. | KQED Food

KQED Food · 5:09

<https://www.youtube.com/watch?v=8e2aBVRHZdI>

WHEN TO WATCH

Before Session 2. Watch how gently Chef Pépin slides the eggs into barely bubbling water.

Note: The famous French chef Jacques Pépin, from public television. He cooks his eggs with runny yolks; in this course we cook poached eggs until the yolks are thickened and set, as the USDA advises.

BACKUP VIDEO

The Food Lab: How To Poach Eggs

Serious Eats · 3:07

<https://www.youtube.com/watch?v=66btvAWmp7g>

To see a trick for neater poached eggs: draining the thin, runny part of the white in a strainer first.

KEY TERMS

boil

Water bubbling hard all over, with big bubbles that keep breaking. At sea level, water boils at 212 °F (100 °C).

simmer

Water just below a boil, with small, gentle bubbles rising here and there.

poach

To cook food gently in hot water that is barely moving, with only a few tiny bubbles.

Celsius

A temperature scale where water freezes at 0 degrees and boils at 100 degrees, named for Anders Celsius.

CORE IDEAS

The story. In 1742 a Swedish astronomer named Anders Celsius wanted a temperature scale that scientists everywhere could use. He chose two things anyone could check: the temperature of melting snow and the temperature of boiling water. He divided the space between them into 100 equal steps. Strangely, Celsius first put 100 at freezing and 0 at boiling! A few years later, other scientists turned his scale upside down, and today water freezes at 0 °C and boils at 100 °C.

How he figured it out. Celsius tested his thermometers carefully. He found that melting snow always gave the same reading, wherever he tested it. He also found that water boils at a slightly lower temperature when the air pressure is lower, such as on a mountain, so he said the boiling point should be measured at sea level. His careful tests made his scale trustworthy. In America we usually use the Fahrenheit scale in the kitchen, where water freezes at 32 °F and boils at 212 °F.

The kitchen science. As water heats, tiny bubbles of air appear first. Then bubbles of steam form on the hot bottom and rise. At a full **boil** (212 °F at sea level), big bubbles roll and break all over the top. Once water boils, it cannot get any hotter; turning up the heat only makes it boil faster. A **simmer** is gentler, about 185 to 205 °F, with small bubbles here and there; soups and sauces simmer. **Poaching** is gentler still, about 160 to 180 °F, with water that barely moves. Gentle heat cooks delicate eggs and fish without tearing them apart. Egg whites set first and yolks set at a little higher temperature; for safety, cook eggs until the whites are firm and the yolks are thickened and set.

Let's cook. You will poach eggs and serve them on whole-wheat toast. **An adult stands beside you at the stove.** The skill to do well is **sliding an egg gently into the water:** crack it into a small cup first, lower the cup close to the water, and tip the egg in slowly so it does not splash.

PICTURE STUDY



A Woman Preparing Bread and Butter for a Boy, Pieter de Hooch, about 1660–1663 · Oil on canvas · J. Paul Getty Museum, Los Angeles

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

In this quiet Dutch home, a mother is preparing a slice of bread and butter for her son, maybe for breakfast or to take to school. The boy waits, holding his hat. Through the open door you can see a sunny courtyard.

Look closely

- Find the bread and the knife. What is the mother doing to the bread?
- Look at the boy. How is he waiting? Do you think he is about to go out?
- Find the open door. What can you see through it?
- Look at the tiled floor, the windows and the open doorway. What can you tell about how this family keeps its home?

Talk about it

1. This family had no stove with knobs; they cooked over a fire in a hearth. How would they boil water or poach an egg over a fire?
2. What would you add to this bread to make a warm, filling breakfast?
3. How does this mother show care for her son through food?

Safety first. An adult stands beside you at the stove. Keep the water at a gentle simmer, not a rolling boil, so it does not splash. Lower the cup close to the water before tipping in the egg, keep the handle turned in, and use a slotted spoon to lift the eggs. Cook eggs until the whites are firm and the yolks are thickened and set.

Watch the Bubbles: Poached Eggs on Toast

You will measure the temperature of water at each stage, from still to simmer to boil, and then poach eggs in gently simmering water.

You will need

- A wide, deep skillet or saucepan (about 3 inches of water)
- An instant-read thermometer
- Four small cups or ramekins
- A slotted spoon and a plate lined with a paper towel
- A toaster
- A timer

POACHED EGGS ON TOAST

Serves 4 • Prep 5 min • Cook about 15 min

Ingredients

- 4 large eggs, very fresh if you can
- 1 tablespoon white vinegar (helps the whites hold together)
- 4 slices whole-wheat bread
- Butter for the toast (optional)
- Salt and pepper

Method

1. Wash your hands. With the adult beside you, fill the pan with about 3 inches of water, add the vinegar, and heat over medium-high until small bubbles rise.
2. Turn the heat down so the water barely simmers (about 180–190 °F), with just a few small bubbles.
3. Crack each egg into its own small cup. Wash your hands after handling uncooked eggs.

4. Lower one cup close to the water and gently tip the egg in. Add the other eggs the same way, spaced apart.
5. Poach 5 to 6 minutes, until the whites are completely firm and the yolks are thickened and set when you touch them gently with the spoon.
6. Meanwhile, toast the bread and butter it.
7. Lift each egg out with the slotted spoon, let it drain on the paper towel, and set it on a piece of toast. Sprinkle with salt and pepper.
8. The adult turns off the burner. When the pan is cool, pour out the water and wash everything.

Allergy check: Contains eggs, wheat and milk (butter). For wheat-free, use gluten-free toast; skip the butter for milk-free.

Steps

1. **Bubble temperatures.** As the water heats, the adult holds the thermometer in it (not touching the bottom) and you read it at three stages: first tiny bubbles, a gentle simmer, and a full rolling boil. Write each temperature.
2. **Predict.** Will the water get hotter if you turn the boiling pot up to high? Watch the thermometer to find out. (It stays near 212 °F.)
3. Turn the heat down to a gentle simmer and poach the eggs as the recipe says.
4. **Watch the egg.** Write what happens to the clear white in the first minute, then at 3 minutes and at 5 minutes.
5. **Taste test.** Rate your poached eggs on toast from 1 to 5. Were the whites tender or rubbery?
6. **Improve it.** Plan one change: a lower simmer, fresher eggs, or adding sliced tomato under the egg.
7. Clean up: wash, dry and put everything away, and wipe the stove when it is cool.

Tips

- Fresh eggs hold together best. Older eggs spread out in thin wisps.
- If the water starts bubbling hard, turn the heat down. Rough bubbles break eggs apart.

- If you live high in the mountains, water boils below 212 °F, so things cook a little more slowly.

Check your work

- ☐ I can tell how Anders Celsius made his temperature scale.
- ☐ I can tell boiling, simmering and poaching apart by their bubbles and temperatures.
- ☐ I poached eggs safely with an adult beside me and cooked them until set.

COOK'S NOTEBOOK

1. Draw three pots: one poaching, one simmering, one boiling. Draw the bubbles in each and write the temperatures you measured.
2. Draw a thermometer with both scales: freeze at 32 °F and 0 °C, boil at 212 °F and 100 °C.
3. Copy the poached egg recipe in your own words.

From history. Before Celsius, there were dozens of different temperature scales, and scientists could not easily compare their measurements. Daniel Fahrenheit made his scale in 1724, and it is still used in American kitchens. Most of the world uses Celsius.

COMMON MISTAKES

- Thinking a hard boil cooks faster than a simmer. Boiling water stays at 212 °F; it only splashes more.
- Dropping an egg into the water from high up. It splashes hot water and breaks the egg apart.
- Taking eggs out while the whites or yolks are still runny.

Make it a game • Bubble Language. Show the three cooking temperatures with your body. Boil is big, bouncy jumps. Simmer is small, steady tiptoes. Poach is a gentle shiver. Your grown-up calls a word and you act it. Then your grown-up acts and you name it. Say what Celsius chose as 0 and 100 on his scale.

4.4 BAKING: HEAT ALL AROUND

OBJECTIVES

- Tell how the Wampanoag man Squanto taught the Plymouth settlers to grow corn in 1621.
- Explain how an oven bakes with convection, conduction and radiation, and how baking powder makes cornbread rise.
- Bake a pan of cornbread with an adult beside you, and test it for doneness.

Warm-up. Hold your hand a safe distance above a pan that has been in a warm (not hot) oven, then near the side of a slice of bread from the toaster. Where do you feel warmth: from the air, from the pan, or from glowing heat? Guess: when a cornbread bakes, does heat come only from the bottom, or from all around?

WATCH

Heat Transfer – Conduction, Convection and Radiation

Next Generation Science · 3:15

https://www.youtube.com/watch?v=Me60Ti0E_rY

WHEN TO WATCH

After the kitchen-science paragraph. Call out “conduction,” “convection” or “radiation” each time the video shows an example before the narrator says it.

Note: A clear science video with real-life kitchen and outdoor examples.

BACKUP VIDEO

Easy Homemade CORNBREAD Recipe!!!

Our Little Family Homestead · 3:52

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

Before you bake. Watch how the dry and wet ingredients are mixed separately and then stirred together.

KEY TERMS

cornmeal

Dried corn ground into a coarse flour.

baking powder

A powder that makes bubbles of gas when it gets wet and hot, so batter rises and turns light.

batter

A wet mixture of flour, liquid and other ingredients that is thin enough to pour.

doneness test

A way to check that baked food is cooked through, such as a toothpick coming out clean from the center.

CORE IDEAS

The story. In the spring of 1621, the English settlers at Plymouth in Massachusetts had survived a very hard first winter. A Wampanoag man named Tisquantum, called Squanto, who had learned English, came to help them. He showed them how to plant corn the way his people did: in little hills, with fish buried in the soil to feed the plants. That fall the corn harvest was good, and the settlers joined their Wampanoag neighbors for a harvest feast, remembered today as the First Thanksgiving.

How they figured it out. The settlers had never grown corn in England, where people baked bread from wheat. They learned from their neighbors how to dry corn, grind it into **cornmeal**, and cook it into mush and flat cakes baked on hot stones or by the fire. Over many years, American cooks made cornmeal into all kinds of breads: johnnycakes, hoecakes, spoon bread and cornbread. When baking powder was sold in the 1800s, cooks found that a spoonful made their cornbread rise light and tender in the oven.

The kitchen science. An oven bakes with **heat all around**. Hot air flows around the pan and over the top of the batter: that is **convection**. The hot metal pan passes heat into the bottom and sides of the batter: that is **conduction**. The glowing heating element sends out **radiation**, which helps brown the top. Inside the batter, **baking powder** makes tiny bubbles of carbon dioxide gas when it gets wet and again when it gets hot. The bubbles grow, the batter rises, and then the heat sets the flour and egg around them, like a sponge. The crust turns golden as sugars and proteins brown in the heat.

Let's cook. You will mix and bake a pan of cornbread. The skills to do well are **measuring carefully** (level the dry cups with the back of a butter knife) and **mixing just until combined**. **An adult stands beside you at the oven**, puts the pan in and takes it out with oven mitts. Remember: never taste raw batter, because raw flour and uncooked eggs can carry germs.

PICTURE STUDY



The First Thanksgiving at Plymouth, Jennie Augusta Brownscombe, 1914 · Oil on canvas · Pilgrim Hall Museum, Plymouth, Massachusetts

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

Jennie Brownscombe painted this imagined scene almost 300 years after the harvest feast of 1621. Settlers and their Wampanoag neighbors have gathered at long tables outdoors. A man stands to give thanks to God for the harvest.

Look closely

- Find the man giving thanks. What are the others doing while he prays?
- Find the food. What foods from the fall harvest do you think are on the table?
- Find the Wampanoag guests. Where are they in the picture?
- Look at the trees and the sky. What season is it?

Talk about it

1. The settlers learned to grow corn from Squanto. What dish made from corn might be on this table?
2. Why is it good to give thanks before a meal, especially after a hard year?
3. This painting was made long after 1621, so the artist had to imagine much of it. What do you think she imagined well?

Safety first. An adult stands beside you at the oven, puts the pan in and takes it out with oven mitts; you stand back when the oven door opens. Never taste raw batter (raw flour and uncooked eggs can carry germs). Wash your hands after cracking eggs. Let the cornbread cool 10 minutes before cutting.

KITCHEN PROJECT

Golden Cornbread and the Oven Heat Hunt

You will find conduction, convection and radiation in your oven, then bake a pan of cornbread and test it for doneness.

You will need

- An 8-inch square baking pan (metal or glass)
- Two mixing bowls, a whisk and a rubber spatula
- Measuring cups and spoons, and a butter knife for leveling
- Oven mitts and a cooling rack
- Toothpicks
- An instant-read thermometer

GOLDEN CORNBREAD

Serves 9 squares • Prep 15 min • Bake 20–25 min

Ingredients

- 1 cup yellow cornmeal
- 1 cup all-purpose flour
- $\frac{1}{4}$ cup sugar
- 1 tablespoon baking powder
- $\frac{1}{2}$ teaspoon salt
- 1 cup milk
- 1 large egg
- $\frac{1}{4}$ cup melted butter or vegetable oil, plus a little for the pan

Method

1. An adult heats the oven to 400 °F. Grease the pan with a little butter or oil.
2. Wash your hands. In one bowl, whisk the cornmeal, flour, sugar, baking powder and salt.

3. In the other bowl, whisk the milk, egg and melted butter (the adult melts the butter). Wash your hands after cracking the egg.
4. Pour the wet ingredients into the dry ones. Stir with the spatula just until no dry flour shows; a few lumps are fine. Do not taste the batter.
5. Scrape the batter into the pan and smooth the top.
6. The adult puts the pan in the oven. Bake 20 to 25 minutes, until the top is golden and a toothpick poked in the center comes out clean.
7. The adult takes it out with oven mitts and sets it on the rack. Cool 10 minutes, then cut into 9 squares.
8. Clean up: wash the bowls and tools and wipe the counter.

Allergy check: Contains wheat, milk and eggs. For milk-free, use oil and an unsweetened plant milk; for egg-free, use 3 tablespoons of unsweetened applesauce instead of the egg (it will be a little denser).

Steps

1. **Heat hunt.** Before baking, list where you can find each kind of heat in your kitchen: conduction (a pan on a burner), convection (hot air rising from the oven vent), radiation (the glow of the toaster). Draw one example of each.
2. **Fizz test.** Put $\frac{1}{2}$ teaspoon of baking powder in a cup and add 2 tablespoons of warm water. What happens? This is the same gas that will make your cornbread rise.
3. Make the cornbread as the recipe says.
4. **Watch it rise.** Look through the oven window every 5 minutes (keep the door closed). Write when the batter starts to rise, when it starts to brown, and when it starts to pull away from the sides.
5. **Doneness test.** Poke a toothpick in the center. Does it come out clean or with wet batter? If you have a thermometer, the center of baked cornbread reads about 200 °F.
6. **Taste test and improve it.** Rate the cornbread from 1 to 5. Plan one change: less sugar, adding corn kernels, or baking it in a hot cast-iron skillet.
7. Clean up: wash, dry and put everything away.

Tips

- Overmixing makes cornbread tough. Stir gently and stop when the flour disappears.
- Opening the oven door lets out the hot air. Peek through the window instead.
- Cornbread is wonderful with soup or chili.

Check your work

- ☐ I can tell how Squanto helped the Plymouth settlers grow corn.
- ☐ I can explain how an oven bakes with conduction, convection and radiation, and how baking powder works.
- ☐ I baked cornbread with an adult beside me and tested it for doneness.

COOK'S NOTEBOOK

1. Draw a pan of cornbread in an oven. Draw red arrows for hot air (convection), the hot pan (conduction) and the glowing element (radiation).
2. Draw the baking powder fizz test and write what happened.
3. Copy the cornbread recipe in your own words and write your rise log.

From history. Edward Winslow, one of the Plymouth settlers, wrote a letter in December 1621 describing the harvest and the feast. He wrote that the Wampanoag leader Massasoit and about ninety of his men came and stayed for three days. His letter is one of only two eyewitness accounts of that first harvest celebration.

COMMON MISTAKES

- Tasting raw batter. Raw flour and uncooked eggs can carry germs; wait until it is baked.
- Overmixing the batter, which makes tough, chewy cornbread with tunnels.
- Opening the oven door again and again, which lets the heat out and slows baking.
- Scooping flour straight from the bag and packing it down. Spoon it into the cup and level it.

Make it a game • Cornbread Story Chain. Tell a story chain from the 1621 cornfield to your oven, one sentence each. Squanto plants corn, the corn is ground into cornmeal, baking powder is added, the batter goes into the oven, and a doneness test shows it is ready. Each sentence must include a new fact. Who can keep it going longest?

UNIT 4

HEAT & COLD

Cooking is mostly about moving heat: into food to cook it, and out of food to keep it fresh. In this unit you will meet **Frederic Tudor**, the “Ice King,” who shipped blocks of frozen pond water from Boston to hot islands far away, and **James Dewar**, whose vacuum flask became the thermos that keeps soup hot in a lunch box.

You will learn the difference between **boiling**, **simmering** and **poaching**, and see how an oven bakes with **heat all around**. Along the way you will learn the three ways heat moves (conduction, convection and radiation), make fruit slushies, cook a pot of soup for a thermos, poach eggs, and bake a pan of golden cornbread.

PREREQUISITES

- Cooks at the stove only with an adult beside, handles turned in (Unit 1)
- Knows the danger zone, 40–140 °F, and the two-hour rule (Unit 1)
- Reads a food thermometer (Lesson 1.3)
- Cuts soft foods with the claw grip with an adult beside (Lesson 1.2)

MASTERY CHECKLIST

- ☐ I can tell the story of Frederic Tudor and explain how sawdust and icehouses kept ice from melting.
- ☐ I can explain how a thermos keeps hot food hot and cold food cold.
- ☐ I can tell boiling, simmering and poaching apart by their bubbles and temperatures.
- ☐ I can name the three ways heat moves (conduction, convection, radiation) and find each one in my kitchen.
- ☐ I can cook soup, poach eggs and bake cornbread safely with an adult beside me.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A small insulated food jar (thermos):** For Lesson 4.2 and the unit challenge. Any wide-mouth insulated jar for soup works.
- **An instant-read food thermometer:** Used in every lesson of this unit to measure ice, soup, simmering water and cornbread.
- **National Center for Home Food Preservation:** Free. Tested advice on freezing and preserving food from the University of Georgia, for parents who want to learn more about keeping food cold and safe.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

4.1 Frederic Tudor, the Ice King	2 sessions of 45–60 minutes
4.2 The Thermos and a Bowl of Hot Soup	2 sessions of 45–60 minutes
4.3 Boiling, Simmering and Poaching	2 sessions of 45–60 minutes
4.4 Baking: Heat All Around	2 sessions of 45–60 minutes

UNIT 4 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
What was Frederic Tudor's idea, and why did he lose money at first?
2. **5 pts**
Why does sawdust keep ice from melting?
3. **5 pts**
Name the three ways heat moves and give a kitchen example of each.
4. **5 pts**
How does a thermos keep soup hot?

5. **5 pts**

How hot should soup be when it goes in a thermos, and how hot should it stay until lunch?

6. **5 pts**

At what temperature does water boil at sea level, in °F and °C?

7. **5 pts**

Predict: a pot of water is boiling hard. You turn the burner up to high. Will the water get hotter than 212 °F? Why?

8. **5 pts**

How can you tell boiling, simmering and poaching apart by looking?

9. **5 pts**

Predict: what will happen when baking powder in cornbread batter gets wet and hot?

10. **5 pts**

How did Squanto help the Plymouth settlers?

ANSWER KEY

1. To cut ice from New England ponds and ship it to hot places like Martinique. At first he had nowhere to store it, people did not know how to use it, and much of it melted.
2. It is insulation: it is full of tiny pockets of still air, which slows heat moving from the warm air into the ice.
3. Conduction (a hot pan heating its handle), convection (hot air flowing in an oven or water rising in a pot), radiation (warmth from a toaster's glow).
4. The vacuum between its two walls stops conduction and convection, the shiny walls bounce back radiated heat, and the stopper keeps hot air in.
5. Steaming hot, 165 °F, when packed; it should stay at 140 °F or hotter.
6. 212 °F and 100 °C.
7. No. Once water boils, extra heat turns more water into steam, so it only boils faster; the temperature stays at about 212 °F.
8. Boiling has big bubbles breaking all over; simmering has small, gentle bubbles here and there; poaching water barely moves, with only a few tiny bubbles.
9. It will make bubbles of carbon dioxide gas that make the batter rise; then the heat sets the batter around the bubbles.
10. He showed them how to plant corn in hills with fish to feed the soil, so they had a good harvest in 1621.

UNIT CHALLENGE: KEEP IT HOT, KEEP IT COLD

Run a hot-and-cold experiment and turn it into a meal. With an adult beside you at the stove, cook a pot of soup (Lesson 4.2's or a family recipe). Pack one serving in a warmed thermos, one in an ordinary covered container, and one in a bowl on the counter. In the same way, pack a cold yogurt cup in a lunch box with two ice packs and another with none.

Check every temperature after 4 hours and record them in a table. Which stayed safe (hot at 140 °F or above, cold at 40 °F or below)? Eat only the ones that stayed safe.

Write a paragraph explaining your results using the words conduction, convection, radiation and insulation.

LOOK FOR	WHAT IT MEANS
Safe cooking	The soup was cooked with an adult beside, packed steaming hot, and anything that fell into the danger zone was not eaten.
Fair test	Same amounts, same starting temperatures, and the same time for every container.
Records	A clear table of temperatures with times, and a simple bar graph or chart.
Science explanation	Correctly explains the results with the words conduction, convection, radiation and insulation.
Cleanup and improvement	The kitchen was cleaned, and one idea for keeping lunch hot or cold better next time is written down.

UNIT 5

FOOD CHEMISTRY

Every kitchen is a little chemistry lab. In this unit you will meet four of the hardest-working ingredients in cooking and find out what each one really does. You will see **starch** from potatoes thicken a pot of soup, learn why a thin film of **oil** browns vegetables, watch living **yeast** puff up a loaf of bread, and grow **sugar crystals** on a string as water slowly leaves a syrup.

Along the way you will meet Antoine Parmentier, who talked France into eating potatoes; a widow whose little jar of oil never ran dry (1 Kings 17); the Fleischmann brothers, who sold fresh yeast to American bakers; and Andreas Marggraf, who found sugar crystals hiding in a beet. Jesus taught us to pray, “Give us this day our daily bread” (Matthew 6:11); by the end of this unit you will have baked a loaf of your own.

PREREQUISITES

- Cooks at the stove and oven only with an adult beside (Units 1–4)
- Uses the claw grip on soft and flat-sided foods with an adult beside (Lesson 1.2)
- Knows simmering and boiling (Lesson 4.3) and how an oven bakes (Lesson 4.4)
- Never tastes uncooked dough or batter (Lesson 4.4)

MASTERY CHECKLIST

- ☐ I can explain how potato starch soaks up water and thickens soup when it is heated.
- ☐ I can explain why oil and water do not mix and why we use only a thin film of oil to sauté.
- ☐ I can explain that yeast is alive, eats sugar, and makes the gas that raises bread.
- ☐ I can explain how sugar crystals grow as a syrup cools and its water evaporates.
- ☐ I can tell the stories of Parmentier, the widow of Zarephath, the Fleischmann brothers and Marggraf.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A heavy pot with a lid that can go in the oven (a Dutch oven):** For the no-knead bread in Lesson 5.3. A heavy oven-safe pot with a lid works; the bread can also be baked on a baking sheet.
- **King Arthur Baking: Learn to bake guides:** Free step-by-step baking guides with photographs from the King Arthur Baking Company, for the adult helping with Lesson 5.3 and the unit challenge.
- **A potato masher:** Used to thicken the potato soup in Lesson 5.1. A large fork works too.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

5.1	Antoine Parmentier and the Potato	2 sessions of 45–60 minutes
5.2	Oil in the Pan	2 sessions of 45–60 minutes
5.3	Fleischmann's Yeast	2 sessions of 60–90 minutes
5.4	Sugar Crystals and Moisture	2 sessions of 45–60 minutes

UNIT 5 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

How did Antoine Parmentier help France learn to eat potatoes?

2. **5 pts**

Predict: you stir cornstarch into cold water, then heat it until it bubbles. What will happen, and why?

3. **5 pts**

Why does mashing some of the potatoes make potato soup thicker?

4. (5 pts)

What happened to the widow of Zarephath's flour and oil?

5. (5 pts)

Why can food cooked in oil turn golden brown when food boiled in water does not?

6. (5 pts)

What should you do if oil in a pan starts to smoke? What if it catches fire?

7. (5 pts)

Predict: you mix yeast and sugar into very hot water (over 140 °F). Will the dough rise? Why?

8. (5 pts)

Explain how yeast makes bread rise.

9. (5 pts)

What did Andreas Marggraf discover in 1747?

10. (5 pts)

Why do sugar crystals grow on the stick as the rock candy syrup sits?

ANSWER KEY

1. He showed scientifically that potatoes were good food, gave dinners of potato dishes for famous guests, gave potato flowers to the king, and (as the story goes) had his potato field guarded so people would want the potatoes.
2. It will turn thick, because the starch grains soak up water, swell and burst when heated, and the starch chains tangle together (gelatinization).
3. Mashing breaks the potatoes open and releases more starch into the liquid, which thickens it.
4. She shared them with Elijah, and God made them last; the barrel of meal did not run out and the jar of oil did not fail.
5. Water cannot get hotter than about 212 °F, but oil can get much hotter, hot enough to brown food.
6. If it smokes, turn the heat down. If it catches fire, the adult turns off the burner and covers the pan with a lid (or baking soda), never water.
7. No. Water that hot kills the yeast, so it cannot make carbon dioxide gas.
8. Yeast is alive. It eats sugar and gives off carbon dioxide gas, and the stretchy gluten in the dough traps the bubbles so the dough puffs up.
9. That beet roots contain real sugar, the same crystals as cane sugar.
10. As the hot syrup cools and water evaporates, there is more sugar than the water can hold, so the extra sugar stacks onto the seed crystals on the stick.

UNIT CHALLENGE: A LOAF OF BREAD WITH A RISE LOG

Bake a loaf of bread (the no-knead bread from Lesson 5.3 or a family recipe) with an adult handling every very hot step. Keep a full rise log: the water temperature, the time you mixed the dough, and the dough's height each time you check it.

When the loaf is baked and cooled, have the adult cut it so you can draw or photograph the holes inside. Write a short paragraph explaining what the yeast, the gluten and the oven heat each did. Serve the bread to your family with soup from this unit or the last, and give thanks for your daily bread.

LOOK FOR	WHAT IT MEANS
Bread made safely	Measured carefully, never tasted uncooked dough, and stayed back while the adult handled the hot pot or pan; the kitchen was cleaned afterward.
Rise log	Times, heights and observations recorded honestly, with a simple bar graph.
Crumb drawing or photo	Shows the holes clearly and labels them as gas bubbles made by yeast.
Science explanation	Correctly explains the jobs of yeast, gluten and heat in your own words.
Improvement	Names one change for next time and why; a flat loaf that is honestly recorded earns full credit.

5.1 ANTOINE PARMENTIER AND THE POTATO

OBJECTIVES

- Tell how Antoine Parmentier helped the people of France learn to eat potatoes in the 1770s and 1780s.
- Find the starch in a potato and explain how starch thickens soup when it is heated in water.
- Cook a potato soup thickened by its own starch, with an adult beside you at the stove.

Warm-up. Rub a cut piece of raw potato on a dark plate or a piece of black paper and let it dry. What white powder is left behind? Now look at a bag of cornstarch and a bag of flour. Which foods in your kitchen do you think are full of starch?

WATCH

Easy Creamy Potato Soup Recipe

Inspired Taste • 2:57

https://www.youtube.com/watch?v=BuJ39QDz_FQ

WHEN TO WATCH

Before Session 2. Watch for the moment the cooks mash some of the potatoes right in the pot. That is the starch going to work.

Note: A husband-and-wife cooking team shows a creamy potato soup. Their recipe adds a little flour and cream; our version is thickened only by the potatoes' own starch.

KEY TERMS

starch

A carbohydrate that plants store in tiny grains in roots, tubers and seeds, such as potatoes, corn, rice and wheat.

thicken

To make a liquid less runny. Heated starch thickens soups, gravies and puddings.

tuber

A thick underground stem where a plant stores food. A potato is a tuber.

gelatinize

What starch grains do when heated in water: they soak up water, swell and burst, and thicken the liquid.

CORE IDEAS

The story. Potatoes came to Europe from South America in the 1500s, but for two hundred years many people in France would not eat them. Some thought potatoes were only for feeding pigs; others thought they caused sickness. Antoine-Augustin Parmentier was a French army pharmacist. During a war in the 1750s and 1760s he was held as a prisoner in Prussia, and he was fed potatoes almost every day. He came home healthy and sure that potatoes could help keep France from going hungry when the wheat harvest failed.

How he figured it out. Parmentier studied the potato like a scientist. He tested its starch and showed it was good, wholesome food, and in 1772 the doctors of Paris agreed that potatoes were safe to eat. Then he worked to change people's minds. He gave dinners where every dish was made from potatoes, and famous guests, including the American Benjamin Franklin, came to eat. He gave a bouquet of potato flowers to King Louis XVI, and the queen wore them in her hair. A famous story says he had soldiers guard his potato field near Paris by day, so people would think the potatoes were precious and sneak in at night to take some home to plant. Whether every part is true or not, France learned to love potatoes, and many French potato dishes are still named *Parmentier*.

The kitchen science. A potato is a **tuber**, an underground storehouse where the plant keeps food as **starch**. The starch is packed in tiny, hard grains, too small to see. In cold water the grains just sink; that is the white powder you can see when a cut potato dries. But when potatoes are heated in water, the grains soak up water, swell and burst open, and long starch chains spill out and tangle together. This is called **gelatinization**, and it makes the liquid thick. When you mash some of the cooked potatoes right in the pot, you release more starch, and the soup becomes creamy without any flour.

Let's cook. You will make a pot of creamy potato soup thickened only by its own starch. **An adult stands beside you at the stove.** Raw potatoes are hard and round, so the adult cuts each one into flat slabs, and you cut the slabs into cubes with the claw grip. The skill to do well is **mashing in the pot safely**: the burner is turned off first, and you press gently so the hot soup does not splash.

PICTURE STUDY



Potato Planters, Jean-François Millet, about 1861 · Oil on canvas · Museum of Fine Arts, Boston

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

Jean-François Millet painted French farm families at their work. Almost a hundred years after Parmentier, potatoes had become an everyday crop in France. Here a husband and wife plant potatoes together, one hole at a time.

Look closely

- Find the man's hoe and the woman's hand. What is each of them doing?
- Find where the woman is carrying the seed potatoes.
- Find the donkey and the baskets under the tree. What might they be for?
- Look at the light. What time of day do you think it is?

Talk about it

1. How many potatoes do you think this family will harvest from one field?
How might potatoes help them through the winter?
2. Parmentier worked hard to get French families to plant potatoes. How does this painting show that he succeeded?
3. Why do you think Millet showed the man and woman working together?

Safety first. An adult cuts the hard, round potatoes into flat slabs; you cut the slabs with the claw grip, with the adult beside you. At the stove, turn the pot handle in and keep your face back from the steam. The adult turns off the burner before you mash, and you press gently so hot soup does not splash.

KITCHEN PROJECT

Find the Starch, Then Make Potato Soup

You will collect real potato starch with your own hands, test it in cold and hot water, and then cook a creamy potato soup that thickens itself.

You will need

- A large pot with a lid and a long wooden spoon
- A potato masher or large fork
- A small serrated knife or paring knife, a cutting board and a damp towel
- A box grater (for the adult), a clean thin towel and two clear glasses
- Measuring cups and spoons and a ladle
- A small saucepan for the starch test

CREAMY POTATO SOUP (NO FLOUR NEEDED)

Serves 6 • Prep 20 min • Cook 30 min

Ingredients

- 2½ pounds Yukon Gold or russet potatoes (about 6 medium), peeled
- 2 tablespoons butter or olive oil
- 1 medium onion
- 2 stalks celery
- 4 cups low-sodium chicken or vegetable broth
- 1 teaspoon salt and ¼ teaspoon black pepper
- 1 cup milk
- Toppings: grated cheddar cheese and chopped chives or green onions

Method

1. Wash your hands and rinse the peeled potatoes. The adult cuts the onion in half and each potato into flat slabs about ¾ inch thick.
2. With the adult beside you, chop the onion and celery with the claw grip, and cut the potato slabs into ¾-inch cubes.

3. With the adult beside you, melt the butter in the pot over medium heat. Add the onion and celery and stir for 5 minutes, until soft.
4. Add the potatoes, broth, salt and pepper. Bring to a boil, then turn down to a simmer, cover with the lid tilted, and cook 15 to 20 minutes, until a potato cube breaks easily with a spoon.
5. The adult turns off the burner. Mash the potatoes right in the pot with gentle presses, until about half are mashed and the soup looks thick.
6. Stir in the milk. The adult turns the burner to low and warms the soup 2 to 3 minutes, stirring, without letting it boil.
7. Ladle into bowls (the adult ladles) and top with cheese and chives.
8. Cool leftovers in shallow containers and refrigerate within 2 hours. Clean up and wipe the stove when it is cool.

Allergy check: Contains milk (butter, milk, cheese). For milk-free, use olive oil, an unsweetened plant milk and no cheese. No wheat or eggs.

Steps

1. **Catch the starch.** The adult grates one raw potato. Wrap the shreds in a thin towel and squeeze the juice into a clear glass. Let it sit 10 minutes. What settles to the bottom? Pour off the brown water and look at the white powder: that is potato starch.
2. **Cold and hot test.** Stir 1 teaspoon of your potato starch (or store-bought cornstarch) into $\frac{1}{2}$ cup cold water. Is it thick? Now the adult heats it in the small saucepan, stirring, until it bubbles. What happened? Write it down.
3. Make the soup as the recipe says, with an adult beside you.
4. **Before and after.** Before you mash, dip a spoon in the broth and see how it drips. After you mash, dip again. Describe the difference.
5. **Taste test.** Rate the soup from 1 to 5 for creaminess and flavor. Ask your family to rate it.
6. **Improve it.** Plan one change: mash more or less, add a carrot, or try different toppings.
7. **Clean up:** soak the pot right away so the starch does not dry on, then wash and put everything away.

Tips

- Russet potatoes have the most starch and make the thickest soup; Yukon Golds make a buttery, creamy soup.
- Cut the potatoes about the same size so they all soften at the same time.
- Starchy soup thickens even more as it cools. Add a splash of broth when you reheat leftovers.

Check your work

- ☐ I can tell how Antoine Parmentier helped France learn to eat potatoes.
- ☐ I can explain how starch thickens soup when it is heated in water.
- ☐ I found real potato starch and cooked potato soup safely with an adult beside me.

COOK'S NOTEBOOK

1. Draw starch grains three ways: hard grains sinking in cold water, swelling in hot water, and burst open with chains tangling.
2. Draw your glass of potato juice with the white starch layer at the bottom and label it.
3. Copy the potato soup recipe in your own words and mark the step where the starch does its work.

From history. Potatoes were first grown by the people of the Andes Mountains in South America thousands of years ago. They could grow in cold, high places where wheat and corn could not. Today potatoes are one of the most important food crops in the world.

COMMON MISTAKES

- Trying to cut a whole round potato with a small knife. It rolls; the adult cuts flat slabs first.
- Mashing while the burner is still on and the soup is bubbling, which makes hot splashes.
- Boiling the soup hard after adding milk, which can make the milk separate. Warm it gently.

Make it a game • Guard the Potatoes. Parmentier guarded his potato field by day but not by night, so people took potatoes. Your grown-up hides five paper potatoes. You are a sneaky villager. To claim each potato, you must whisper one fact about starch, potatoes or soup thickening. Your grown-up plays the guard with eyes closed for ten seconds at a time.

5.2 OIL IN THE PAN

OBJECTIVES

- Retell the story of the widow of Zarephath and her jar of oil (1 Kings 17).
- Explain why oil and water do not mix, why oil can brown food, and why we stop before oil smokes.
- Sauté zucchini and peppers in a thin film of oil with an adult beside you at the stove.

Warm-up. Pour some water into a clear jar, then add a few spoonfuls of cooking oil. Watch. Put the lid on and shake it hard. Now watch for one minute. What happens to the oil and water? Which one ends up on top?

WATCH

How To Saute

Jacob Burton · 2:01

<https://www.youtube.com/watch?v=CTyV3JExDT8>

WHEN TO WATCH

Before Session 2. Watch how the chef heats the pan first, then adds a little oil, then the food.

Note: A professional chef and cooking teacher shows the basic sauté. He tosses food by flipping the pan; at your age, stir with a spatula instead.

KEY TERMS

sauté

To cook food quickly in a little oil in a hot pan, stirring often. The word is French for “jump.”

spatter

When drops of water hit hot oil and pop, throwing tiny drops of hot oil.

smoke point

The temperature at which oil starts to smoke. Smoking oil is too hot; turn the heat down.

olive oil

Oil pressed from olives. People in Bible lands have used it for cooking and lamps for thousands of years.

CORE IDEAS

The story. During a long drought in Israel, God sent the prophet Elijah to a town called Zarephath. At the town gate he met a widow gathering sticks. She told him she had only “an handful of meal in a barrel, and a little oil in a cruse” (a small jar), enough for one last meal for herself and her son. Elijah asked her to bake him a little cake first and promised that God would not let her meal or oil run out. She trusted God and did as he asked. “And the barrel of meal wasted not, neither did the cruse of oil fail” (1 Kings 17:16).

How cooks figured it out. In Bible lands, oil came from olives. Families picked olives, crushed them in stone presses, and caught the golden oil. They used it for lamps, for medicine and for cooking, mixing it with flour to make little cakes baked on hot stones or in a pan. Cooks learned that a small amount of oil in a hot pan kept food from sticking and gave it a golden, toasty outside. They also learned that oil is precious and that a little goes a long way.

The kitchen science. Oil and water do not mix. Water is heavier, so oil floats on top. Water can only get as hot as 212 °F before it boils away, but oil can get much hotter. That is why food cooked in hot oil turns golden brown and crisp, while food boiled in water stays pale. If oil gets too hot, it reaches its **smoke point** and starts to smoke; that means turn the heat down right away. Wet food **spatters** in hot oil, because the water turns to steam with a pop, so cooks pat vegetables dry first. And remember from Lesson 1.1: if oil ever catches fire, the adult turns off the burner and covers the pan with a lid, never water.

Let's cook. You will sauté zucchini and bell peppers in a thin film of olive oil. **An adult stands right beside you at the stove.** The skills to do well are **drying the vegetables**, adding them to the pan gently (not tossing them in from high up), and **stirring with a spatula** so every piece touches the hot pan.

PICTURE STUDY



Women Picking Olives, Vincent van Gogh, 1889 · Oil on canvas · The Metropolitan Museum of Art, New York

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

In 1889, while he was living in the south of France, Vincent van Gogh painted the olive groves again and again. Here two women harvest olives in the late fall. Olives like these are pressed to make olive oil.

Look closely

- Find the ladder. Why would a picker need it?
- Find the basket. How many olives do you think it holds?
- Look at the tree trunks. How did Van Gogh show they are twisted and old?
- Look at the colors of the sky and the ground. How do they make you feel?

Talk about it

1. It takes a great many olives to make one bottle of oil. Why should we use oil carefully?
2. How is this harvest like the olive harvests in Bible times?
3. What food would you cook with the oil from these olives?

Safety first. An adult stands right beside you at the stove. Use only a thin film of oil, pat the vegetables dry, add them gently, turn the handle in and stir with a spatula. If the oil smokes, turn the heat down; if oil ever catches fire, the adult turns off the burner and covers the pan with a lid, never water.

KITCHEN PROJECT

Oil and Water, Then a Golden Sauté

You will test oil and water in a jar and on a cold pan, then sauté a colorful pan of zucchini and peppers and compare them with steamed ones.

You will need

- A clear jar with a lid
- A large skillet and a wide spatula
- A small serrated knife or paring knife, a cutting board and a damp towel
- Paper towels or a clean towel for drying
- Measuring spoons
- A small pot with a lid for the comparison

SAUTÉED ZUCCHINI AND PEPPERS

Serves 4 as a side dish · Prep 15 min · Cook 8–10 min

Ingredients

- 2 medium zucchini
- 1 red or yellow bell pepper
- 1½ tablespoons olive oil
- ¼ teaspoon garlic powder (or 1 clove garlic, minced by the adult)
- ½ teaspoon dried Italian seasoning or oregano
- ¼ teaspoon salt and a pinch of black pepper
- 2 tablespoons grated Parmesan cheese (optional)

Method

1. Wash your hands and wash the vegetables. Pat them completely dry.
2. The adult cuts each zucchini in half the long way. With the adult beside you, lay the halves flat and slice them into half-moons with the claw grip. Cut the pepper into strips, then into pieces.
3. With the adult beside you, heat the skillet over medium heat for 1 minute. Add the oil and tilt the pan gently so it spreads in a thin film.

4. When the oil shimmers (but does not smoke), add the vegetables gently, close to the pan, and spread them out.
5. Let them cook 2 minutes without stirring, so they brown. Then stir and turn them with the spatula every minute or so for 5 to 7 minutes more, until golden in spots and just tender.
6. Sprinkle with garlic powder, seasoning, salt and pepper and stir 30 seconds more.
7. The adult turns off the burner. Spoon the vegetables into a bowl and top with Parmesan if you like.
8. Clean up: when the pan is cool, wipe it out and wash it, and wipe the stove.

Allergy check: Contains milk only if you add Parmesan. Otherwise contains none of the nine major allergens.

Steps

1. **Jar test.** Shake oil and water in a jar. Time how long it takes for them to separate again. Which layer is on top?
2. **Steam or sauté?** Before you sauté, ask the adult to steam a few zucchini slices in a covered pot with a little water for 4 minutes. Keep them aside to compare.
3. Sauté the vegetables as the recipe says, with the adult beside you.
4. **Compare.** Look at, smell and taste the steamed and the sautéed zucchini. Which is browner? Which tastes sweeter or toastier? Write three words for each.
5. **Taste test.** Rate the sautéed vegetables from 1 to 5. Ask your family to rate them.
6. **Improve it.** Plan one change: a different vegetable (mushrooms, green beans), more browning time, or a squeeze of lemon at the end.
7. Clean up: wash, dry and put everything away.

Tips

- Crowding the pan makes vegetables steam instead of brown. Cook in two batches if your pan is small.

- Shimmering oil is ready; smoking oil is too hot.
- Salt at the end; salt draws water out of the vegetables and makes them soggy if added too soon.

Check your work

- ☐ I can retell the story of the widow's oil.
- ☐ I can explain why oil and water do not mix and why we turn the heat down if oil smokes.
- ☐ I sautéed vegetables in a thin film of oil safely with an adult beside me.

COOK'S NOTEBOOK

1. Draw your jar test before shaking, right after shaking, and after one minute.
2. Draw a steamed zucchini slice and a sautéed one side by side, and write three words for each.
3. Copy the sauté recipe in your own words.

COMMON MISTAKES

- Pouring lots of oil into the pan. A thin film is all you need.
- Dropping wet vegetables into hot oil, which spatters.
- Letting oil smoke. Turn the heat down as soon as you see smoke.
- Ever putting water on an oil fire. Use a lid and turn off the heat.

Make it a game • The Never-Empty Jar. Place a jar of dry beans on the table, the widow of Zarephath's oil. Each time you state a true fact about oil, a spoonful of beans is added to a second jar. Facts: oil and water do not mix, oil browns food, oil can smoke, oil spatters. Can you fill the second jar? Retell 1 Kings 17 for a bonus.

Scripture. “And the barrel of meal wasted not, neither did the cruse of oil fail, according to the word of the LORD, which he spake by Elijah.” (1 Kings 17:16, KJV)

The widow shared her last bit of flour and oil, and God provided for her day after day. A little oil, shared and used well, became a great blessing.

5.3 FLEISCHMANN'S YEAST

OBJECTIVES

- Tell how Charles and Maximilian Fleischmann began selling fresh yeast in Cincinnati in 1868.
- Explain that yeast is a living thing that eats sugar and gives off carbon dioxide gas, which makes bread rise.
- Make an easy no-knead bread with a rise log, with an adult handling the very hot pot.

Warm-up. Put 1 teaspoon of yeast and 1 teaspoon of sugar in a clear cup. Add $\frac{1}{2}$ cup of warm water (about as warm as a bath). In a second cup, add yeast and sugar to cold water. Set them side by side. Guess: will anything happen? Check them in 10 minutes.

WATCH

Yeast Alive! - by Scientific American

Scientific American • 2:55

<https://www.youtube.com/watch?v=Ckesvr-51i0>

WHEN TO WATCH

After the kitchen-science paragraph. Watch what the yeast does when it gets warm water and sugar.

Note: From Scientific American's science-at-home series: a simple experiment showing that yeast is alive.

BACKUP VIDEO

Blow Up Balloon with Yeast / Yeast Science Experiment

Teach Starter • 1:06

https://www.youtube.com/watch?v=_1DV0q1_9ac

Try this balloon test yourself while your dough rises.

KEY TERMS

yeast

A tiny living fungus, too small to see one by one, that eats sugar and gives off carbon dioxide gas.

carbon dioxide

A gas with no color or smell. Yeast makes it, and its bubbles make bread dough rise.

gluten

Stretchy strands that form when wheat flour and water are mixed. Gluten traps the gas bubbles in bread dough like tiny balloons.

dough

A thick, soft mixture of flour and water that can be shaped. Never eat uncooked dough.

CORE IDEAS

The story. In the 1860s, American families who wanted light, fluffy bread had to make their own yeast starter or get some from a neighbor, and it did not always work. Two brothers, Charles and Maximilian Fleischmann, came to America from Austria-Hungary, where bakers used a fresh, reliable yeast. In 1868, with a partner named James Gaff, they opened a yeast factory in Cincinnati, Ohio, and began selling small, moist cakes of fresh yeast wrapped in foil.

How they figured it out. The Fleischmanns knew that bakers would only buy yeast that worked the same way every time. They grew their yeast carefully, packed it into cakes, and delivered it fresh by wagon to bakers and stores. In 1876, at the great Centennial Exhibition in Philadelphia, they built a model bakery where visitors could watch bread made with their yeast rise and bake, and eat it warm. Soon households across America were baking with store-bought yeast, and the name Fleischmann's is still on yeast packets today.

The kitchen science. Yeast is alive! It is a tiny fungus, so small that a single packet holds billions of yeast cells. When yeast gets warm water and food (sugar and the starch in flour), it wakes up, eats, and gives off bubbles of **carbon dioxide** gas. In bread dough, the flour and water form stretchy strands of **gluten** that trap the bubbles, so the dough puffs up. Yeast likes warm water, about 105 to 110 °F; cold water makes it sleepy and slow, and water hotter than about 140 °F kills it. In the oven, the gas bubbles and steam from the dough's water expand one last time, and then the heat sets the bread.

Let's cook. You will make an easy no-knead bread. It rises slowly overnight, so the yeast and time do the kneading for you. The skills to do well are **measuring** and **keeping a rise log**. The bread bakes in a very hot covered pot, so **the adult handles the hot pot from start to finish**, while you watch from a safe spot.

PICTURE STUDY



The Baker, Job Berckheyde, about 1681 · Oil on canvas · Worcester Art Museum, Worcester, Massachusetts

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

In Dutch towns long ago, a baker blew a horn from his shop window to tell the neighbors that fresh, hot bread was ready. Job Berckheyde painted this baker in the middle of his announcement, with his bread spread out for all to see.

Look closely

- Find the horn. Why do you think the baker blows it?
- Find the round loaves, the long loaf and the pretzels. How many kinds of bread can you count?
- Look at the crusts. Which loaves look crusty and which look soft?
- Look at the baker's sleeves and cap. Why might a baker dress this way?

Talk about it

1. This baker probably made his bread with yeast. What do you think his bread smelled like when it came out of the oven?
2. Why would a whole town want to know when the bread was ready?
3. How is your loaf like this baker's bread? How is it different?

Safety first. Never taste uncooked dough: raw flour can carry germs. The pot is heated to 450 °F, far hotter than a regular baking pan, so only the adult moves the pot, lifts the lid and takes out the bread, with thick oven mitts; you watch from a safe spot. Let the bread cool at least 30 minutes before cutting.

Watch It Rise: No-Knead Bread

You will prove that yeast is alive with a cup test, mix a simple dough, and keep a rise log as the yeast slowly fills it with bubbles overnight. The next day the adult bakes it in a hot covered pot.

You will need

- A large mixing bowl and a wooden spoon
- Measuring cups and spoons
- Plastic wrap or a clean towel, and masking tape and a marker
- Parchment paper
- A heavy oven-safe pot with a lid (Dutch oven), or a baking sheet
- Thick oven mitts (for the adult), a cooling rack and a thermometer
- For the balloon test: a small bottle, a balloon, yeast, sugar and warm water

EASY NO-KNEAD BREAD

Serves 1 round loaf (about 10 slices) • Mix 10 min • Rise 12–18 hr • Shape and rest 1–2 hr • Bake 45 min

Ingredients

- 3 cups (about 390 g) all-purpose or bread flour, plus a little for dusting
- 1½ teaspoons salt
- ½ teaspoon instant or active dry yeast
- 1½ cups warm water, about 105–110 °F (feels warm, not hot)

Method

1. **Day 1, evening:** Wash your hands. In the bowl, stir the flour, salt and yeast. Pour in the warm water and stir with the wooden spoon until there is no dry flour left. The dough will be wet and shaggy. Do not taste it.
2. Cover the bowl with plastic wrap. Put a strip of tape on the outside of the bowl at the top of the dough and write the time. Let it rise at room temperature 12 to 18 hours.

3. **Day 2:** The dough will be bubbly and more than double. Sprinkle flour on the counter. With floured hands, scrape the dough out and fold it over itself a few times to make a round ball.
4. Set the ball on a piece of parchment paper, dust the top with flour, cover loosely with a towel, and let it rise 1 to 2 hours more.
5. About 45 minutes before baking, the adult puts the empty covered pot in the oven and heats it to 450 °F.
6. The adult takes out the very hot pot, lifts the dough by the parchment and lowers it into the pot, puts the lid on, and returns it to the oven. Bake 30 minutes covered.
7. The adult removes the lid and bakes 10 to 15 minutes more, until deep golden brown. The center should read about 200–210 °F on a thermometer.
8. The adult lifts the bread out onto the rack. Cool at least 30 minutes; it is still baking inside. Wash your bowl and spoon right away, before the dough dries.

Allergy check: Contains wheat. No milk, eggs or nuts.

Steps

1. **Alive or not?** Look at your warm-up cups after 10 minutes. Which one is foamy? Write why you think the yeast in warm water came to life.
2. **Balloon test.** Put 1 packet of yeast, 1 tablespoon sugar and ½ cup warm water in a small bottle, stretch a balloon over the top and wait 20 minutes. What happens to the balloon? What is inside it?
3. Mix the dough on Day 1 as the recipe says.
4. **Rise log.** Each time you check the dough (at bedtime, in the morning and before shaping), mark its height on the tape and write the time and what you see: bubbles, smell, size.
5. Shape and bake the bread on Day 2. You shape; the adult does every hot step.
6. **Crumb look.** When the bread is cool, the adult cuts it in half. Look at the holes inside. Each hole was a bubble of gas made by the yeast. Draw them.

7. **Taste test and improve it.** Rate your bread from 1 to 5. Plan one change: a longer rise, a sprinkle of seeds on top, or half whole-wheat flour.
8. Clean up: wash, dry and put everything away, and give thanks for your daily bread.

Tips

- Test water on your wrist: it should feel pleasantly warm, like a bath.
- A wet, sticky dough is right for no-knead bread. Flour your hands well when shaping.
- No heavy pot? Bake the loaf on a parchment-lined baking sheet at 450 °F for 30–35 minutes.

Check your work

- ☐ I can tell how the Fleischmann brothers brought fresh yeast to American bakers.
- ☐ I can explain how yeast makes bread rise.
- ☐ I made bread, kept a rise log, and stayed safely back while the adult handled the hot pot.

COOK'S NOTEBOOK

1. Draw a few yeast cells eating sugar and giving off bubbles. Label the bubbles “carbon dioxide.”
2. Make a rise log chart and a simple bar graph of the dough’s height at each check.
3. Draw the inside of your loaf, showing the holes, and copy the recipe in your own words.

From history. Long before packaged yeast, bakers kept a bit of yesterday’s dough to start tomorrow’s bread. This is called leaven. The Bible often mentions leaven, and at Passover the Israelites ate unleavened bread, made without it, because they left Egypt in a hurry (Exodus 12).

COMMON MISTAKES

- Using hot water. Water over about 140 °F kills the yeast, and the bread will not rise.
- Tasting the uncooked dough. Raw flour can carry germs.
- Cutting the bread while it is hot. It is still cooking inside and will be gummy.

- Touching the inside of the hot pot. It is far hotter than a regular baking pan.

Make it a game · Fleischmann's Sales Pitch. You sell fresh yeast in Cincinnati in 1868.

Your grown-up is a baker who needs to be convinced. In sixty seconds, say that yeast is alive, eats sugar, gives off carbon dioxide gas, and makes gluten dough stretch and rise. The baker buys if you cover all four. Then switch and pitch again.

Scripture. “Give us this day our daily bread.” (Matthew 6:11, KJV)

Jesus taught His disciples to ask God for bread each day. Every loaf, whether bought or baked at home, is a gift from His hand.

5.4 SUGAR CRYSTALS AND MOISTURE

OBJECTIVES

- Tell how Andreas Marggraf found sugar crystals in beets in 1747.
- Explain how sugar dissolves in hot water and grows into crystals as the syrup cools and water evaporates.
- Grow rock candy over a week, with the adult making and pouring the very hot syrup.

Warm-up. Look at sugar grains with a magnifying glass. What shape are they? Now put a spoonful of sugar in a cup of cold water and stir, and another spoonful in a cup of warm tap water and stir. In which cup does the sugar disappear faster? Where did it go?

WATCH

Make Your Own Rock Candy! | The Science of Cooking! | SciShow Kids

SciShow Kids · 4:46

<https://www.youtube.com/watch?v=jyYrHQvvqy8>

WHEN TO WATCH

After the kitchen-science paragraph and before you start your rock candy.

Note: From SciShow Kids. Jessi and Squeaks learn about crystals while making rock candy.

BACKUP VIDEO

How to Make Great Rock Candy – STEM activity

Science Buddies · 4:01

<https://www.youtube.com/watch?v=ajrNj7JcCpQ>

For tips on seeding the sticks and helping the crystals grow big.

KEY TERMS

dissolve

To mix completely into a liquid, so you can no longer see it, as sugar does in water.

crystal

A solid whose tiny parts are stacked in a neat, repeating pattern, with flat sides and sharp edges, like a sugar grain.

syrup

Water with a great deal of sugar dissolved in it.

seed crystal

A small crystal that gives new sugar a place to start stacking and growing.

CORE IDEAS

The story. For hundreds of years, nearly all the sugar in Europe came from sugarcane, a tall grass that grows only in hot places far away, so sugar was expensive. In 1747 a German chemist in Berlin named Andreas Marggraf wondered if common plants that grew in cold Germany might hold sugar too. He tested the roots of white beets and other vegetables.

How he figured it out. Marggraf dried and crushed the beet roots, soaked out their juices, and let the liquid slowly dry. Then he looked at what was left under a microscope. He saw tiny crystals with the very same shape as the crystals of cane sugar. He had proved that beets hold real sugar! His student Franz Karl Achard bred sweeter beets, and in 1801 Achard opened the world's first factory for making sugar from beets. Today much of the sugar in America comes from sugar beets.

The kitchen science. Sugar **dissolves** in water: its tiny pieces spread out among the water's pieces so you cannot see them. Hot water can hold much more sugar than cold water. When a very sugary hot **syrup** cools, and as its water slowly **evaporates** into the air, there is too much sugar for the water to hold. The extra sugar comes out of the water and stacks itself neatly onto any rough surface it finds, especially onto other sugar crystals. Slow cooling and a quiet jar make big, sparkly **crystals**. The same idea explains why honey can turn grainy in the cupboard and why dried fruit like raisins taste so sweet: their water is gone, and the sugar is left.

Let's cook. You will grow rock candy on sticks or strings over about a week. **Hot sugar syrup is much hotter than boiling water and sticks to skin, so the adult makes and pours it.** Your jobs are to prepare the seed sticks, label the jars, and

keep a crystal log. Rock candy is a sometimes food, a fun treat to share, not an everyday snack.

PICTURE STUDY



Still Life with Cake, Raphaelle Peale, 1822 · Oil on wood panel · Brooklyn Museum, New York

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

Raphaelle Peale was one of America's first still-life painters. He painted just a few simple things on a ledge: a fresh apple, a pile of raisins (dried grapes), and a little iced cake. Each one shows sugar in a different form.

Look closely

- Find the apple. Where does its sweetness come from?
- Find the raisins. They were once juicy grapes. What happened to their water?
- Find the cake's white icing. How did the painter make it look sugary?
- Look at the light and the shadows. Where is the light coming from?

Talk about it

1. Which of these three foods has the most water? Which has the least?
2. Why do you think a cake like this was a special treat in 1822?
3. How could you share a treat like this with your family so it is a happy "sometimes food"?

Safety first. Hot sugar syrup can reach well over 212 °F and sticks to skin, so only the adult heats, stirs and pours it, and you stand back. Let the jars cool before you touch them. Keep the jars where they will not be knocked over. Brush your teeth after eating candy.

KITCHEN PROJECT

Grow Your Own Rock Candy

You will seed wooden sticks with sugar, help an adult make a hot syrup, and watch sugar crystals grow day by day. You will also make a quick dried-fruit comparison to see how removing water concentrates sugar.

You will need

- A medium saucepan and a long wooden spoon (for the adult)
- Measuring cups
- 3 or 4 tall, clean glass jars
- Wooden skewers or clean cotton string, clothespins to hang them, and a plate of sugar
- Paper towels or coffee filters to cover the jars
- A magnifying glass, masking tape and a marker

ROCK CANDY STICKS

Serves 3–4 sticks • Prep 20 min • Grow 5–10 days

Ingredients

- 2 cups water
- 4 to 5 cups granulated sugar, plus a little extra for seeding
- A few drops of food coloring or ½ teaspoon flavoring extract such as vanilla or orange (optional)

Method

1. **Seed the sticks:** Wet the top two-thirds of each skewer with water, roll it in sugar, and let it dry completely for at least 1 hour. These sugar grains are your seed crystals.
2. The adult brings the water to a boil in the saucepan, then adds the sugar 1 cup at a time, stirring until each cup dissolves. Stop when no more sugar will dissolve.
3. The adult takes the pan off the heat and lets the syrup cool for 20 minutes. Add coloring or flavoring.

4. The adult carefully pours the warm syrup into the jars, filling them almost to the top.
5. Clip each seeded stick in a clothespin and rest the clothespin across the top of a jar, so the stick hangs in the syrup without touching the bottom or sides.
6. Cover each jar loosely with a paper towel. Set the jars in a quiet place where they will not be bumped.
7. Check them every day. After 5 to 10 days, lift out the sticks and let them dry on a rack. Enjoy one as a treat and share the others.
8. Clean up: soak the jars in hot water to dissolve the leftover sugar crust, then wash.

Allergy check: Contains none of the nine major allergens. Check flavor extracts and colorings for any family allergies.

Steps

1. **Seed or no seed?** Hang one stick that was *not* rolled in sugar in one jar. Predict which stick will grow crystals faster.
2. **Crystal log.** Each day for a week, look at the jars with a magnifying glass. Draw the crystals and measure how long the crystal part is with a ruler.
3. **Dried-fruit test.** Taste a fresh grape and a raisin. Which is sweeter? Write why, using the words *water* and *evaporate*.
4. **Look for crust.** Notice any crystals on the top of the syrup and the sides of the jar. Why might crystals grow there?
5. **Taste test.** When your rock candy is ready, taste a little and share the rest. Rate it from 1 to 5.
6. **Improve it.** Plan one change: more sugar, a quieter spot, or a longer wait for bigger crystals.
7. Clean up: wash, dry and put everything away.

Tips

- Do not jiggle the jars. Moving them makes many tiny crystals instead of a few big ones.

- If a crust forms on top, the adult can gently break it with a spoon so water can keep evaporating.
- Clear glass jars let you watch without disturbing the crystals.

Check your work

- ☐ I can tell how Andreas Marggraf found sugar in beets.
- ☐ I can explain how sugar crystals grow as syrup cools and water evaporates.
- ☐ I grew rock candy with the adult doing every hot step, and I kept a crystal log.

COOK'S NOTEBOOK

1. Draw a sugar grain under a magnifying glass. Draw your rock candy stick on Day 1, Day 4 and the last day.
2. Make a chart of your crystal log with the length of the crystals each day.
3. Copy the rock candy recipe in your own words and write who does each hot step.

From history. Rock candy is one of the oldest sweets in the world. Long before candy shops, sugar was sold as crystals on strings or in big cone-shaped “sugar loaves” that cooks broke into pieces with special sugar nips.

COMMON MISTAKES

- Handling hot sugar syrup. It is hotter than boiling water and sticks to skin; this is an adult job.
- Letting the stick touch the bottom or sides, where it gets stuck in the crystals that grow there.
- Moving the jars every day to look. Crystals grow best when left alone.
- Eating lots of candy at once. Rock candy is a sometimes food to share.

Make it a game · Sugar Dissolve Duel. Fill two cups with the same amount of water, one cool and one warm from the tap. Guess how many spoonfuls of sugar each cup will dissolve before the sugar sinks to the bottom. Stir carefully and count. The closer guess wins. Tell how sugar can grow crystals as water evaporates.

UNIT 5

FOOD CHEMISTRY

Every kitchen is a little chemistry lab. In this unit you will meet four of the hardest-working ingredients in cooking and find out what each one really does. You will see **starch** from potatoes thicken a pot of soup, learn why a thin film of **oil** browns vegetables, watch living **yeast** puff up a loaf of bread, and grow **sugar crystals** on a string as water slowly leaves a syrup.

Along the way you will meet Antoine Parmentier, who talked France into eating potatoes; a widow whose little jar of oil never ran dry (1 Kings 17); the Fleischmann brothers, who sold fresh yeast to American bakers; and Andreas Marggraf, who found sugar crystals hiding in a beet. Jesus taught us to pray, “Give us this day our daily bread” (Matthew 6:11); by the end of this unit you will have baked a loaf of your own.

PREREQUISITES

- Cooks at the stove and oven only with an adult beside (Units 1–4)
- Uses the claw grip on soft and flat-sided foods with an adult beside (Lesson 1.2)
- Knows simmering and boiling (Lesson 4.3) and how an oven bakes (Lesson 4.4)
- Never tastes uncooked dough or batter (Lesson 4.4)

MASTERY CHECKLIST

- ☐ I can explain how potato starch soaks up water and thickens soup when it is heated.
- ☐ I can explain why oil and water do not mix and why we use only a thin film of oil to sauté.
- ☐ I can explain that yeast is alive, eats sugar, and makes the gas that raises bread.
- ☐ I can explain how sugar crystals grow as a syrup cools and its water evaporates.
- ☐ I can tell the stories of Parmentier, the widow of Zarephath, the Fleischmann brothers and Marggraf.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **A heavy pot with a lid that can go in the oven (a Dutch oven):** For the no-knead bread in Lesson 5.3. A heavy oven-safe pot with a lid works; the bread can also be baked on a baking sheet.
- **King Arthur Baking: Learn to bake guides:** Free step-by-step baking guides with photographs from the King Arthur Baking Company, for the adult helping with Lesson 5.3 and the unit challenge.
- **A potato masher:** Used to thicken the potato soup in Lesson 5.1. A large fork works too.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

5.1	Antoine Parmentier and the Potato	2 sessions of 45–60 minutes
5.2	Oil in the Pan	2 sessions of 45–60 minutes
5.3	Fleischmann's Yeast	2 sessions of 60–90 minutes
5.4	Sugar Crystals and Moisture	2 sessions of 45–60 minutes

UNIT 5 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

How did Antoine Parmentier help France learn to eat potatoes?

2. **5 pts**

Predict: you stir cornstarch into cold water, then heat it until it bubbles. What will happen, and why?

3. **5 pts**

Why does mashing some of the potatoes make potato soup thicker?

4. (5 pts)

What happened to the widow of Zarephath's flour and oil?

5. (5 pts)

Why can food cooked in oil turn golden brown when food boiled in water does not?

6. (5 pts)

What should you do if oil in a pan starts to smoke? What if it catches fire?

7. (5 pts)

Predict: you mix yeast and sugar into very hot water (over 140 °F). Will the dough rise? Why?

8. (5 pts)

Explain how yeast makes bread rise.

9. (5 pts)

What did Andreas Marggraf discover in 1747?

10. (5 pts)

Why do sugar crystals grow on the stick as the rock candy syrup sits?

ANSWER KEY

1. He showed scientifically that potatoes were good food, gave dinners of potato dishes for famous guests, gave potato flowers to the king, and (as the story goes) had his potato field guarded so people would want the potatoes.
2. It will turn thick, because the starch grains soak up water, swell and burst when heated, and the starch chains tangle together (gelatinization).
3. Mashing breaks the potatoes open and releases more starch into the liquid, which thickens it.
4. She shared them with Elijah, and God made them last; the barrel of meal did not run out and the jar of oil did not fail.
5. Water cannot get hotter than about 212 °F, but oil can get much hotter, hot enough to brown food.
6. If it smokes, turn the heat down. If it catches fire, the adult turns off the burner and covers the pan with a lid (or baking soda), never water.
7. No. Water that hot kills the yeast, so it cannot make carbon dioxide gas.
8. Yeast is alive. It eats sugar and gives off carbon dioxide gas, and the stretchy gluten in the dough traps the bubbles so the dough puffs up.
9. That beet roots contain real sugar, the same crystals as cane sugar.
10. As the hot syrup cools and water evaporates, there is more sugar than the water can hold, so the extra sugar stacks onto the seed crystals on the stick.

UNIT CHALLENGE: A LOAF OF BREAD WITH A RISE LOG

Bake a loaf of bread (the no-knead bread from Lesson 5.3 or a family recipe) with an adult handling every very hot step. Keep a full rise log: the water temperature, the time you mixed the dough, and the dough's height each time you check it.

When the loaf is baked and cooled, have the adult cut it so you can draw or photograph the holes inside. Write a short paragraph explaining what the yeast, the gluten and the oven heat each did. Serve the bread to your family with soup from this unit or the last, and give thanks for your daily bread.

LOOK FOR	WHAT IT MEANS
Bread made safely	Measured carefully, never tasted uncooked dough, and stayed back while the adult handled the hot pot or pan; the kitchen was cleaned afterward.
Rise log	Times, heights and observations recorded honestly, with a simple bar graph.
Crumb drawing or photo	Shows the holes clearly and labels them as gas bubbles made by yeast.
Science explanation	Correctly explains the jobs of yeast, gluten and heat in your own words.
Improvement	Names one change for next time and why; a flat loaf that is honestly recorded earns full credit.

CRAVINGS, REWARD & A BALANCED DIET

God made us able to enjoy sweet, salty and rich foods, and He gave us good things to enjoy, from honey in the comb to a feast day with friends. In this unit you will learn how your brain learns to **want** certain foods, why sweet drinks can hide a surprising amount of sugar, and why some foods keep you happily full for hours while others leave you hungry again soon.

You will hear how Jonathan found honey in the woods and how Ruth was satisfied at Boaz's table. You will make honey-oat energy bites, warm cinnamon peaches, a pitcher of lemonade with half the usual sugar, and a black bean dip. Most of all, you will practice listening to your body, giving thanks, and enjoying treats in their place, as "sometimes foods."

PREREQUISITES

- Knows the five food groups and a balanced plate (Unit 2)
- Knows the five tastes and that tastes can change with practice (Unit 3)
- Cooks at the stove only with an adult beside (Units 1–5)

MASTERY CHECKLIST

- ☐ I can explain that sweet foods give quick energy, and that fiber, protein and fat make energy last longer.
- ☐ I can explain, simply, that dopamine is a messenger in the brain that helps us want and look for good things, and that we can still choose.
- ☐ I can read the sugar on a drink label and change grams into teaspoons (4 grams is about 1 teaspoon).
- ☐ I can explain why fiber, protein and water help me feel full, and that fullness takes about 20 minutes to notice.
- ☐ I can enjoy a treat thankfully as a sometimes food.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **FDA: The Nutrition Facts Label (for kids and families)**: Free. The U.S. Food and Drug Administration's guide to reading the label, including the Added Sugars line. For the adult helping with Lesson 6.3.
- **A clear glass, a teaspoon and a bag of sugar**: For the sugar-spoon display in Lesson 6.3: measure out the sugar in a drink and see it.
- **A citrus juicer or reamer**: Optional, for squeezing lemons in Lesson 6.3. A fork twisted inside a lemon half works too.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

6.1 Jonathan and the Honeycomb	2 sessions of 45–60 minutes
6.2 How Your Brain Learns to Want Foods	2 sessions of 45–60 minutes
6.3 Hidden Sugar in Drinks	2 sessions of 45–60 minutes
6.4 Fiber and Protein Help You Feel Full	2 sessions of 45–60 minutes

UNIT 6 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
What happened when Jonathan ate a little honey? Why?
2. **5 pts**
How do bees turn nectar into honey?
3. **5 pts**
Why should honey never be given to a baby under one year old?
4. **5 pts**
In your own words, what does dopamine do?

5. (5 pts)

Predict: you were not hungry, but then you smell cookies baking. What might happen, and what could you do?

6. (5 pts)

A drink label says 32 grams of sugar. About how many teaspoons is that?

7. (5 pts)

What are the best everyday drinks?

8. (5 pts)

Name three things in food that help you feel full.

9. (5 pts)

Predict: you eat a bean dip snack one day and a cookie the next. Which will keep you full longer, and why?

10. (5 pts)

About how long does it take to notice you are full? How can that help you at meals?

ANSWER KEY

1. “His eyes were enlightened”: he felt stronger right away, because the sugars in honey give quick energy.
2. They sip nectar from flowers, store it in the wax cells of the honeycomb, and fan their wings to dry out the water until it is thick honey; then they seal the cells with wax.
3. It can make babies very sick.
4. It is a messenger in the brain that helps us want, look for and remember good things, like food when we are hungry.
5. You might suddenly want a cookie because the smell is a cue. You could ask “Am I really hungry?”, drink water, wait, or choose a good snack.
6. $32 \div 4 = 8$ teaspoons.
7. Plain water and milk.
8. Fiber, protein and water.
9. The bean dip, because its fiber and protein are digested slowly and take up room; the cookie gives quick energy that does not last.
10. About 20 minutes. Eating slowly gives your body time to tell you that you are satisfied.

UNIT CHALLENGE: A ONE-WEEK DRINK AND SNACK SWAP

For one week, make two swaps: drink water or milk instead of a sweet drink at least once a day, and choose a snack with fiber and protein (like the energy bites, bean dip, fruit with yogurt, or vegetables with hummus) instead of a sweet snack at least once a day. Make at least one of your snacks yourself.

Keep a log each day: what you drank, what snack you chose, how long it kept you satisfied, and one word about how your taste buds noticed things. At the end of the week, plan one family treat to enjoy together as a sometimes food, and give thanks for it.

LOOK FOR	WHAT IT MEANS
Daily log	Seven days of drinks, snacks and how long each kept you satisfied, recorded honestly.
Homemade snack	At least one snack made yourself, safely, with cleanup.
Sugar math	At least two drink labels read and changed from grams to teaspoons correctly.
Reflection	A few sentences on what you noticed about wanting, liking, fullness and your taste buds.
Treat in its place	A family treat planned and enjoyed thankfully, with no talk of “good” or “bad” foods or bodies.

6.1 JONATHAN AND THE HONEYCOMB

OBJECTIVES

- Retell how Jonathan ate honey in the woods and “his eyes were enlightened” (1 Samuel 14).
- Explain how bees make honey and why sweet foods give quick energy, while oats, nut butter and seeds make energy last.
- Make no-bake honey-oat energy bites.

Warm-up. Look at a jar of honey with a flashlight shining through it. Tip it slowly and watch how it moves. Smell it. Guess: how much honey do you think one honeybee makes in its whole life: a cup, a spoonful, or less than a spoonful?

WATCH

How Do Bees Make Honey? - The Dr. Binocs Show | Best Learning Videos For Kids | Peekaboo Kidz

Peekaboo Kidz · 5:01

https://www.youtube.com/watch?v=uES_6C1gle0

WHEN TO WATCH

After the story. Listen for how the bees turn watery nectar into thick honey.

Note: A cartoon explanation from the Dr. Binocs Show of how honeybees collect nectar and make honey in the hive.

BACKUP VIDEO

How Do Bees Make Honey? | The Science of Food! | SciShow Kids

SciShow Kids · 6:02

<https://www.youtube.com/watch?v=A4YlpGQiD3w>

A second look at how bees turn nectar into honey, with close-up film of real bees and honeycomb.

KEY TERMS

nectar

A sweet, watery juice made by flowers.
Bees drink it and turn it into honey.

honeycomb

The six-sided wax cells bees build to store honey and raise young bees.

energy

The power your body uses to move, grow, think and keep warm. Food gives you energy.

quick energy

Energy from sugars that your body takes in fast. It helps for a little while but does not last long by itself.

CORE IDEAS

The story. One day King Saul's army was chasing its enemies. Saul made the soldiers promise not to eat anything until evening. His son Jonathan was away fighting bravely and did not hear the order. Tired and hungry, Jonathan passed through a forest where honey was dripping from a honeycomb. He dipped the end of his staff in the honey and ate a little, "and his eyes were enlightened" (1 Samuel 14:27). He felt stronger right away. Jonathan said that the people would have done better if they had been allowed to eat.

How bees figured it out. Of course bees do not think like scientists, but God made them wonderful food makers. Worker bees fly from flower to flower, sipping **nectar**. Back at the hive, they pass the nectar from bee to bee and store it in the wax cells of the **honeycomb**. Then they fan their wings over it to dry it out until it is thick and sweet, and seal each cell with wax. One bee makes only about one-twelfth of a teaspoon of honey in its whole life, so every jar is the work of thousands of bees.

The kitchen science. Honey is mostly sugars, and sugars give **quick energy**: your body takes them in fast, which is why Jonathan felt better so quickly. But sugar alone does not last long, and you can soon feel hungry or tired again. Foods with **fiber** (like oats), **protein** and some **fat** (like peanut or sunflower butter) are digested more slowly, so their energy lasts. Put them together with a little honey, and you have a snack that tastes sweet and keeps you going. Scripture says, "Hast thou found honey? eat so much as is sufficient for thee" (Proverbs 25:16): honey is a good gift, enjoyed in the right amount.

Let's cook. You will make no-bake energy bites from oats, a nut or seed butter and honey. The skills to do well are **measuring sticky ingredients** (a little oil on the measuring cup helps honey slide out) and **rolling even balls** with clean hands. There is no stove or knife today.

PICTURE STUDY



The Honey Harvest, Riccardo Pellegrini, 1892 · Oil on canvas

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

The Italian painter Riccardo Pellegrini painted country life in bright sunshine. Here an old beekeeper is harvesting honey from his hives among the flowers on a warm day.

Look closely

- Find the beehives. What are they made of, and how are they raised off the ground?
- Find the beekeeper's hands. What do you think he is doing?
- Find the flowers in the field. Why would a beekeeper want his hives near so many flowers?
- Find the jug on the ground. What might it be for?

Talk about it

1. How many bees do you think worked to fill this man's jug with honey?
2. Jonathan found wild honey in the woods. How is this beekeeper's honey different?
3. What does it mean to eat honey "so much as is sufficient"?

Safety first. Check for peanut, tree-nut and sesame allergies before choosing your nut or seed butter. Honey is never given to babies under one year old, so keep these bites away from baby siblings. Wash your hands before rolling the bites.

KITCHEN PROJECT

Honey-Oat Energy Bites

You will mix and roll energy bites, compare how long they keep you going with a plain spoonful of honey on another day, and taste honey from different flowers if you can.

You will need

- A medium mixing bowl and a sturdy spoon
- Measuring cups and spoons
- A small plate or tray lined with parchment paper
- A container with a lid
- A timer

NO-BAKE HONEY-OAT ENERGY BITES

Serves About 18 bites • Prep 15 min • Chill 30 min

Ingredients

- 1 cup old-fashioned rolled oats
- ½ cup creamy peanut butter or sunflower seed butter
- ⅓ cup honey
- ¼ cup ground flaxseed or 2 tablespoons chia seeds (optional)
- ¼ cup mini chocolate chips or raisins (optional)
- 1 teaspoon vanilla extract
- A pinch of cinnamon

Method

1. Wash your hands. Put all the ingredients in the bowl.
2. Stir hard with the spoon until everything is mixed and sticky. If it is too dry, add a little more nut butter; if it is too wet, add a spoonful more oats.
3. Cover the bowl and chill 30 minutes, so the mixture is easier to roll.

4. With clean hands, scoop a tablespoon of the mixture and roll it into a ball. Set it on the tray. Make the rest.
5. Eat one or two as a snack. Keep the rest in a covered container in the refrigerator for up to 1 week.
6. Clean up: wash the bowl, spoon and measuring cups in hot, soapy water (nut butter is sticky!), and wipe the counter.

Allergy check: Contains peanuts if made with peanut butter; sunflower seed butter is a peanut-free swap. Chocolate chips may contain milk or soy; check the label. Oats are often processed with wheat; use certified gluten-free oats if needed. Honey is not for babies under one year.

Steps

1. **Honey taste.** If you can, taste two kinds of honey (such as clover and wildflower) on clean spoons. Do they taste the same? Why might honey from different flowers taste different?
2. Make the energy bites as the recipe says.
3. **How long does it last?** On one afternoon, eat two energy bites as your snack. Write the time, and write when you first feel hungry again. On another afternoon, compare with a snack of just a few crackers or a small cookie. Which kept you going longer?
4. **Taste test.** Rate the bites from 1 to 5. Ask your family to rate them.
5. **Improve it.** Plan one change: less honey, more seeds, a different dried fruit, or a sprinkle of coconut.
6. Clean up: wash, dry and put everything away.

Tips

- Rub a drop of oil inside the measuring cup before you measure honey. It will slide right out.
- Damp hands keep the mixture from sticking while you roll.
- These make a good after-school or before-sports snack.

Check your work

- ☐ I can retell the story of Jonathan and the honey.
- ☐ I can explain why sugar gives quick energy and why oats and nut butter make energy last.

- I made energy bites and tested how long they kept me going.

COOK'S NOTEBOOK

1. Draw a honeycomb with six-sided cells. Draw bees fanning their wings over the honey and label “drying out the water.”
2. Make an energy-lasting chart from your snack test: snack, time eaten, time hungry again.
3. Copy the energy bites recipe in your own words.

COMMON MISTAKES

- Giving honey to a baby under one year old. It can make babies very sick.
- Thinking a sweet snack alone will keep you going all afternoon. Add fiber and protein.
- Forgetting to check for peanut and tree-nut allergies before you share them.

Make it a game • Quick or Lasting Energy. Your grown-up names a food. If it gives quick energy, like honey, sprint in place for ten seconds. If it gives lasting energy, like oats, nut butter or seeds, march steadily for thirty. Then explain your choice. Score a point for each right pick. Retell what happened when Jonathan ate honey in the woods.

Scripture. “But Jonathan heard not when his father charged the people with the oath: wherefore he put forth the end of the rod that was in his hand, and dipped it in an honeycomb, and put his hand to his mouth; and his eyes were enlightened.” (1 Samuel 14:27, KJV)

A little honey gave tired Jonathan quick strength. Food is God’s gift to strengthen us for our work.

6.2 HOW YOUR BRAIN LEARNS TO WANT FOODS

OBJECTIVES

- Explain, simply, that dopamine is a messenger in the brain that helps us want and look for good things.
- Explain why the smell or sight of a treat can make us want it, and how we can still choose wisely.
- Cook warm cinnamon peaches with an adult beside you and rate how much you want them before and how much you liked them after.

Warm-up. Close your eyes and imagine walking into a kitchen where cookies are baking. What happens? Does your mouth water? Do you suddenly want one, even if you were not hungry a minute ago? Write down three sights, sounds or smells that make you want a certain food.

WATCH

How does your body know you're full? - Hilary Coller

TED-Ed • 4:33

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

WHEN TO WATCH

After the kitchen-science paragraph. Then talk about the difference between being hungry, being full, and just wanting a food.

Note: A short animated lesson from TED-Ed about the messages between the stomach and the brain; best watched together, with a parent explaining the bigger words. Grade 5 also uses this video; we chose it because no other video we found explained hunger and fullness without diet or weight talk.

KEY TERMS

dopamine

A messenger chemical in the brain that helps us want, look for and remember good things, such as food when we are hungry.

craving

A strong feeling of wanting a certain food.

cue

A sight, sound or smell that reminds your brain of something, such as the smell of cookies or the snack cupboard door.

self-control

Choosing what is good even when you want something else right now. It is part of the fruit of the Spirit (Galatians 5:22-23).

CORE IDEAS

The story. For a long time, people thought that the brain simply felt pleasure when we ate something tasty. In the 1990s a scientist named Wolfram Schultz and others studied the brain more carefully. They found that a messenger chemical called **dopamine** was very active not only when a treat arrived, but even more when the brain *expected* a treat was coming, such as when a familiar sound or light signaled it.

How they figured it out. The scientists measured tiny signals in the brain as it learned. At first, the dopamine signal came when the reward arrived. But after the brain learned that a certain signal always came before the reward, the dopamine signal moved to the moment the signal appeared, before any food was there at all. They realized dopamine is mostly about **wanting and learning**: it helps the brain notice and go after things it has learned are good. That is why the smell of baking cookies, a bakery sign, or the sound of the ice-cream truck can make you want a treat right away.

The kitchen science. God made us able to enjoy food and to want what nourishes us. When you are hungry, wanting food is good: it gets you to the table! The brain learns quickly that sweet, salty and rich foods are rewarding, and it learns the **cues** that go with them. But wanting is not the same as needing, or even the same as liking. Sometimes we want something very much and then find it was only “okay.” The good news is that wanting does not have to be in charge. You can notice the feeling, ask “Am I really hungry?”, drink some water, wait a little, or choose a good snack. That is **self-control**, and it grows stronger with practice.

Let’s cook. You will cook warm cinnamon peaches in a skillet and serve them with yogurt. **An adult stands beside you at the stove.** The skill to do well is **stirring gently over medium heat** so the fruit softens without burning. You will also do a want-and-like test before and after you eat.

PICTURE STUDY



Still Life with Peaches, Raphaëlle Peale, 1821 · Oil on wood panel · Brooklyn Museum, New York

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

Raphaëlle Peale painted fruit so ripe and real that you almost want to reach into the picture. Look how the fuzzy peaches glow against the dark background.

Look closely

- Find the brightest peach. How did the painter make it look soft and fuzzy?
- Find the leaves and the grapes. What colors did he use for them?
- Look at the white basket. What pattern is in it?
- Look at the dark background. Why do you think he made it so dark?

Talk about it

1. Does looking at this picture make you want a peach? That is your brain responding to a cue!
2. How could you enjoy a sweet, juicy peach as a good everyday food?
3. What is one way you can practice self-control when you see a treat you want?

Safety first. An adult stands beside you at the stove. Turn the handle in, stir gently with a heat-proof spatula, and keep your face back. Cooked fruit and its syrup get very hot, so let the peaches cool for a few minutes before tasting.

Want It, Like It: Warm Cinnamon Peaches

You will rate how much you want a dessert before you eat it and how much you like it and how full you feel after. Then you will compare with your family's ratings.

You will need

- A large skillet and a heat-proof spatula
- A small serrated knife or paring knife, a cutting board and a damp towel (for fresh peaches)
- Measuring spoons
- Small bowls and spoons
- A chart in your notebook with columns for want, like and full

WARM CINNAMON PEACHES WITH YOGURT

Serves 4 • Prep 10 min • Cook 6–8 min

Ingredients

- 4 ripe peaches, or one 16-ounce bag of frozen sliced peaches, thawed
- 1 tablespoon butter
- 1 tablespoon brown sugar or maple syrup
- ½ teaspoon ground cinnamon
- 1 teaspoon lemon juice
- 1½ cups plain or vanilla yogurt
- ¼ cup granola or chopped nuts for topping (optional)

Method

1. Wash your hands. If using fresh peaches, wash them. The adult cuts each peach in half around the pit and removes the pit. With the adult beside you, lay the halves flat and slice them with the claw grip.
2. With the adult beside you, melt the butter in the skillet over medium heat.
3. Add the peaches and spread them out. Cook 3 minutes, stirring gently.

4. Sprinkle the brown sugar and cinnamon over the peaches and add the lemon juice. Stir gently 2 to 4 minutes more, until the peaches are soft and the juices turn syrupy.
5. The adult turns off the burner. Let the peaches cool 3 to 5 minutes.
6. Spoon yogurt into bowls and top with warm peaches and a sprinkle of granola.
7. Clean up: when the skillet is cool, wash it and wipe the stove.

Allergy check: Contains milk (butter, yogurt). Granola may contain wheat and nuts; nuts are tree nuts. For milk-free, use coconut oil and a dairy-free yogurt.

Steps

1. **Before.** While the peaches cook and the kitchen fills with their smell, rate how much you *want* them from 1 to 5. Also rate how hungry you are from 1 to 5.
2. Cook the peaches as the recipe says, with the adult beside you.
3. **Eat slowly.** Eat your bowl slowly, putting your spoon down between bites. Notice the taste, the warmth and the texture.
4. **After.** Rate how much you *liked* it and how full you feel. Wait 20 minutes and rate your fullness again. Did it change?
5. **Family chart.** Ask everyone to do the same ratings. Did anyone want it more than they liked it, or like it more than they expected?
6. **Improve it.** Plan one change: less sugar (do the peaches need it?), a different fruit like pears or apples, or a sprinkle of oats.
7. Clean up: wash, dry and put everything away.

Tips

- Ripe peaches are sweet enough that you may not need any sugar at all. Taste first.
- Frozen peaches work all year round.
- Putting your spoon down between bites gives your stomach time to tell your brain you are getting full.

Check your work

- ☐ I can explain, simply, what dopamine does and what a cue is.

- ☐ I can tell the difference between wanting a food, liking it and being hungry for it.
- ☐ I cooked warm peaches safely with an adult beside me and kept a want-and-like chart.

COOK'S NOTEBOOK

1. Draw a brain with a little messenger running from a nose smelling cookies to the brain, carrying a sign that says "Want!" Then draw yourself stopping to ask, "Am I hungry?"
2. Copy your family's want-like-full chart.
3. Copy the cinnamon peaches recipe in your own words.

COMMON MISTAKES

- Thinking wanting a food means your body needs it. Wanting is often just your brain noticing a cue.
- Eating very fast. Fullness takes about 20 minutes to notice.
- Thinking treats are "bad." They are good gifts in their place, as sometimes foods.

Make it a game • Cue, Craving, Choice. Write three cue cards, such as the smell of cookies, a candy display at the store, and a commercial. Draw one at a time. Say what the cue makes your brain want, then name a wise choice you could make. Your grown-up scores a point for each plan. Explain what dopamine is in one sentence.

6.3 HIDDEN SUGAR IN DRINKS

OBJECTIVES

- Tell how Joseph Priestley made the first bubbly water in 1767, and how sugary sodas came later.
- Read the sugar on a drink label and change grams into teaspoons (4 grams $\approx$ 1 teaspoon).
- Make lemonade with half the usual sugar, and a sparkling version, with an adult nearby at the microwave.

Warm-up. Line up three or four drink containers from your kitchen or the store (juice, a sports drink, chocolate milk, a soda, water). Guess which has the most sugar and which has the least. Line them up in order of your guess.

WATCH

How Much Sugar is in Soda? (Signing Savvy) S1 E18

WonderGrove Kids · 1:45

https://www.youtube.com/watch?v=lbb1Se_ttvc

WHEN TO WATCH

After you make your guesses in the warm-up. Then check your guesses against the labels.

Note: A short cartoon from a children's health-education series, with an American Sign Language helper in the corner.

KEY TERMS

Nutrition Facts label

The chart on packaged food that tells how much of each nutrient is in one serving.

gram

A small unit for weighing. About 4 grams of sugar fill one teaspoon.

added sugars

Sugar or syrup put into a food or drink when it is made, not the sugar that is naturally in fruit or milk.

carbonated

Bubbly, with carbon dioxide gas dissolved in it.

CORE IDEAS

The story. In 1767 an English minister and scientist named Joseph Priestley became curious about a gas that bubbled up from large vats near his home in Leeds. He found a way to make the gas dissolve into water by pouring water back and forth between glasses held in the gas. The water became fizzy and tasted tangy and fresh. Priestley had made the first **carbonated** water. A few years later, in 1783, Johann Jacob Schweppe opened a factory in Geneva to sell bottled bubbly water.

How it changed. At first, people drank bubbly water plain, thinking it was healthful. Then, in the 1800s, drugstores began mixing it with flavored syrups made from lots of sugar, and the soda fountain was born. Over the years, sodas, juice drinks, sports drinks and sweet teas came in bigger and bigger bottles. Because sugar dissolves in water, you cannot see it in a drink, so it is easy to drink a lot without noticing. In 2016 the U.S. Food and Drug Administration decided that food labels must show an **Added Sugars** line, so families could see the sugar that was put in.

The kitchen science. Sugar on a label is measured in **grams**. About **4 grams of sugar fill one teaspoon**. To change grams into teaspoons, divide by 4. A 12-ounce can of regular soda has about 39 grams of sugar, nearly 10 teaspoons! Sweet drinks give quick energy but do not fill you up the way food does. Your body needs plenty of water, and **plain water and milk are the best everyday drinks**. Taste buds can also learn: when you drink less-sweet drinks for a few weeks, they start to taste just right, and very sweet drinks start to taste too sweet.

Let's cook. You will make fresh lemonade with **half the sugar** of many recipes, and a bubbly version with plain sparkling water. The skills to do well are **squeezing lemons** (the adult cuts them in half) and **tasting and adjusting**. The adult heats water in the microwave to dissolve the sugar, with you nearby.

PICTURE STUDY



The Copper Drinking Fountain, Jean-Siméon Chardin, about 1733–1734 · Oil on wood · Musée du Louvre, Paris

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

Long before kitchen faucets, many French homes kept a copper water tank called a cistern in the kitchen. The family filled it with water carried from a well or fountain and drew water from the little spout. Chardin painted the tank and its jugs and buckets as carefully as if they were treasures.

Look closely

- Find the spout. How would you fill a cup from this tank?
- Find the bucket, the dipper and the jug. What job does each one do?
- Look at the copper. How did Chardin make it shine?
- Look at the floor and wall. Is this a fancy room or a plain kitchen?

Talk about it

1. Every drop of water in this tank was carried in by hand. How does that make you think about the water from your faucet?
2. For most of history, people drank water, milk or watered drinks with meals. How is that different from many drinks sold today?
3. Why is water the best drink when you are thirsty?

Safety first. The adult cuts the lemons and heats the water in the microwave; hot water and the bowl can burn, so let the adult carry them. Lemon juice stings in small cuts and in eyes, so squeeze gently and wash your hands after.

Sugar Spoons and Half-Sugar Lemonade

You will measure out the sugar in a few drinks with real teaspoons, then make a pitcher of lemonade with half the usual sugar and a sparkling version, and run a family taste test.

You will need

- Several drink containers with Nutrition Facts labels
- Clear glasses, a teaspoon and a bag of sugar for the display
- A citrus juicer or fork, a strainer and a large pitcher
- A microwave-safe bowl or measuring cup (for the adult)
- Measuring cups and a long spoon
- Small cups for the taste test

HALF-SUGAR LEMONADE (STILL OR SPARKLING)

Serves 6 (about 1 cup each) • Prep 20 min • Chill 1 hr

Ingredients

- 6 lemons (about 1 cup of juice)
- ½ cup sugar (many lemonade recipes use 1 cup or more)
- 1 cup water for dissolving the sugar
- 4 cups cold water, or 2 cups cold water and 2 cups plain sparkling water
- Ice and lemon slices for serving
- A few mint leaves or strawberries (optional)

Method

1. Wash your hands and wash the lemons. Roll each lemon on the counter, pressing with your palm; this makes it juicier.
2. The adult cuts the lemons in half. Squeeze each half with the juicer or a fork twisted inside. Pour the juice through the strainer to catch the seeds. You need about 1 cup.
3. The adult heats 1 cup of water in the microwave until hot (about 1 minute), with you nearby. Stir in the sugar until it dissolves. Let it cool

10 minutes.

4. In the pitcher, stir together the lemon juice, the sugar water and 4 cups cold water (or 2 cups for the sparkling version).
5. Taste. Too sour? Add a little cold water. Chill at least 1 hour.
6. For sparkling lemonade, add 2 cups of cold plain sparkling water to the pitcher just before serving, so it stays fizzy. Serve over ice with lemon slices.
7. Clean up: wash the juicer, strainer and pitcher, and wipe up sticky spills.

Allergy check: Contains none of the nine major allergens.

Steps

1. **Sugar spoons.** For each drink, find the Total Sugars (or Added Sugars) on the label. Divide the grams by 4 to get teaspoons. Spoon that many teaspoons of sugar into a clear glass in front of the container. Were your warm-up guesses right?
2. Make the lemonade as the recipe says.
3. **Your lemonade's sugar.** Your whole pitcher has $\frac{1}{2}$ cup of sugar, which is 24 teaspoons, shared among 6 cups. How many teaspoons are in each cup? ($24 \div 6 = 4$ teaspoons.) Compare with a can of soda (about 10).
4. **Family taste test.** Give each person a small cup of still lemonade and a small cup of sparkling lemonade. Which do they like better? Is half-sugar sweet enough?
5. **Improve it.** Plan one change: even less sugar next time, adding mint, or mashing in a few strawberries.
6. Clean up: pour the sugar from the display glasses back into the bag (it is still clean), and wash everything.

Tips

- Room-temperature lemons give more juice than cold ones.
- If you want lemonade even less sweet over time, cut the sugar by a spoonful each time you make it. Your taste buds will adjust.
- Water with a few slices of lemon, cucumber or berries is a refreshing everyday drink.

Check your work

- ☐ I can tell how Joseph Priestley made bubbly water.
- ☐ I can change grams of sugar into teaspoons by dividing by 4.
- ☐ I made half-sugar lemonade and measured the sugar in other drinks.

COOK'S NOTEBOOK

1. Draw your sugar-spoon display: each drink with its glass of sugar and the number of teaspoons.
2. Write the math for your lemonade: $24 \text{ teaspoons} \div 6 \text{ cups} = 4 \text{ teaspoons per cup}$.
3. Copy the lemonade recipe in your own words.

From history. Joseph Priestley is also famous for discovering oxygen in 1774. He was a careful experimenter and a minister who wrote many books. He moved to America in 1794 and lived his last years in Northumberland, Pennsylvania, where his house still stands.

COMMON MISTAKES

- Thinking juice drinks and sports drinks have little sugar because they look healthy. Read the label.
- Forgetting to look at the serving size. Some bottles hold two or more servings.
- Adding sparkling water too early, so the bubbles escape before serving.

Make it a game • Teaspoon Math Duel. Find three drinks in the pantry and read the added sugars on each label. Four grams is one teaspoon. Race your grown-up to do the math in your heads, then scoop real sugar into clear cups to check. Score a point for each right answer. Who finds the drink with the most sugar?

6.4 FIBER AND PROTEIN HELP YOU FEEL FULL

OBJECTIVES

- Explain how fiber, protein and water help you feel full, and why fullness takes about 20 minutes to notice.
- Tell how scientists tested which foods keep people full the longest.
- Make a black bean dip with vegetables and keep a “how long till hungry” log.

Warm-up. Pour 1 tablespoon of dry oats into a glass of water and 1 tablespoon of white sugar into another. Stir both and wait 10 minutes. What happened to each? Which one would take up more room in your stomach?

WATCH

Pasta with Beans and Greens

Food Hero · 8:01

<https://www.youtube.com/watch?v=QBw-UqSk-os>

WHEN TO WATCH

Before Session 2. Notice the fiber-rich beans, greens and whole grains, and how mother and daughter cook together.

Note: From Food Hero, Oregon State University Extension. A mother and daughter cook a filling dish of beans, greens and pasta in an electric skillet.

BACKUP VIDEO

How Does Food Get to Our Stomachs and More Answers to Your Questions! | SciShow Kids

SciShow Kids · 7:03

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

The middle part of this question-and-answer video shows the path food takes to your stomach. The first part answers questions about the earth and sun.

KEY TERMS

fiber

The part of plant foods your body cannot digest. It soaks up water, takes up room and slows digestion, which helps you feel full.

protein

Building material for your body, found in beans, eggs, meat, fish, dairy and nuts. It is digested slowly and helps you stay full.

satisfied

Comfortably full: no longer hungry, but not stuffed.

fullness cues

Signals that you have eaten enough, such as your stomach feeling comfortable and food tasting less exciting.

CORE IDEAS

The story. Ruth was a young widow who had come to Bethlehem with her mother-in-law, Naomi. They were poor, so Ruth gleaned in the fields, gathering the grain the harvesters left behind. Boaz, who owned the field, was kind to her. At mealtime he invited her to sit with the reapers. She dipped her bread and he handed her parched (roasted) grain, “and she did eat, and was sufficed, and left” (Ruth 2:14). Ruth ate until she was satisfied, and she even saved some to take home to Naomi.

How they figured it out. Why do some foods leave us satisfied for hours while others leave us hungry soon? In 1995 a scientist named Susanna Holt and her team in Sydney, Australia, tested this. They gave volunteers servings of 38 different foods, each with the same amount of food energy, and asked them every 15 minutes how hungry or full they felt. Foods like boiled potatoes, fish, oatmeal, beans, apples and oranges kept people full the longest. Foods like croissants, cake and candy bars left them hungry soonest.

The kitchen science. The foods that kept people full had more **fiber**, **protein** or **water**. Fiber soaks up water and takes up room in your stomach, and it slows digestion. Protein takes a long time to digest and sends “I’m full” signals to your brain. Water-rich foods like fruits, vegetables and soup fill your stomach too. Your stomach and brain need about **20 minutes** to tell you that you are full, so eating slowly helps you notice when you are satisfied. Ruth’s parched grain and bread, full of fiber, made a satisfying meal.

Let's cook. You will make a warm black bean dip, full of fiber and protein, and eat it with crunchy vegetables. The skills to do well are **mashing beans** and **cutting vegetable sticks with the claw grip, with an adult right beside you.** The adult warms the dip in the microwave, with you nearby.

PICTURE STUDY



Ruth in Boaz's Field, Julius Schnorr von Carolsfeld, 1828 · Oil on canvas · National Gallery, London

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

The German painter Julius Schnorr von Carolsfeld painted many Bible stories. Here Ruth stands in Boaz's field holding the grain she has gleaned, while Boaz speaks kindly to her and the reapers work behind them.

Look closely

- Find Ruth. What is she holding?
- Find Boaz. How can you tell he is the owner of the field?
- Find the reapers in the background. What are they doing?
- Find the jug on the ground. What might be inside for the workers' meal?

Talk about it

1. Ruth gleaned grain to feed herself and Naomi. How would that grain become food?
2. Ruth "did eat, and was sufficed, and left." What does it mean to eat until you are satisfied and save the rest?
3. How did Boaz show kindness through food? How can you?

Safety first. Cut the vegetable sticks with the claw grip, with an adult right beside you, on a board that cannot slide; the adult cuts hard, round vegetables in half first. The adult heats the dip in the microwave and takes it out with oven mitts; stir it before tasting so there are no hot spots.

KITCHEN PROJECT

Black Bean Dip and the “How Long Till Hungry” Log

You will make a fiber-and-protein dip and keep a log comparing how long different snacks keep you satisfied.

You will need

- A can opener and a colander
- A medium microwave-safe bowl and a potato masher or fork
- A small serrated knife or paring knife, a cutting board and a damp towel
- Measuring cups and spoons
- Oven mitts (for the adult)
- A clock or timer and your notebook

WARM BLACK BEAN DIP WITH VEGETABLE DIPPERS

Serves 4–6 • Prep 15 min • Heat 2 min

Ingredients

- 1 can (15 ounces) black beans, rinsed and drained
- ½ cup mild salsa
- 1 tablespoon lime juice
- ½ teaspoon ground cumin and ¼ teaspoon garlic powder
- ¼ teaspoon salt
- ½ cup grated cheddar or Monterey Jack cheese (optional)
- **Dippers:** 2 carrots, 1 bell pepper, 1 cucumber, and a handful of snap peas or celery sticks
- Whole-grain crackers or baked tortilla chips (optional)

Method

1. Wash your hands and wash the vegetables.
2. Put the beans in the bowl and mash them with the masher until mostly smooth (a few whole beans are fine).

3. Stir in the salsa, lime juice, cumin, garlic powder and salt. Sprinkle the cheese on top.
4. The adult microwaves the dip 1 to 2 minutes, until warm and the cheese melts, and takes it out with oven mitts. Stir before tasting.
5. The adult peels the carrots and cuts the pepper and cucumber in half. With the adult beside you, cut them into sticks with the claw grip.
6. Arrange the vegetables around the dip and serve.
7. Refrigerate leftover dip within 2 hours; it keeps 3 days. Clean up and wipe the counter.

Allergy check: Contains milk if you add cheese. For milk-free, leave it off or use a dairy-free cheese. Crackers may contain wheat. No eggs or nuts.

Steps

1. **Oats and sugar.** Look at your warm-up glasses. Write what happened to the oats (they soaked up water and swelled) and the sugar (it dissolved and disappeared).
2. Make the dip as the recipe says.
3. **Day 1 log.** Eat a snack of bean dip and vegetables. Write the time you finished. Every 30 minutes, rate your hunger from 1 (very hungry) to 5 (very full). Write the time you feel hungry again.
4. **Day 2 log.** On another day, at the same time, eat a snack of one or two cookies. Keep the same log.
5. **Compare.** Which snack kept you satisfied longer? Explain why with the words fiber and protein. (A cookie is a fine sometimes food; it just does not keep you full for long.)
6. **Taste test and improve it.** Rate the dip from 1 to 5. Plan one change: pinto beans, more lime, or a spoonful of plain yogurt on top.
7. Clean up: wash, dry and put everything away.

Tips

- Rinsing canned beans removes extra salt and the thick liquid.
- Eat slowly and put your dipper down between bites. Give your stomach time to send its message.

- Bean dip makes a good lunch-box dip with an ice pack.

Check your work

- ☐ I can explain how fiber, protein and water help me feel full.
- ☐ I can tell how scientists tested which foods keep people full.
- ☐ I made bean dip safely and kept a “how long till hungry” log.

COOK’S NOTEBOOK

1. Draw two stomachs: one with bean dip and vegetables (fiber soaking up water, taking up room) and one with a cookie. Label each.
2. Make a line graph of your two hunger logs, with time along the bottom.
3. Copy the bean dip recipe in your own words.

COMMON MISTAKES

- Eating so fast that you do not notice you are full until you feel stuffed.
- Thinking a sweet drink or candy will hold you over until dinner. Add fiber and protein.
- Leaving bean dip out all afternoon. It is perishable; follow the two-hour rule.

Make it a game • Staying Power Toss. Make three hoops from string or bowls: fiber, protein and water. Your grown-up names foods, like beans, an egg, an apple or soup. Toss a rolled sock into the hoop that helps you feel full. A food can belong to more than one hoop. Score a point for each right toss. Say why fullness takes 20 minutes.

Scripture. “And Boaz said unto her, At mealtime come thou hither, and eat of the bread, and dip thy morsel in the vinegar. And she sat beside the reapers: and he reached her parched corn, and she did eat, and was sufficed, and left.” (Ruth 2:14, KJV)

“Sufficed” means satisfied, and “left” means she had some left over to take home. Boaz’s kindness gave Ruth enough and more, and she shared it with Naomi.

UNIT 6

CRAVINGS, REWARD & A BALANCED DIET

God made us able to enjoy sweet, salty and rich foods, and He gave us good things to enjoy, from honey in the comb to a feast day with friends. In this unit you will learn how your brain learns to **want** certain foods, why sweet drinks can hide a surprising amount of sugar, and why some foods keep you happily full for hours while others leave you hungry again soon.

You will hear how Jonathan found honey in the woods and how Ruth was satisfied at Boaz's table. You will make honey-oat energy bites, warm cinnamon peaches, a pitcher of lemonade with half the usual sugar, and a black bean dip. Most of all, you will practice listening to your body, giving thanks, and enjoying treats in their place, as "sometimes foods."

PREREQUISITES

- Knows the five food groups and a balanced plate (Unit 2)
- Knows the five tastes and that tastes can change with practice (Unit 3)
- Cooks at the stove only with an adult beside (Units 1–5)

MASTERY CHECKLIST

- ☐ I can explain that sweet foods give quick energy, and that fiber, protein and fat make energy last longer.
- ☐ I can explain, simply, that dopamine is a messenger in the brain that helps us want and look for good things, and that we can still choose.
- ☐ I can read the sugar on a drink label and change grams into teaspoons (4 grams is about 1 teaspoon).
- ☐ I can explain why fiber, protein and water help me feel full, and that fullness takes about 20 minutes to notice.
- ☐ I can enjoy a treat thankfully as a sometimes food.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **FDA: The Nutrition Facts Label (for kids and families):** Free. The U.S. Food and Drug Administration's guide to reading the label, including the Added Sugars line. For the adult helping with Lesson 6.3.
- **A clear glass, a teaspoon and a bag of sugar:** For the sugar-spoon display in Lesson 6.3: measure out the sugar in a drink and see it.
- **A citrus juicer or reamer:** Optional, for squeezing lemons in Lesson 6.3. A fork twisted inside a lemon half works too.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

6.1 Jonathan and the Honeycomb	2 sessions of 45–60 minutes
6.2 How Your Brain Learns to Want Foods	2 sessions of 45–60 minutes
6.3 Hidden Sugar in Drinks	2 sessions of 45–60 minutes
6.4 Fiber and Protein Help You Feel Full	2 sessions of 45–60 minutes

UNIT 6 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
What happened when Jonathan ate a little honey? Why?
2. **5 pts**
How do bees turn nectar into honey?
3. **5 pts**
Why should honey never be given to a baby under one year old?
4. **5 pts**
In your own words, what does dopamine do?

5. (5 pts)

Predict: you were not hungry, but then you smell cookies baking. What might happen, and what could you do?

6. (5 pts)

A drink label says 32 grams of sugar. About how many teaspoons is that?

7. (5 pts)

What are the best everyday drinks?

8. (5 pts)

Name three things in food that help you feel full.

9. (5 pts)

Predict: you eat a bean dip snack one day and a cookie the next. Which will keep you full longer, and why?

10. (5 pts)

About how long does it take to notice you are full? How can that help you at meals?

ANSWER KEY

1. “His eyes were enlightened”: he felt stronger right away, because the sugars in honey give quick energy.
2. They sip nectar from flowers, store it in the wax cells of the honeycomb, and fan their wings to dry out the water until it is thick honey; then they seal the cells with wax.
3. It can make babies very sick.
4. It is a messenger in the brain that helps us want, look for and remember good things, like food when we are hungry.
5. You might suddenly want a cookie because the smell is a cue. You could ask “Am I really hungry?”, drink water, wait, or choose a good snack.
6. $32 \div 4 = 8$ teaspoons.
7. Plain water and milk.
8. Fiber, protein and water.
9. The bean dip, because its fiber and protein are digested slowly and take up room; the cookie gives quick energy that does not last.
10. About 20 minutes. Eating slowly gives your body time to tell you that you are satisfied.

UNIT CHALLENGE: A ONE-WEEK DRINK AND SNACK SWAP

For one week, make two swaps: drink water or milk instead of a sweet drink at least once a day, and choose a snack with fiber and protein (like the energy bites, bean dip, fruit with yogurt, or vegetables with hummus) instead of a sweet snack at least once a day. Make at least one of your snacks yourself.

Keep a log each day: what you drank, what snack you chose, how long it kept you satisfied, and one word about how your taste buds noticed things. At the end of the week, plan one family treat to enjoy together as a sometimes food, and give thanks for it.

LOOK FOR	WHAT IT MEANS
Daily log	Seven days of drinks, snacks and how long each kept you satisfied, recorded honestly.
Homemade snack	At least one snack made yourself, safely, with cleanup.
Sugar math	At least two drink labels read and changed from grams to teaspoons correctly.
Reflection	A few sentences on what you noticed about wanting, liking, fullness and your taste buds.
Treat in its place	A family treat planned and enjoyed thankfully, with no talk of “good” or “bad” foods or bodies.

UNIT 7

FIRE, THE GRILL & SPICE

This is the fun unit! You will help with real outdoor cooking, travel in your imagination with Marco Polo to the spice lands of the East, test hot and mild peppers, and taste how sweet and sour work together. You will learn the rules that keep a grill safe: **only adults light and run the grill, and young helpers stay 3 feet back.**

You will mix your own spice blend, make a fresh salsa, and help an adult grill chicken drumsticks and pineapple-chicken skewers. Every recipe also has an **indoor way**, in the oven or under the broiler, for families without a grill or on a rainy day. Spices and flavors are part of the richness God put into His creation, and learning to balance them is part of becoming a good cook.

PREREQUISITES

- Knows the fire triangle and that a grease fire gets a lid, never water (Lesson 1.1)
- Keeps raw meat separate and knows chicken is safe at 165 °F (Lesson 1.3)
- Uses the claw grip with an adult beside (Lesson 1.2)
- Knows the five tastes (Lesson 3.1)

MASTERY CHECKLIST

- ☐ I can name the grill rules: outdoors only, adults light and run it, kids stay 3 feet back, long tongs, a lid for flare-ups, and never leave it alone.
- ☐ I can help prepare food for the grill while keeping raw chicken separate, and read the thermometer with an adult.
- ☐ I can tell how Marco Polo described spices from faraway lands, and name where three spices come from.
- ☐ I can explain that capsaicin makes peppers hot and what helps when food is too spicy.
- ☐ I can taste and balance sweet, sour, salty and spicy flavors in a dish.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **NFPA: Grilling safety:** Free. Grilling safety tips and a printable tip sheet from the National Fire Protection Association. Read it together before Lesson 7.1.
- **For the adult griller: long-handled tongs and a chimney starter:** Long tongs keep hands away from the heat. A chimney starter lights charcoal with newspaper, so no liquid starter is needed. A gas grill needs neither. Not required: every recipe also works in the oven or under the broiler.
- **An instant-read food thermometer:** Check every piece of chicken in its thickest part, away from the bone: 165 °F.
- **Small glass jars with shaker lids:** Clean spice jars or small jars with lids are perfect for the spice blends in Lesson 7.2.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

7.1 Grill Safety for Helpers	2 sessions of 45–60 minutes
7.2 Marco Polo and the Spices of the East	2 sessions of 45–60 minutes
7.3 Hot Peppers and Mild Peppers	2 sessions of 45–60 minutes
7.4 Sweet and Sour Together	2 sessions of 45–60 minutes

UNIT 7 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

Name four grill safety rules.

2. **5 pts**

Predict: fat drips from chicken onto the coals and flames jump up. What should the adult do, and why does it work?

3. (5 pts)

How hot must chicken be to be safe, and where do you check it?

4. (5 pts)

Who was Marco Polo, and why did his book matter?

5. (5 pts)

Name the plant part each spice comes from: cinnamon, ginger, cloves, black pepper.

6. (5 pts)

What makes hot peppers hot, and where is most of it?

7. (5 pts)

Predict: your mouth is burning from spicy salsa. Will water or milk help more? Why?

8. (5 pts)

How did Wilbur Scoville measure pepper heat?

9. (5 pts)

How do sweet and sour balance each other? Give an example.

10. (5 pts)

Why did the pineapple become a sign of welcome in early America?

ANSWER KEY

1. Any four: grill outdoors only, away from the house and dry leaves; only adults light and run the grill; children stay 3 feet back; use long tongs; close the lid on a flare-up; keep a hose or extinguisher nearby; never leave a lit grill alone; never use liquid starter.
2. Close the lid (and move the food to the cooler side). The lid takes away oxygen, one side of the fire triangle, so the flare-up dies down.
3. 165 °F, in the thickest part, not touching the bone.
4. A young man from Venice who traveled to China in 1271 and served Kublai Khan for many years. His book described the spices and riches of Asia and made Europeans want to reach the spice lands.
5. Cinnamon: bark. Ginger: root. Cloves: flower buds. Black pepper: dried berries (fruit).
6. Capsaicin, which is mostly in the white ribs and seeds.
7. Milk. Capsaicin mixes with fat, not water, so milk, yogurt or cheese wash it away better.
8. He mixed pepper liquid with sugar water and had tasters sip it, diluting it more and more until they could no longer feel the heat. The more dilution needed, the hotter the pepper.
9. A little sweet softens the sharpness of sour, and a little sour keeps sweet from tasting flat. Examples: lemonade, sweet-and-sour glaze, pineapple.
10. Pineapples were rare and costly, so serving one showed guests that the host had gone to great trouble for them.

UNIT CHALLENGE: A FAMILY GRILLED (OR BROILED) DINNER

Plan and prepare a grilled or broiled family dinner with an adult doing all the grilling or broiling. Make your own spice rub or spice blend (from Lessons 7.1 or 7.2), use it on chicken or vegetables, and serve it with a salsa, a fruit side or a sweet-and-sour sauce you balanced yourself.

Before dinner, make a flavor-pairing chart that shows which flavors you put together (salty and sweet, sour and sweet, spicy and cool) and why. Write down the thermometer readings, ask your family to rate each dish, and lead the family in giving thanks.

LOOK FOR	WHAT IT MEANS
Grill or broiler safety	An adult did all the grilling or broiling; the student stayed 3 feet back, kept raw chicken separate and washed hands.
Homemade rub or blend	A rub or spice blend measured and mixed by the student, with the recipe written down.
Flavor-pairing chart	A chart showing at least three flavor pairs used in the meal and why they work.
Food safety records	Chicken checked to 165 °F with readings recorded; leftovers refrigerated within 2 hours.
Family table and cleanup	The family rated each dish, gave thanks together, and the student helped clean up.

7.1 GRILL SAFETY FOR HELPERS

OBJECTIVES

- Tell how barbecues were part of American life even in George Washington’s day.
- Name the grill safety rules and explain why only adults light and run the grill.
- Prepare a drumstick rub, keep raw chicken separate, and help an adult grill (or bake) drumsticks to 165 °F.

Warm-up. With an adult, walk outside to where your family would put a grill. Use a tape measure or take three big steps to mark a “3-foot kid zone” with chalk or a rope. Look up and around: is the spot away from the house, railings, low branches and dry leaves?

WATCH

Grill Safety Tips

CityofPG • 3:51

<https://www.youtube.com/watch?v=N9LC6L5l6lg>

WHEN TO WATCH

Before Session 2. Make a list of every safety tip you hear.

Note: From the fire department of the City of Prince George, British Columbia. It shows an adult using a gas grill safely.

KEY TERMS

grill

An outdoor cooker that cooks food on a metal grate over burning charcoal or gas flames.

kid-free zone

A space at least 3 feet around the grill where children do not go while it is hot.

flare-up

A sudden burst of flame when fat drips onto the fire. The adult closes the lid to smother it.

tongs

A long tool for gripping and turning food, so hands stay far from the heat.

CORE IDEAS

The story. Cooking meat over an open fire is one of the oldest kinds of cooking. In colonial Virginia, a “barbecue” was a big outdoor feast where meat was roasted slowly over a pit of coals, and neighbors came from miles around. George Washington wrote in his diary in May 1769 that he “went in to Alexandria to a Barbicue” and stayed the night. Barbecues, picnics and cookouts have been part of American life ever since.

How people figured it out. Cooks over open fires learned many lessons the hard way, and firefighters have collected the most important ones. They learned to keep cooking fires away from houses and dry grass, that a cover smothers flames (the fire triangle again: no oxygen, no fire), that long tools keep hands safe, and that children should stay back. Today fire departments teach these same rules for backyard grills: grill outdoors only, on a flat spot away from the house, railings, overhanging branches and dry leaves; **only adults light the grill**, using a chimney starter or a gas grill, never with liquid starter; keep a 3-foot kid-free zone; use long tongs; keep the lid handy for flare-ups and a hose or fire extinguisher nearby; and never leave a lit grill alone. Hot coals stay hot for a day or two and must cool completely before an adult empties them into a metal can.

The kitchen science. A grill cooks with all three kinds of heat from Unit 4. The glowing coals or flames send out **radiation**; the hot grate cooks by **conduction** and makes the dark grill marks; and with the lid closed, hot air cooks by **convection**. Chicken drumsticks have bones and thick meat, so they need time to cook through. They are safe when the thickest part, away from the bone, reaches **165 °F** on a food thermometer. Raw chicken juices can carry germs, so raw chicken never touches cooked food or the plate it will be served on.

Let’s cook. You will mix a simple rub and help prepare chicken drumsticks. **An adult lights the grill and does all the grilling** while you watch from outside the kid-free zone. Your skills are mixing the rub, keeping raw chicken separate, washing your hands, and reading the thermometer with the adult. No grill? The adult bakes the drumsticks in the oven, and the safety lessons about raw chicken and 165 °F are just the same.

PICTURE STUDY



Campers, Karl Witkowski, 1910 • Oil on canvas

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

Karl Witkowski, an American painter, loved to paint boys at work and play. Here two boys are camping in the woods at night. One tends a pot over the fire, and the firelight glows on the other's face.

Look closely

- Find the pot. How is it hung over the fire?
- Find where the light is coming from. How did the painter show the glow of the flames?
- Look at the boy in front. Is he a safe distance from the fire, or too close? What would you tell him?
- Look at the dark woods around them. Why must a campfire be watched every minute?

Talk about it

1. How is cooking over this campfire like cooking on a backyard grill? How is it different?
2. Which grill safety rules from this lesson would also keep these boys safe?
3. What would the boys need to do with the fire before they go to sleep?

Safety first. Only an adult lights and runs the grill. Grill outdoors only, on a flat spot away from the house, railings, overhangs and dry leaves; children stay 3 feet back; use long tongs, never a fork; keep the lid ready for flare-ups and a hose or extinguisher nearby; never leave a lit grill alone; never use liquid charcoal starter. Wash hands after touching raw chicken, and cook chicken to 165 °F.

Helper at the Grill: Smoky-Sweet Chicken Drumsticks

You will draw a grill safety map, mix a rub, and help an adult grill (or bake) chicken drumsticks, checking every one with a thermometer.

You will need

- A small bowl and measuring spoons for the rub
- A large bowl or zip-top bag for the chicken (for the adult)
- A separate clean platter for cooked chicken
- An instant-read thermometer
- For the adult griller: a grill, long tongs and oven mitts; or a foil-lined rimmed baking sheet and a rack for the oven
- Chalk or a rope to mark the kid-free zone

SMOKY-SWEET GRILLED (OR BAKED) CHICKEN DRUMSTICKS

Serves 4–6 (10–12 drumsticks) • Prep 15 min • Cook 35–45 min

Ingredients

- 10 to 12 chicken drumsticks (about 3 pounds)
- 1 tablespoon olive oil or vegetable oil
- **Rub:** 1 tablespoon brown sugar
- 2 teaspoons paprika (smoked paprika if you have it)
- 1 teaspoon garlic powder and 1 teaspoon onion powder
- 1 teaspoon salt and ½ teaspoon black pepper

Method

1. Wash your hands. In the small bowl, mix all the rub ingredients with a spoon.
2. The adult puts the drumsticks in the large bowl, pats them dry with paper towels, and drizzles them with the oil. You sprinkle the rub over them from above, without touching the raw chicken, and the adult tosses them to coat. Wash your hands and the adult washes theirs.

3. **Grill:** The adult heats the grill to medium (about 375–400 °F), with one side cooler. The adult grills the drumsticks with the lid closed, turning every 5 to 7 minutes with long tongs, for 30 to 40 minutes. If they brown too fast, the adult moves them to the cooler side. You watch from outside the 3-foot zone.
4. **Indoor way:** The adult heats the oven to 425 °F, sets a rack on a foil-lined rimmed baking sheet, and bakes the drumsticks 35 to 45 minutes, turning once.
5. With the adult, check the thickest part of each drumstick, not touching the bone: it must read 165 °F. Any that are not there yet keep cooking.
6. The adult puts the cooked drumsticks on the clean platter, never the one that held raw chicken. Let them rest 5 minutes; they are very hot.
7. Serve with vegetables or a salad. Refrigerate leftovers within 2 hours.
8. **Clean up:** wash bowls, tongs and the raw-chicken platter in hot, soapy water. The adult cleans the grill once it has cooled.

Allergy check: Contains none of the nine major allergens. Check spice blends for added ingredients.

Steps

1. **Safety map.** Draw your yard or patio from above. Mark the grill, the house, the 3-foot kid zone, the hose or extinguisher, and where you will stand to watch.
2. **Grill tour.** Before the grill is lit, have the adult show you its parts: the grate, the lid, the vents or knobs, and the grease tray. Label them on your map.
3. Make the rub and help prepare the drumsticks as the recipe says.
4. **Watch and record.** From your safe spot, watch the adult turn the chicken. Write down how many times it was turned and whether there were any flare-ups and what the adult did.
5. **Thermometer check.** Record the temperature of three drumsticks. Were any under 165 °F at first? What did you do?
6. **Taste test and improve it.** Rate the drumsticks from 1 to 5. Plan one change for the rub: more paprika, less sugar, or a pinch of cumin.

7. Clean up: wash and put away everything indoors. Remember that coals stay hot for 24 to 48 hours.

Tips

- Brown sugar in a rub can burn over very high heat. Medium heat cooks drumsticks through without scorching.
- Keep a squirt bottle of water away from the grill; the lid is the right tool for a flare-up.
- Drumsticks are juicy and forgiving; they taste best when cooked a little past 165 °F, to about 175 °F.

Check your work

- ☐ I can name the grill safety rules and explain why only adults run the grill.
- ☐ I kept raw chicken separate, washed my hands and stayed 3 feet back.
- ☐ I checked the drumsticks with an adult and they reached 165 °F.

COOK'S NOTEBOOK

1. Copy your grill safety map with the kid zone and labels.
2. Draw a grill and show radiation (rays from the coals), conduction (the grate) and convection (hot air under the lid).
3. Copy the drumstick rub recipe and your thermometer readings.

From history. The word “barbecue” probably comes from *barbacoa*, a Spanish word for a wooden frame for cooking or drying meat over a fire, which Spanish explorers learned from the Taíno people of the Caribbean in the 1500s.

COMMON MISTAKES

- Standing close to watch the grill. Stay outside the 3-foot zone.
- Squirting liquid starter onto coals. It can flare up badly; adults use a chimney starter or a gas grill.
- Putting cooked chicken back on the plate that held raw chicken.
- Judging chicken by its color. Only a thermometer tells you it is 165 °F.

Make it a game • Grill Hazard Inspector. With a cold, unused grill or a pretend one, your grown-up secretly places six hazards nearby, using toys and drawings: a toy inside the kid-free zone, a loose sleeve, no adult present, tongs left on the ground, a bag of charcoal too close, and a drawn lighter on a table. Find all six in sixty seconds and say why only adults light the grill.

7.2 MARCO POLO AND THE SPICES OF THE EAST

OBJECTIVES

- Tell how Marco Polo traveled to China and described the spices of Asia in his book.
- Explain what spices are and which part of a plant each common spice comes from.
- Mix a spice blend for a shaker jar and use it on oven-roasted chickpeas, with an adult at the oven.

Warm-up. Line up five spice jars: black pepper, cinnamon, ginger, cloves and nutmeg (or whatever you have). Smell each one gently by waving the smell toward your nose. Guess which part of a plant each one came from: a seed, bark, a root, a flower bud or a fruit.

WATCH

Marco Polo For Kids | Bedtime History

Bedtime History • 8:52

<https://www.youtube.com/watch?v=C88P-SCEKsw>

WHEN TO WATCH

After you read the story. Listen for the places Marco Polo visited and the things he saw there.

Note: A calm, illustrated biography for children from a family history channel.

KEY TERMS

spice

A dried seed, bark, root, flower bud or fruit used to give flavor to food, such as pepper, cinnamon, ginger and cloves.

herb

The leaves of a plant used for flavor, such as basil, parsley, oregano and mint.

trade route

A path by land or sea that merchants followed to carry goods from one country to another.

spice blend

Several spices mixed together, such as chili powder or pumpkin pie spice.

CORE IDEAS

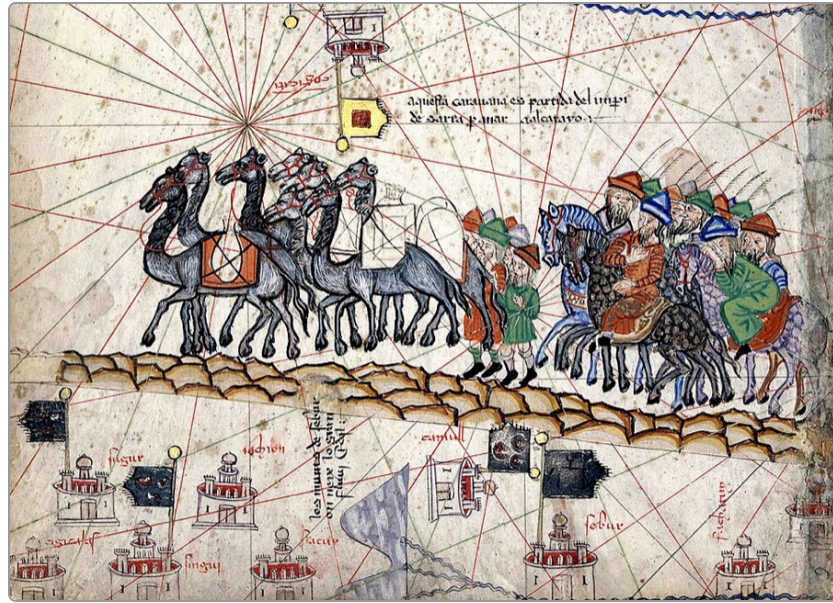
The story. In 1271, when he was seventeen, Marco Polo left Venice, Italy, with his father and his uncle, who were merchants. They traveled for more than three years across deserts and mountains to reach the court of Kublai Khan, the great ruler of China. Marco stayed in Kublai Khan's lands for about seventeen years and traveled widely for him. He came home to Venice in 1295. A few years later, while he was a prisoner of war in Genoa, he told his adventures to a writer named Rustichello, who wrote them down in a book that was read all over Europe.

How people found out. In Europe, spices like pepper, ginger, cinnamon, cloves and nutmeg were very expensive, because they came from far away and passed through many merchants' hands. Few Europeans knew where they really grew. Marco Polo's book described cities full of spices, ginger growing in China, and pepper growing in India and on islands of the Indian Ocean. His stories made Europeans dream of reaching the spice lands themselves, and two hundred years later, sailors like Christopher Columbus carried a copy of his book on their voyages.

The kitchen science. Spices come from many parts of plants. Black pepper is a dried berry (a fruit). Cinnamon is the rolled-up bark of a tree. Ginger and turmeric are roots. Cloves are dried flower buds. Nutmeg is a seed. Spices are full of strong-smelling oils, and remember from Unit 3 that smell makes up most of flavor. Whole spices keep their oils inside longer; ground spices lose their smell after a while, which is why old spices taste weak. Warm, dry heat, like toasting in the oven, wakes up their aroma.

Let's cook. You will mix your own savory spice blend in a shaker jar and use it on crunchy roasted chickpeas. The skills to do well are **measuring carefully** and **smelling and adjusting**. **An adult stands beside you at the oven** and handles the hot pan.

PICTURE STUDY



Marco Polo's Caravan, from the Catalan Atlas, Attributed to Abraham Cresques, about 1375 · Ink, paint and gold on parchment · Bibliothèque nationale de France, Paris

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

About eighty years after Marco Polo came home, a mapmaker on the island of Majorca painted a great map of the known world, called the Catalan Atlas. On it he drew a caravan of merchants traveling across Asia, the kind of journey Marco Polo made.

Look closely

- Find the camels. What are they carrying?
- Find the travelers on horseback. How are they dressed?
- Find the little towns drawn on the map. Why would a caravan stop in towns?
- Look for the lines and writing on the map. What do you think they were for?

Talk about it

1. What goods do you think a caravan like this might carry back to Europe?
2. Why were spices so expensive by the time they reached Venice?
3. Today you can buy spices from all over the world at a grocery store. How is that a blessing?

Safety first. Sniff spices gently by waving the smell toward your nose; never sniff hard, and keep spices away from your eyes. The oven is very hot: the adult puts the pan in, shakes it halfway, and takes it out with oven mitts. Roasted chickpeas are very hot and can pop, so let them cool before tasting.

Marco Polo Spice Shaker and Roasted Chickpeas

You will sort spices by plant part, mix your own spice blend in a shaker jar, and roast crunchy chickpeas seasoned with it.

You will need

- Small bowls for sorting spices and a small jar with a shaker lid
- Measuring spoons and a small funnel or folded paper
- A rimmed baking sheet and paper towels
- A colander and a can opener
- A large bowl, oven mitts and a timer
- Masking tape and a marker for a label

MARCO POLO SPICE BLEND AND CRUNCHY ROASTED CHICKPEAS

Serves 4 as a snack (plus extra spice blend) · Prep 15 min · Roast 25–35 min

Ingredients

- **Spice blend:** 2 teaspoons paprika
- 1 teaspoon ground cumin
- 1 teaspoon garlic powder
- ½ teaspoon ground ginger
- ½ teaspoon ground black pepper
- ¼ teaspoon ground cinnamon
- 1 teaspoon salt
- **Chickpeas:** 2 cans (15 ounces each) chickpeas, rinsed and drained
- 2 tablespoons olive oil

Method

1. Wash your hands. Measure all the spice blend ingredients into a small bowl and stir with a spoon. Smell it. Pour it into the shaker jar with a funnel and label the jar.

2. An adult heats the oven to 400 °F.
3. Rinse and drain the chickpeas. Spread them on paper towels and pat them very dry. Pull off any loose skins.
4. Put the chickpeas in the large bowl, add the oil and 2 teaspoons of your spice blend, and stir to coat.
5. Spread them on the baking sheet in one layer.
6. The adult roasts them 25 to 35 minutes, shaking the pan every 10 minutes, until golden and crunchy.
7. The adult takes out the pan. Let the chickpeas cool 10 minutes; they get crunchier as they cool. Taste and shake on a little more spice if you like.
8. Clean up: wash the bowl and pan and wipe the counter. Store the spice blend in a cool, dark cupboard.

Allergy check: Contains none of the nine major allergens. Chickpeas are a legume; a few people who are allergic to peanuts also react to chickpeas, so check with your family.

Steps

1. **Plant-part sort.** Make five labels: seed, bark, root, flower bud, fruit. Put a spice jar by each one: nutmeg or cumin (seed), cinnamon (bark), ginger (root), cloves (flower bud), black pepper (fruit). Check your warm-up guesses.
2. **Map it.** On a world map, find Venice, China and India. Trace a line for Marco Polo's journey.
3. Mix your spice blend and roast the chickpeas as the recipe says.
4. **Smell test.** Smell your blend before and after it goes on the warm chickpeas. Does heat make the smell stronger?
5. **Taste test and improve it.** Rate the chickpeas from 1 to 5. Plan one change to your blend: more cumin, less pepper, or a pinch of chili powder.
6. Clean up: wash, dry and put everything away.

Tips

- Dry chickpeas get crunchy; wet ones stay soft.
- Your spice blend is also good on roasted potatoes, carrots or chicken.
- Spices keep their flavor best in a closed jar away from the stove's heat.

Check your work

- ☐ I can tell the story of Marco Polo and why spices were so precious in Europe.
- ☐ I can name which plant part five spices come from.
- ☐ I mixed a spice blend and roasted chickpeas with an adult at the oven.

COOK'S NOTEBOOK

1. Draw a plant and label where five spices come from: seed, bark, root, flower bud and fruit.
2. Draw Marco Polo's caravan and write where it was going.
3. Copy your spice blend recipe and design a label for your shaker jar.

From history. Pepper was so valuable in the Middle Ages that it was sometimes called “black gold,” and people could pay rent or taxes with it. Today a jar of pepper costs very little, thanks to many centuries of traders, sailors and farmers.

COMMON MISTAKES

- Sniffing spices hard. Pepper and chili powder can make you sneeze or sting your nose.
- Leaving chickpeas wet before roasting, so they stay soft.
- Keeping spices for years. Ground spices lose their smell and flavor over time.

Make it a game • Marco, Spice, Polo. Play Marco Polo in a safe open room. With your eyes closed, call, Marco, and your grown-up answers, Polo, while moving. When you tag your grown-up, answer a spice question: what plant part do cinnamon, pepper, ginger or cloves come from? Right answers earn points. Tell about Marco Polo's trip to China.

7.3 HOT PEPPERS AND MILD PEPPERS

OBJECTIVES

- Explain that capsaicin makes peppers taste hot, and tell how Wilbur Scoville measured pepper heat in 1912.
- Explain what helps when food is too spicy, and why hands must be washed after touching hot peppers.
- Make a fresh mild salsa, with the adult cutting any hot pepper, and taste-test for salt and heat.

Warm-up. Look at a green bell pepper and a jalapeño side by side (do not touch the inside of the jalapeño). Which do you think is hotter? The adult cuts the bell pepper in half. Look at the white ribs and seeds inside. Guess: in a hot pepper, where do you think the heat is hiding?

WATCH

The science of spiciness - Rose Eveleth

TED-Ed · 3:54

https://www.youtube.com/watch?v=qD0_yWgifDM

WHEN TO WATCH

After the kitchen-science paragraph. Listen for why spicy food feels hot even though it is not.

Note: From TED-Ed. A short animation about capsaicin and the body's heat sensors.

BACKUP VIDEO

Easy Salsa Recipe

Inspired Taste · 2:10

<https://www.youtube.com/watch?v=RTOMv9RhEE0>

To see a fresh salsa made step by step.

KEY TERMS

capsaicin

The natural chemical in hot peppers that makes them feel hot and burning in your mouth. Say it “cap-SAY-uh-sin.”

Scoville scale

A scale for measuring how hot a pepper is, made by Wilbur Scoville in 1912. Bell peppers score 0.

salsa

A fresh sauce of chopped tomatoes, onion, herbs and peppers. The word means “sauce” in Spanish.

season to taste

To add salt, lime or spice a little at a time, tasting as you go, until the flavor is just right.

CORE IDEAS

The story. In 1912 a pharmacist named Wilbur Scoville worked for a medicine company in Detroit, Michigan. The company used hot peppers in a warming cream, and Scoville needed a way to tell how hot each batch of peppers was. There were no machines to measure it, so he invented a test using people’s tongues.

How he figured it out. Scoville soaked a measured amount of dried pepper to draw out its heat, then mixed a little of that pepper liquid into sugar water. A small team of tasters sipped it. If they could still feel the heat, he added more sugar water and they tasted again, over and over, until the heat could no longer be felt. The more times he had to dilute it, the hotter the pepper was. Today we call his measurements **Scoville heat units**. A bell pepper has 0, a jalapeño has a few thousand, and the very hottest peppers have more than a million!

The kitchen science. The heat in peppers comes from **capsaicin**. It is not one of the five tastes. Instead, capsaicin tricks the heat sensors in your mouth into sending a “hot!” message to your brain, even though the food is not hot at all. Most of the capsaicin is in the white ribs and seeds inside the pepper. Capsaicin mixes with fat, not water, so a sip of water just spreads it around, but milk, yogurt or cheese help cool the burn. Capsaicin also stays on your fingers and can burn your eyes, so whoever cuts hot peppers wears gloves or washes hands very well.

Let’s cook. You will make a fresh, mild salsa. You will chop the tomatoes with the claw grip, **with an adult right beside you**. If your family wants a little heat, **the adult cuts the jalapeño**, scrapes out the seeds and ribs, and adds just a little. The skill to do

well is **seasoning to taste**: add salt and lime a little at a time and taste with a clean chip each time.

PICTURE STUDY



Kitchen Still Life with Peppers, Tomatoes and Eggs, Jan Ingenhous, before 1948 · Oil on canvas
Image: [Wikimedia Commons](#), public domain

This Dutch painter set out ordinary kitchen foods on a ledge: tomatoes, peppers, apples and a basket of eggs, with a checked cloth. Many of these foods would make a good fresh salsa or a summer meal.

Look closely

- Find the peppers. Do they look like sweet peppers or hot peppers? How can you tell?
- Find the tomatoes. Are they ripe? How can you tell?
- Find the eggs and the pitcher. What meal might the cook be planning?
- Find the checked cloth. Why do you think the painter added it?

Talk about it

1. Which foods in this picture could go into a salsa?
2. Bell peppers and jalapeños are cousins. How are they alike, and how are they different?
3. If you were the cook, what would you make with everything on this ledge?

Safety first. Only the adult cuts hot peppers, wearing gloves or washing hands very well afterward; never touch your eyes or face after handling them. Chop tomatoes with the claw grip with an adult right beside you, on a board that cannot slide. If a bite is too spicy, drink milk or eat yogurt, not water.

KITCHEN PROJECT

Mild-to-Medium Fresh Salsa

You will make a fresh tomato salsa, split it into mild and medium bowls, run a family heat test, and practice seasoning to taste.

You will need

- A small serrated knife, a cutting board and a damp towel
- A sharp knife and kitchen gloves (for the adult, for the jalapeño)
- A medium bowl and a small bowl
- Measuring cups and spoons and a citrus juicer
- Tortilla chips or vegetable sticks for tasting
- A glass of milk or a cup of yogurt for the heat test

FRESH GARDEN SALSA (MILD OR MEDIUM)

Serves 6 (about 2½ cups) · Prep 25 min · Rest 15 min

Ingredients

- 5 ripe Roma tomatoes
- ¼ small red or white onion (the adult chops it)
- ½ green bell pepper
- ¼ cup chopped fresh cilantro or parsley
- 1 to 2 tablespoons lime juice (1 lime)
- ¼ teaspoon salt, plus more to taste
- For medium salsa: ½ jalapeño, seeds and ribs removed and minced by the adult

Method

1. Wash your hands and wash the vegetables.
2. The adult cuts each tomato in half the long way. With the adult right beside you, lay the halves flat and chop them into small pieces with the claw grip. Put them in the medium bowl with their juice.

3. Chop the bell pepper strips into small pieces the same way. The adult finely chops the onion. Tear or snip the cilantro leaves.
4. Add the onion, bell pepper and cilantro to the tomatoes. Add 1 tablespoon lime juice and the salt and stir.
5. Taste with a clean chip. Add more lime or salt a pinch at a time until it tastes bright and lively.
6. For a medium salsa, spoon half into the small bowl. The adult, wearing gloves, minces the jalapeño and stirs a little into the small bowl. Label the bowls “mild” and “medium.”
7. Let the salsa rest 15 minutes so the flavors mingle. Refrigerate leftovers; it keeps 2 to 3 days.
8. Clean up: wash the board and knives; the adult washes the jalapeño board and gloves separately and washes hands well.

Allergy check: Contains none of the nine major allergens. Tortilla chips are usually corn; check the label.

Steps

1. **Where's the heat?** Watch the adult cut the jalapeño (wearing gloves). Point to the ribs and seeds where most capsaicin hides.
2. Make the salsa as the recipe says.
3. **Salt test.** Before adding the salt, taste a chip of salsa. Then taste again after. What did salt do? Remember Job 6:6.
4. **Family heat test.** Each person tastes the mild salsa, then a tiny taste of the medium. Rate the heat from 0 to 5. If it is too hot, try a sip of water, then a sip of milk. Which helped more?
5. **Improve it.** Plan one change: more lime, a little corn or black beans, or diced mango for sweetness.
6. Clean up: wash, dry and put everything away, and wash your hands well.

Tips

- Roma tomatoes are meaty and less watery than other tomatoes, so the salsa does not get soupy.
- Taste with a fresh chip each time; no double-dipping.
- Mild salsa is great on eggs, tacos, rice bowls and baked potatoes.

Check your work

- ☐ I can explain what capsaicin is and how Scoville measured pepper heat.
- ☐ I can explain why milk helps more than water when food is too spicy.
- ☐ I made salsa safely, seasoned it to taste, and let the adult handle the hot pepper.

COOK'S NOTEBOOK

1. Draw a jalapeño cut in half and color the ribs and seeds red to show where the capsaicin is.
2. Draw a Scoville “thermometer” with a bell pepper at 0, a jalapeño in the low thousands, and the hottest peppers at the top.
3. Copy your salsa recipe and your family’s heat ratings.

COMMON MISTAKES

- Touching your eyes after handling hot peppers. It burns badly; wash hands well or wear gloves.
- Gulping water to cool a burning mouth. Milk or yogurt works much better.
- Adding all the salt or lime at once. Season a little at a time and taste.

Make it a game • Scoville Line-Up. Write four pepper names on cards: bell pepper, jalapeno, cayenne, habanero. Lay them in order from mildest to hottest on the table. Your grown-up checks and awards points for each correct place. Then name what capsaicin does, tell what helps when food is too spicy, and explain why you must wash your hands after touching hot peppers.

Scripture. “Can that which is unsavoury be eaten without salt? or is there any taste in the white of an egg?” (Job 6:6, KJV)

Job knew that a pinch of salt wakes up flavor, just as you found in your salt test. Colossians 4:6 says our words should be “seasoned with salt,” too: kind and good to hear.

7.4 SWEET AND SOUR TOGETHER

OBJECTIVES

- Tell how pineapples traveled from the Caribbean to Europe after 1493 and why they became a sign of welcome.
- Explain how sweet and sour flavors balance each other in a dish.
- Help an adult grill (or broil) pineapple and chicken skewers with a sweet-and-sour glaze.

Warm-up. Taste a small piece of lemon. Then taste a piece of lemon with a pinch of sugar on it. Then taste a piece of pineapple. How did the sugar change the lemon? Is the pineapple sweet, sour or both?

WATCH

The Pioneer Woman Makes Mini Hawaiian Chicken Skewers | The Pioneer Woman | Food Network

Food Network • 3:42

<https://www.youtube.com/watch?v=S2fNID-NzMI>

WHEN TO WATCH

Before Session 2. Watch how the sweet-and-salty sauce is mixed and how the chicken and pineapple are threaded.

Note: A television cook makes small pineapple-chicken skewers with a soy-and-pineapple marinade. She cooks indoors on a grill pan; in this lesson an adult does all the grilling or broiling.

KEY TERMS

balance

When flavors are mixed so that none is too strong, such as sour lime softened by a little sweetness.

glaze

A thin, shiny sauce brushed on food near the end of cooking.

skewer

A long thin stick of metal or wood for holding pieces of food while they cook.

contrast

Putting different flavors or textures side by side so each one stands out, like sweet and sour or crunchy and soft.

CORE IDEAS

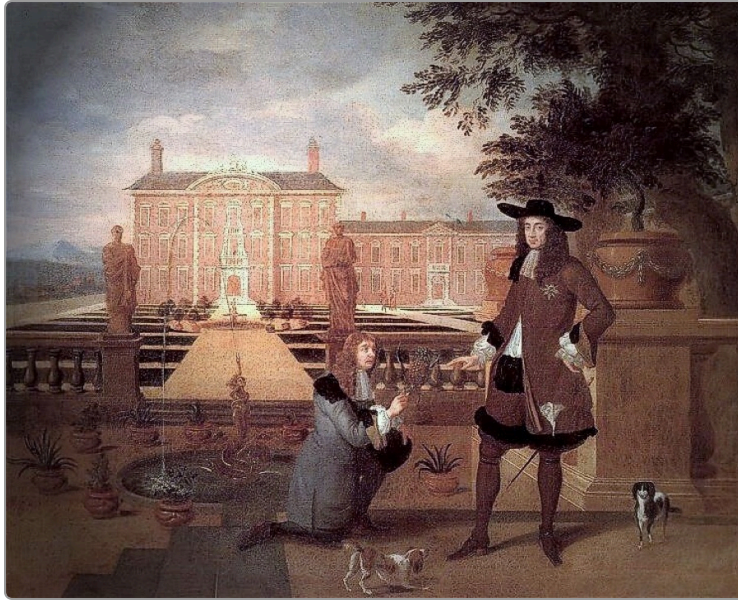
The story. In November 1493, on his second voyage, Christopher Columbus and his sailors landed on the Caribbean island of Guadeloupe. There they found a strange fruit, spiky on the outside and golden, sweet and tangy inside. The people of the islands grew it. The Spanish called it *piña* because it looked like a pine cone, and English speakers later called it the pineapple. The sailors carried pineapples back to Spain, and the fruit amazed everyone who tasted it.

How people figured it out. Pineapples spoiled on the long sea voyage, and they would not grow in Europe's cold weather. So European gardeners worked for many years to grow them in heated glass houses, and for a long time a pineapple was a rare and costly treat. A painting from about 1675 shows a royal gardener kneeling to present a pineapple to King Charles II of England. In early America, pineapples brought by ship from the Caribbean were still a costly treat, so a pineapple set out at a dinner party showed that the host had gone to great trouble for the guests. Over time, the pineapple became a favorite American picture of welcome and hospitality, carved on doorways and bedposts.

The kitchen science. Good cooks **balance** flavors. Sour foods (lemon, lime, vinegar, pineapple) taste sharp and bright. Sweet foods (honey, fruit, sugar) taste soft and round. A little sweet takes the sharp edge off sour, and a little sour keeps sweet from tasting flat. That is why sweet-and-sour sauce, lemonade and fruit salads with lime taste so good. A pinch of salt makes both sweet and sour taste stronger, and the toasty browning from the grill adds even more flavor. Pineapple is both sweet and sour all by itself, which is why it pairs so well with savory chicken.

Let's cook. You will thread skewers of chicken, pineapple and peppers and make a sweet-and-sour glaze. **The adult cuts the raw chicken and does all the grilling** (or broiling indoors), while you watch from outside the 3-foot zone. Your skills are **threading skewers**, keeping the raw-chicken skewers separate, and **tasting and balancing the glaze**.

PICTURE STUDY



Royal Gardener John Rose Presenting a Pineapple to King Charles II, Attributed to Hendrick Danckerts, about 1675 · Oil on canvas

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

This painting shows a famous story: the king's gardener presenting King Charles II with a pineapple, a fruit so rare in England that it was a gift fit for a king. The garden and the great house behind them show how important the moment was meant to look.

Look closely

- Find the pineapple. Who is holding it, and how is he holding it?
- Look at the gardener. Why do you think he kneels?
- Look at the king. What do his clothes tell you about him?
- Find the little dogs and the fancy garden. What do they add to the picture?

Talk about it

1. Why was a pineapple such a special gift in England in the 1600s?
2. In early America, a pineapple became a sign of welcome. How can the food we serve show welcome to guests?
3. Today you can buy a pineapple at almost any grocery store. What does that tell you about how much the world has changed?

Safety first. Only an adult cuts raw chicken, lights and runs the grill or broiler; you stay 3 feet back. Keep raw-chicken skewers apart from fruit and vegetable skewers, wash hands after touching raw chicken, and brush glaze only from a separate bowl that never touched raw chicken. Chicken must reach 165 °F. Soak wooden skewers so they do not burn.

KITCHEN PROJECT

Sweet-and-Sour Pineapple Chicken Skewers

You will make and balance a sweet-and-sour glaze by taste, thread colorful skewers, and help an adult grill or broil them, checking the chicken with a thermometer.

You will need

- 10–12 wooden skewers soaked in water for 30 minutes, or metal skewers
- Two cutting boards: one for raw chicken (adult) and one for fruit and vegetables (you), and a damp towel
- A small serrated knife
- A small saucepan and a whisk (for the glaze)
- Two small bowls: one for brushing, one for serving the extra glaze
- A pastry brush, an instant-read thermometer and a clean platter
- For the adult: a grill and long tongs, or a foil-lined rimmed baking sheet for the broiler

SWEET-AND-SOUR PINEAPPLE CHICKEN SKEWERS

Serves 4–6 (10–12 skewers) • Prep 30 min • Cook 12–15 min

Ingredients

- 1½ pounds boneless, skinless chicken thighs or breasts
- 2 cups fresh pineapple chunks (or a 20-ounce can of chunks, drained, with ¼ cup juice saved)
- 1 red and 1 green bell pepper
- 1 tablespoon vegetable oil and ½ teaspoon salt
- **Glaze:** ¼ cup pineapple juice
- 3 tablespoons ketchup
- 2 tablespoons honey or brown sugar
- 1 tablespoon low-sodium soy sauce
- 1 tablespoon rice vinegar or apple cider vinegar

Method

1. Wash your hands. In the saucepan, whisk the glaze ingredients. With the adult beside you, simmer over medium-low heat 3 to 5 minutes, stirring, until slightly thick. Taste a cooled spoonful: add a little vinegar if too sweet or a little honey if too sour. Divide the glaze into two clean bowls: one for brushing, one for serving.
2. The adult cuts the chicken into 1¼-inch cubes on the raw-meat board, tosses them with the oil and salt, and washes the board and knife.
3. With the adult beside you, cut the peppers into 1¼-inch squares on your own board with the claw grip.
4. Thread pineapple and peppers onto their own skewers. The adult threads the chicken onto separate skewers (chicken takes longer). Everyone washes hands after touching raw chicken.
5. **Grill:** The adult grills the skewers over medium-high heat with the lid closed, turning every 3 minutes: fruit and vegetables 6 to 8 minutes, chicken 10 to 14 minutes. In the last 2 minutes, the adult brushes the chicken with glaze from the brushing bowl. You watch from 3 feet back.
6. **Indoor way:** The adult sets the oven rack about 5 inches below the broiler, heats the broiler, and broils the skewers on a foil-lined pan 5 to 7 minutes per side, brushing with glaze at the end.
7. With the adult, check the thickest piece of chicken: it must read 165 °F. Put the skewers on a clean platter and serve with the extra glaze and rice.
8. Clean up: wash boards, bowls and tools in hot, soapy water. Throw away any glaze left in the brushing bowl.

Allergy check: Contains soybeans and wheat (soy sauce). For soy- and wheat-free, use coconut aminos instead of soy sauce. Honey is not for babies under one year.

Steps

1. **Balance test.** Before you cook the glaze, taste a drop of vinegar, a drop of honey, and then the mixed glaze. Write how the honey changed the vinegar.
2. Make the glaze and skewers as the recipe says.
3. **Watch from your spot.** From 3 feet back, notice what happens to the pineapple on the grill. Does it brown? Why might it brown faster than the

peppers? (Hint: sugar.)

4. **Thermometer check.** Record the temperature of three pieces of chicken.
5. **Flavor chart.** Taste chicken alone, pineapple alone, then chicken and pineapple together with glaze. Rate each from 1 to 5. Which tasted best, and why?
6. **Improve it.** Plan one change: more vinegar, a pinch of ginger, or adding red onion to the vegetable skewers.
7. **Clean up:** wash and put everything away; the adult cleans the grill after it cools.

Tips

- Leave a little space between pieces on the skewer so heat reaches every side.
- Pineapple and glaze both have sugar and can char. Brush the glaze on only at the end.
- Chicken thighs stay juicier than breasts and are harder to overcook.

Check your work

- ☐ I can tell how pineapples came to Europe and why they became a sign of welcome.
- ☐ I can explain how sweet and sour balance each other.
- ☐ I made skewers safely, kept raw chicken separate, and checked the chicken to 165 °F with an adult.

COOK'S NOTEBOOK

1. Draw a flavor seesaw: sour on one side, sweet on the other, balanced in the middle. Write foods on each side.
2. Draw your skewers before and after cooking, and label which parts browned most.
3. Copy the glaze recipe and write what you changed to balance it.

COMMON MISTAKES

- Brushing cooked chicken with glaze from a bowl that touched raw chicken.
- Putting chicken and pineapple on the same skewer. They cook at different speeds; separate skewers keep both just right.
- Using dry wooden skewers, which can catch fire. Soak them first.

- Adding all the sugar or vinegar at once. Balance a little at a time.

Make it a game · Sweet and Sour Balance. Make a balance by laying a ruler across a pencil. Put dry beans on each side: sweet on the left, sour on the right. Your grown-up names a dish that is too sour or too sweet, like lemonade. Add beans to the other side until it is level, and say what flavor you would add. Mention the pineapple's welcome.

UNIT 7

FIRE, THE GRILL & SPICE

This is the fun unit! You will help with real outdoor cooking, travel in your imagination with Marco Polo to the spice lands of the East, test hot and mild peppers, and taste how sweet and sour work together. You will learn the rules that keep a grill safe: **only adults light and run the grill, and young helpers stay 3 feet back.**

You will mix your own spice blend, make a fresh salsa, and help an adult grill chicken drumsticks and pineapple-chicken skewers. Every recipe also has an **indoor way**, in the oven or under the broiler, for families without a grill or on a rainy day. Spices and flavors are part of the richness God put into His creation, and learning to balance them is part of becoming a good cook.

PREREQUISITES

- Knows the fire triangle and that a grease fire gets a lid, never water (Lesson 1.1)
- Keeps raw meat separate and knows chicken is safe at 165 °F (Lesson 1.3)
- Uses the claw grip with an adult beside (Lesson 1.2)
- Knows the five tastes (Lesson 3.1)

MASTERY CHECKLIST

- ☐ I can name the grill rules: outdoors only, adults light and run it, kids stay 3 feet back, long tongs, a lid for flare-ups, and never leave it alone.
- ☐ I can help prepare food for the grill while keeping raw chicken separate, and read the thermometer with an adult.
- ☐ I can tell how Marco Polo described spices from faraway lands, and name where three spices come from.
- ☐ I can explain that capsaicin makes peppers hot and what helps when food is too spicy.
- ☐ I can taste and balance sweet, sour, salty and spicy flavors in a dish.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **NFPA: Grilling safety:** Free. Grilling safety tips and a printable tip sheet from the National Fire Protection Association. Read it together before Lesson 7.1.
- **For the adult griller: long-handled tongs and a chimney starter:** Long tongs keep hands away from the heat. A chimney starter lights charcoal with newspaper, so no liquid starter is needed. A gas grill needs neither. Not required: every recipe also works in the oven or under the broiler.
- **An instant-read food thermometer:** Check every piece of chicken in its thickest part, away from the bone: 165 °F.
- **Small glass jars with shaker lids:** Clean spice jars or small jars with lids are perfect for the spice blends in Lesson 7.2.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

7.1 Grill Safety for Helpers	2 sessions of 45–60 minutes
7.2 Marco Polo and the Spices of the East	2 sessions of 45–60 minutes
7.3 Hot Peppers and Mild Peppers	2 sessions of 45–60 minutes
7.4 Sweet and Sour Together	2 sessions of 45–60 minutes

UNIT 7 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**

Name four grill safety rules.

2. **5 pts**

Predict: fat drips from chicken onto the coals and flames jump up. What should the adult do, and why does it work?

3. (5 pts)

How hot must chicken be to be safe, and where do you check it?

4. (5 pts)

Who was Marco Polo, and why did his book matter?

5. (5 pts)

Name the plant part each spice comes from: cinnamon, ginger, cloves, black pepper.

6. (5 pts)

What makes hot peppers hot, and where is most of it?

7. (5 pts)

Predict: your mouth is burning from spicy salsa. Will water or milk help more? Why?

8. (5 pts)

How did Wilbur Scoville measure pepper heat?

9. (5 pts)

How do sweet and sour balance each other? Give an example.

10. (5 pts)

Why did the pineapple become a sign of welcome in early America?

ANSWER KEY

1. Any four: grill outdoors only, away from the house and dry leaves; only adults light and run the grill; children stay 3 feet back; use long tongs; close the lid on a flare-up; keep a hose or extinguisher nearby; never leave a lit grill alone; never use liquid starter.
2. Close the lid (and move the food to the cooler side). The lid takes away oxygen, one side of the fire triangle, so the flare-up dies down.
3. 165 °F, in the thickest part, not touching the bone.
4. A young man from Venice who traveled to China in 1271 and served Kublai Khan for many years. His book described the spices and riches of Asia and made Europeans want to reach the spice lands.
5. Cinnamon: bark. Ginger: root. Cloves: flower buds. Black pepper: dried berries (fruit).
6. Capsaicin, which is mostly in the white ribs and seeds.
7. Milk. Capsaicin mixes with fat, not water, so milk, yogurt or cheese wash it away better.
8. He mixed pepper liquid with sugar water and had tasters sip it, diluting it more and more until they could no longer feel the heat. The more dilution needed, the hotter the pepper.
9. A little sweet softens the sharpness of sour, and a little sour keeps sweet from tasting flat. Examples: lemonade, sweet-and-sour glaze, pineapple.
10. Pineapples were rare and costly, so serving one showed guests that the host had gone to great trouble for them.

UNIT CHALLENGE: A FAMILY GRILLED (OR BROILED) DINNER

Plan and prepare a grilled or broiled family dinner with an adult doing all the grilling or broiling. Make your own spice rub or spice blend (from Lessons 7.1 or 7.2), use it on chicken or vegetables, and serve it with a salsa, a fruit side or a sweet-and-sour sauce you balanced yourself.

Before dinner, make a flavor-pairing chart that shows which flavors you put together (salty and sweet, sour and sweet, spicy and cool) and why. Write down the thermometer readings, ask your family to rate each dish, and lead the family in giving thanks.

LOOK FOR	WHAT IT MEANS
Grill or broiler safety	An adult did all the grilling or broiling; the student stayed 3 feet back, kept raw chicken separate and washed hands.
Homemade rub or blend	A rub or spice blend measured and mixed by the student, with the recipe written down.
Flavor-pairing chart	A chart showing at least three flavor pairs used in the meal and why they work.
Food safety records	Chicken checked to 165 °F with readings recorded; leftovers refrigerated within 2 hours.
Family table and cleanup	The family rated each dish, gave thanks together, and the student helped clean up.

UNIT 8

MEAL PLANNING & THE FAMILY TABLE

A good meal begins long before anyone picks up a spoon. Someone has to plan it, read the recipes, shop for it, cook it, set the table and welcome the people who will eat it. In this unit you will learn to do all of that. You will hear how Martha served Jesus in her home while her sister Mary sat at His feet, how Ruth Wakefield's careful recipe-reading gave the world the chocolate chip cookie, and how God fed His people with manna one day at a time.

You will cook a simple supper for guests, bake cookies by reading a recipe all the way through, plan a balanced day of meals, and finish the year with a **family feast**: three dishes, a menu card, a set table and a word of thanks. Everything you have learned this year comes together at the family table.

PREREQUISITES

- Knows the five food groups and a balanced plate (Unit 2)
- Cooks at the stove and oven only with an adult beside (Units 1–7)
- Uses the claw grip with an adult beside (Lesson 1.2)
- Knows Clean, Separate, Cook, Chill and the two-hour rule (Unit 1)

MASTERY CHECKLIST

- ☐ I can read a whole recipe before I start, gather my ingredients and tools, and measure carefully.
- ☐ I can plan a balanced day of meals with all five food groups.
- ☐ I can cook a simple supper and serve guests kindly.
- ☐ I can set a table correctly: fork on the left, knife and spoon on the right, glass above the knife.
- ☐ I can plan, cook and serve a three-dish family feast with an adult beside me, and lead or join in giving thanks.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **MyPlate Kitchen recipes (USDA):** Free; search for it at [MyPlate.gov](https://www.mypyplate.gov). A large collection of simple, balanced recipes from the U.S. Department of Agriculture, useful for planning meals in Lesson 8.3 and the family feast.
- **Index cards or a small notebook for a family recipe box:** Copy your favorite recipes from this year onto cards to keep and share.
- **A cloth tablecloth, napkins and a few candles or flowers:** For the family feast. Anything your family already owns is perfect.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

8.1	Martha and Mary	2 sessions of 45–60 minutes
8.2	Reading a Recipe All the Way Through First	2 sessions of 45–60 minutes
8.3	Planning Meals for a Day	2 sessions of 45–60 minutes
8.4	The Family Feast	2 sessions of 60–90 minutes

UNIT 8 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
What did Jesus teach Martha when she was troubled about serving?
2. **5 pts**
How can planning ahead help a cook serve guests and still spend time with them?
3. **5 pts**
Why do we cook pasta only until al dente for a baked pasta dish?

4. (5 pts)

How did Ruth Wakefield create the chocolate chip cookie?

5. (5 pts)

What is mise en place, and why does it help?

6. (5 pts)

Predict: you scoop flour straight from the bag and pack it into the cup. How might your cookies turn out?

7. (5 pts)

What happened when the Israelites tried to keep extra manna overnight? What was God teaching them?

8. (5 pts)

How hot must egg dishes be to be safe? How hot should leftovers be reheated?

9. (5 pts)

Describe a correct place setting.

10. (5 pts)

Name the three dishes on your feast menu and the food groups they include.

ANSWER KEY

1. That serving is good, but one thing is most needful, listening to Him, and Mary had chosen that good part.
2. By making a timeline and preparing dishes ahead, like a casserole, so there is less to do when guests arrive.
3. It keeps soaking up sauce and softening in the oven, so slightly firm pasta ends up just right instead of mushy.
4. Around 1938 at the Toll House Inn, she chopped semisweet chocolate into small pieces and stirred them into cookie dough; the pieces held their shape.
5. Gathering and measuring all your ingredients and tools before you start. It helps you avoid missing ingredients and mistakes.
6. Too much flour will make them dry, puffy and crumbly instead of chewy.
7. It spoiled (except the double portion before the Sabbath). God was teaching them to trust Him for their daily bread one day at a time.
8. Egg dishes 160 °F; leftovers reheated to 165 °F.
9. Plate in the middle; napkin and fork on the left; knife (blade toward the plate) and spoon on the right; glass above the knife.
10. Answers vary. Example: lemon-herb chicken and potatoes (protein, vegetable), cucumber-tomato salad (vegetables), cornbread (grain, dairy).

UNIT CHALLENGE: THE FAMILY FEAST

Your unit challenge is the family feast itself. Plan a balanced three-dish menu, make a decorated menu card, write a shopping list and a timeline for the day, and shop with a parent.

Cook the feast with an adult beside you for every knife, stove and oven step, set the table, welcome your family, and lead or join in giving thanks. Afterward, put your menu card, list, timeline, a photo or drawing of the table, your family's ratings and a thank-you note or written grace in your cook's notebook.

LOOK FOR	WHAT IT MEANS
Plan	A balanced three-dish menu checked against MyPlate, a complete shopping list and a realistic timeline.
Safe cooking	An adult was beside the student for every knife, stove and oven step; raw meat was kept separate; temperatures were checked and recorded.
Table and hospitality	A correctly set table with a menu card, a warm welcome, and grace said together.
Records	Menu card, list, timeline, photo or drawing, ratings and a thank-you note or grace are in the notebook.
Cleanup and reflection	The kitchen was cleaned up together, and the student wrote what went well and what to change next time.

8.1 MARTHA AND MARY

OBJECTIVES

- Retell the story of Martha and Mary (Luke 10:38-42) and explain why both serving and listening matter.
- Plan ahead so that cooking for guests is calm, not frantic.
- Cook a baked pasta supper for guests with an adult beside you at the stove and oven.

Warm-up. Think about the last time guests came to your home for a meal. What jobs had to be done before they came? Make a list. Which jobs could be done the day before or in the morning, so that you could sit and talk with the guests when they arrive?

WATCH

Nonna Pia's Baked Ziti! Hot Out of the Oven!

Nonna Pia • 2:24

<https://www.youtube.com/watch?v=gYWJ1U-tJal>

WHEN TO WATCH

Before Session 2. Watch how Nonna Pia layers the pasta, sauce and cheese, and covers the pan.

Note: A cheerful Italian grandmother makes a big pan of baked ziti for her family. Her apron reads “My hands are clean!”

KEY TERMS

hospitality

Welcoming guests warmly and caring for them, often by opening your home and your table to them.

make ahead

To prepare part or all of a dish earlier, so there is less to do when guests arrive.

casserole

A dish baked and served in the same deep pan, such as baked pasta.

al dente

Pasta cooked until tender but still a little firm to the bite. It means “to the tooth” in Italian.

CORE IDEAS

The story. Jesus and His disciples came to a village where a woman named Martha welcomed Him into her home. Martha had a sister named Mary. While Martha hurried about getting the meal ready, Mary sat at Jesus’ feet listening to His teaching. Martha grew upset and said, “Lord, dost thou not care that my sister hath left me to serve alone?” Jesus answered gently, “Martha, Martha, thou art careful and troubled about many things: But one thing is needful: and Mary hath chosen that good part” (Luke 10:41-42).

What we learn. Martha’s cooking and serving were good and kind; welcoming guests with food is a good gift. But Jesus showed that the most important thing was being with Him and listening to Him. Martha was so busy and worried that she missed it. Wise cooks have learned that planning ahead helps them do both: make the food with love, and still have time to sit with their guests. A dish that can be made ahead and slipped into the oven, like a baked pasta, gives the cook time to welcome, listen and talk.

The kitchen science. Baked pasta is a **casserole**: pasta, sauce and cheese layered in a deep pan and baked. The pasta is boiled only until **al dente**, still a little firm, because it keeps soaking up sauce and softening in the oven. In the oven, the cheese melts, and the top browns as its proteins and sugars toast in the dry heat. Because it can be put together ahead of time and refrigerated, then baked before supper, a casserole is a host’s good friend.

Let’s cook. You will make a baked pasta supper and a simple salad for guests. **An adult stands beside you at the stove** and drains the boiling pasta (the pot is heavy and the steam is very hot). You will stir the sauce, layer the casserole and set the table. The skill to do well is **planning ahead**: make a timeline so everything is ready when the guests arrive, and then sit down and enjoy them.

PICTURE STUDY



Christ in the House of Martha and Mary, Johannes Vermeer, about 1654–1655 · Oil on canvas · Scottish National Gallery, Edinburgh

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

This is one of the earliest paintings by Johannes Vermeer, the Dutch painter of quiet rooms. Jesus is visiting the home of Martha and Mary. Martha has brought a basket of bread to the table, and Mary sits at His feet, listening.

Look closely

- Find Martha. What is she carrying? What do you think she has been doing all day?
- Find Mary. Where is she sitting, and what is she doing?
- Look at Jesus' hand. Whom is He pointing to as He speaks?
- Look at the faces. Does Martha look angry, tired or listening?

Talk about it

1. Was Martha wrong to make the bread? What did Jesus want her to understand?
2. How can planning ahead help a cook be like both Martha and Mary?
3. What could you do to make a guest feel welcome besides cooking?

Safety first. An adult stands beside you at the stove and drains the heavy pot of boiling pasta; stand back from the steam. The adult puts the casserole in and out of the oven with oven mitts. If you use ground meat, cook it to 160 °F and wash your hands after touching it raw.

KITCHEN PROJECT

A Make-Ahead Supper for Guests: Baked Ziti

You will write a timeline, cook a baked pasta and a simple salad, set the table, and welcome guests (or your own family as honored guests) to supper.

You will need

- A large pot, a colander and a large skillet
- A 9×13-inch baking dish
- A wooden spoon, measuring cups and a large spoon for layering
- An instant-read thermometer
- Oven mitts and foil
- Paper for a timeline

EASY BAKED ZITI

Serves 6–8 • Prep 25 min • Bake 25 min

Ingredients

- 1 pound ziti or penne pasta
- 1 tablespoon salt for the pasta water
- 1 pound lean ground beef or Italian sausage (optional)
- 1 jar (24 ounces) marinara sauce
- 1 cup ricotta or cottage cheese
- 2 cups grated mozzarella cheese, divided
- ½ cup grated Parmesan cheese
- 1 teaspoon dried basil or Italian seasoning
- A simple green salad and bread to serve (optional)

Method

1. An adult heats the oven to 375 °F. Wash your hands.
2. With the adult beside you, bring a large pot of water and the salt to a boil. Add the pasta and stir. Boil 2 minutes less than the package says, until al dente. The adult drains it in the colander.

3. If using meat, the adult and you brown it in the skillet over medium heat, breaking it up with a wooden spoon, until no pink remains and it reaches 160 °F, about 8 minutes. The adult spoons off any fat. Stir in the marinara and basil.
4. In the big pot (off the heat), stir the pasta with the sauce, the ricotta and 1 cup of the mozzarella.
5. Spoon it into the baking dish. Sprinkle the rest of the mozzarella and the Parmesan on top.
6. **Make ahead:** cover with foil and refrigerate up to 1 day. Bake it straight from the refrigerator, adding 10 to 15 minutes.
7. The adult bakes it uncovered 20 to 25 minutes, until bubbly and the cheese is golden. Let it rest 10 minutes before serving.
8. Refrigerate leftovers within 2 hours. Clean up the pots and counters.

Allergy check: Contains wheat (pasta) and milk (cheeses). Some sausages contain milk or soy; check labels. For wheat-free, use gluten-free pasta; for milk-free, leave out the ricotta and use dairy-free cheese.

Steps

1. **Timeline.** Working backward from the time guests arrive, write when each job must be done: shop, make the casserole, set the table, bake, toss the salad. Which jobs can be done the day before?
2. Make the baked ziti as the recipe says, with the adult beside you.
3. **Welcome the guests.** Set the table, greet your guests at the door, and when the food is in the oven, sit and talk with them. Ask each guest one question about themselves.
4. **Serve.** Serve the guests first. Offer seconds kindly.
5. **Taste test and improve it.** Ask your guests and family to rate the meal from 1 to 5. Plan one change: more vegetables in the sauce, a different cheese, or a better timeline.
6. **Clean up:** clear the table, wash, dry and put everything away, with help from your family.

Tips

- Pasta keeps softening in the oven, so slightly firm pasta turns out just right.

- Add a bag of fresh spinach to the hot sauce for an easy vegetable.
- A written timeline on the refrigerator keeps the whole family helping.

Check your work

- ☐ I can retell the story of Martha and Mary and explain what Jesus taught.
- ☐ I made a timeline so the meal was ready on time.
- ☐ I cooked a baked pasta supper with an adult beside me and welcomed guests.

COOK'S NOTEBOOK

1. Draw Martha and Mary in their home and write one sentence about what each one did well.
2. Copy your supper timeline into your notebook.
3. Copy the baked ziti recipe in your own words and write what your guests said about it.

COMMON MISTAKES

- Leaving everything for the last minute, so the cook is too busy to enjoy the guests.
- Boiling pasta until very soft before baking. It turns mushy in the oven.
- Draining a heavy pot of boiling pasta yourself. This is an adult job.

Make it a game · Guests in Thirty Minutes. Your grown-up announces that guests will arrive in thirty minutes. In ninety seconds, list the jobs to do, then put each job on a timeline from earliest to latest. A make-ahead casserole goes first, the table comes next, and the final touches come last. Explain why Mary chose to listen.

Scripture. “And Jesus answered and said unto her, Martha, Martha, thou art careful and troubled about many things: But one thing is needful: and Mary hath chosen that good part, which shall not be taken away from her.” (Luke 10:41-42, KJV)

Serving others is good, but listening to Jesus is the one thing most needful. Planning ahead in the kitchen can leave time for both.

8.2 READING A RECIPE ALL THE WAY THROUGH FIRST

OBJECTIVES

- Tell how Ruth Wakefield, a careful cook and teacher, created the chocolate chip cookie at the Toll House Inn in the 1930s.
- Read a whole recipe before starting, set out every ingredient and tool, and measure accurately.
- Bake oatmeal chocolate chip cookies with an adult beside you at the oven, without tasting uncooked dough.

Warm-up. Read this short recipe once, then close your eyes and say what you would do first: “Bake at 350 °F. Mix the butter and sugar. Chill the dough for 1 hour before shaping.” Did you catch the 1-hour wait? Why does it matter to read the whole recipe before you start?

WATCH

How to Read a Recipe

Spoons Across America • 5:52

<https://www.youtube.com/watch?v=Q2tkryZa9VA>

WHEN TO WATCH

Before you start cooking. Write down each tip she gives for following a recipe.

Note: From Spoons Across America, a nonprofit that teaches children to cook.

BACKUP VIDEO

Oatmeal Chocolate Chip Cookies

Simply Home Cooked • 3:21

<https://www.youtube.com/watch?v=35m3Lkm9psA>

To see each step of mixing oatmeal cookie dough before you bake.

KEY TERMS

mise en place

French for “everything in its place”: gathering and measuring all your ingredients and tools before you start cooking. Say it “meez ahn plahs.”

level

To scrape the top of a measuring cup or spoon flat with the back of a butter knife, for an exact measure.

cream

To beat butter and sugar together until light and fluffy.

preheat

To turn the oven on ahead of time so it is fully hot when the food goes in.

CORE IDEAS

The story. Ruth Wakefield studied household arts and taught cooking before she and her husband opened the Toll House Inn in Whitman, Massachusetts, in 1930.

Travelers came from far away for her meals and her desserts. Around 1938 she created a new cookie by chopping a bar of semisweet chocolate into small pieces and stirring them into a butter cookie dough. The pieces held their shape in the oven. She printed the recipe in her cookbook, *Toll House Tried and True Recipes*, and the chocolate chip cookie soon became America’s favorite.

How she figured it out. A popular story says Ruth ran out of baking chocolate and tossed in chopped chocolate by accident, but she later said she did it on purpose to make something new. She was a careful cook who wrote her recipes clearly and measured exactly, so that her kitchen helpers could make the same cookies every time. She knew that a good recipe works only when the cook reads it all the way through, gathers everything first, and measures level and true. The Nestlé company later printed her recipe on its chocolate packages, and it is still there today.

The kitchen science. Baking is like chemistry: the amounts matter. Too much flour makes cookies dry and puffy; too little makes them spread flat. That is why we **level** each cup. **Creaming** butter and sugar beats in tiny air bubbles that help the cookies rise. Oats add chewiness and fiber. In the oven, the butter melts and the dough spreads, the baking soda makes gas bubbles, and the edges brown as sugars caramelize. Cookies keep cooking on the hot pan for a few minutes after they come out, so they are taken out when the centers still look a little soft.

Let's cook. You will read the recipe all the way through, set out your **mise en place**, and bake oatmeal chocolate chip cookies. **An adult stands beside you at the oven.** The skills to do well are **reading first** and **measuring level**. Remember: never taste uncooked cookie dough, because raw flour and uncooked eggs can carry germs. Cookies are a sometimes food, perfect to share.

PICTURE STUDY



*Cooking Class at Watertown High School, Unknown photographer, 1909 · Photograph
Image: [Wikimedia Commons](#), public domain*

In the early 1900s, many American high schools taught cooking as a science, with careful measuring, clean aprons and orderly kitchens. This photograph shows a cooking class in Watertown, New York, in 1909. Cooks like Ruth Wakefield learned in classes like this one.

Look closely

- Find the aprons and caps. Why do you think every student wears them?
- Look at the long tables. How is the classroom set up so each student has a place to work?
- Look at the windows and walls. Is this kitchen bright and clean?
- Look at how the students stand. Do they look ready to listen and follow directions?

Talk about it

1. What do you think the teacher said before the students started cooking?
2. Why is it important for every student to read the recipe and measure the same way?
3. How is your kitchen at home like this classroom? How is it different?

Safety first. Never taste uncooked cookie dough: raw flour and uncooked eggs can carry germs. Wash your hands after cracking eggs. The adult puts the pans in and out of the oven with oven mitts, and you use a spatula, not fingers, to move hot cookies.

KITCHEN PROJECT

Read It First: Oatmeal Chocolate Chip Cookies

You will read the whole recipe out loud, set out your mise en place, do a leveling test, and bake a batch of cookies to share.

You will need

- Two baking sheets and parchment paper
- A large bowl and a medium bowl, a whisk and a sturdy spoon or electric mixer
- Dry measuring cups, liquid measuring cup and measuring spoons
- A butter knife for leveling
- A small scoop or two spoons, a spatula, oven mitts and a cooling rack
- A kitchen scale (optional, for the leveling test)

OATMEAL CHOCOLATE CHIP COOKIES

Serves About 30 cookies • Prep 20 min • Bake 10–12 min per pan

Ingredients

- ½ cup (1 stick) butter, softened
- ½ cup packed brown sugar
- ¼ cup granulated sugar
- 1 large egg
- 1 teaspoon vanilla extract
- 1 cup all-purpose flour
- ½ teaspoon baking soda
- ½ teaspoon salt
- ½ teaspoon ground cinnamon
- 1½ cups old-fashioned rolled oats
- ¾ cup semisweet chocolate chips

Method

1. Read the whole recipe out loud first. Then wash your hands and set out every ingredient and tool.
2. An adult heats the oven to 350 °F. Line the baking sheets with parchment.
3. In the large bowl, cream the butter, brown sugar and sugar with the spoon or mixer until light and fluffy, about 2 minutes.
4. Beat in the egg and vanilla. Wash your hands after cracking the egg.
5. In the medium bowl, whisk the flour, baking soda, salt and cinnamon. Spoon the flour into the cup and level it with the butter knife.
6. Stir the flour mixture into the butter mixture just until combined. Stir in the oats and chocolate chips. Do not taste the dough.
7. Scoop tablespoon-size balls onto the pans, 2 inches apart.
8. The adult bakes one pan at a time 10 to 12 minutes, until the edges are golden and the centers still look a little soft. Cool on the pan 5 minutes, then move to the rack with the spatula. Clean up while the last pan bakes.

Allergy check: Contains wheat, milk (butter; often in chocolate chips), eggs, and possibly soy (in some chocolate chips). For milk-free, use a plant-based butter and dairy-free chocolate chips; for egg-free, use 3 tablespoons of unsweetened applesauce (cookies will be softer).

Steps

1. **Read aloud.** Read the recipe out loud to an adult. Circle any step that needs waiting time, an oven, or a tool you might forget.
2. **Mise en place.** Before mixing, measure every ingredient into its own little bowl or cup. Take a photo of your setup.
3. **Leveling test.** Scoop one cup of flour straight from the bag and pack it down; weigh it. Then spoon a cup in lightly and level it; weigh it. How different were they? (A packed cup can hold much more flour.)
4. Mix and bake the cookies as the recipe says.
5. **Taste test and share.** Rate your cookies from 1 to 5. Share some with a neighbor, a grandparent or a friend.
6. **Improve it.** Plan one change: raisins instead of chocolate, a minute less baking, or chilling the dough for thicker cookies.

7. Clean up: wash, dry and put everything away.

Tips

- Soft butter creams best. Leave it on the counter for about an hour before you start.
- Take cookies out when the middles look slightly underdone; they finish cooking on the hot pan.
- Store cooled cookies in a closed container so they stay soft.

Check your work

- ☐ I can tell how Ruth Wakefield created the chocolate chip cookie.
- ☐ I read the whole recipe first, set out my mise en place and leveled my measures.
- ☐ I baked cookies with an adult at the oven and did not taste the uncooked dough.

COOK'S NOTEBOOK

1. Draw your mise en place from above, with every ingredient labeled.
2. Write the results of your leveling test.
3. Copy the cookie recipe onto an index card for your family recipe box.

From history. Ruth Wakefield's cookbook went through many editions. Her inn served three meals a day to travelers for many years, and she taught her cooks to follow her written recipes exactly. The Toll House Inn burned down in 1984, but her cookie lives on in kitchens everywhere.

COMMON MISTAKES

- Starting to cook before reading the whole recipe, and then discovering a missing ingredient or a long wait.
- Packing flour into the cup. Spoon it in and level it.
- Tasting uncooked cookie dough. Wait for the baked cookie.
- Leaving cookies in the oven until the centers look done. They will be hard when cool.

Make it a game • Read It First Race. Your grown-up writes an eight-line recipe with one hidden catch, such as chill the dough for one hour at step five. Read the whole recipe in sixty seconds. Then answer questions: what tools do you need, how long will it take, and what is the catch? Score a point for each right answer.

8.3 PLANNING MEALS FOR A DAY

OBJECTIVES

- Retell how God fed Israel with manna, enough for each day (Exodus 16).
- Plan a balanced day of meals and snacks with all five food groups.
- Make veggie egg muffins for a make-ahead breakfast with an adult at the oven, and check them for doneness.

Warm-up. Write down everything you ate yesterday, from breakfast to bedtime snack. Then color-code it: fruits red, vegetables green, grains orange, protein purple, dairy blue. Which colors show up a lot? Which are missing?

WATCH

Easy Breakfast Egg Muffins Recipe - Natasha's Kitchen

Natasha's Kitchen • 3:05

<https://www.youtube.com/watch?v=J26ixgWpTEg>

WHEN TO WATCH

Before Session 2. Watch how the egg mixture and fillings are divided into the muffin cups.

Note: A home cook makes egg muffins with sausage, bacon and vegetables, cooking the meat at the stove first. Our recipe uses already-cooked ham or none.

BACKUP VIDEO

MyPlate - Overview

Food Hero • 5:35

https://www.youtube.com/watch?v=4hZ4_mkavLY

A review of the five food groups before you plan your day of meals (also used in Lesson 2.1).

KEY TERMS

manna

The bread from heaven God gave the Israelites in the wilderness. It appeared on the ground each morning.

meal plan

A written plan of what a family will eat for each meal and snack.

make-ahead breakfast

A breakfast cooked ahead of time and reheated on busy mornings.

batch cooking

Cooking a larger amount at once to use for several meals.

CORE IDEAS

The story. After God brought the Israelites out of Egypt, they traveled through the wilderness, where there were no fields or markets. The people were hungry and complained. God told Moses, “Behold, I will rain bread from heaven for you; and the people shall go out and gather a certain rate every day” (Exodus 16:4). Each morning the ground was covered with small, white flakes that tasted like wafers made with honey. The people called it *manna*. Each family gathered what it needed for the day, and on the sixth day they gathered twice as much, so they could rest on the Sabbath.

What they learned. When some people tried to save extra manna overnight (except before the Sabbath), it spoiled. God was teaching His people to trust Him for their daily bread, one day at a time, and to gather just what they needed. For forty years, He fed them faithfully. Planning meals is not worrying about tomorrow; it is taking good care of what God gives today, so nothing is wasted and everyone is fed.

The kitchen science. A balanced day of eating spreads the five food groups across meals and snacks. A good **meal plan** includes a breakfast with protein and a grain or fruit, a lunch and supper built on MyPlate with half fruits and vegetables, and snacks that fill you up with fiber and protein. Planning ahead also saves time, money and food: you buy what you need, cook in **batches**, and use leftovers wisely. A **make-ahead breakfast** like egg muffins can be baked on the weekend, refrigerated, and reheated each morning.

Let’s cook. You will plan one full balanced day of meals and snacks for your family, then bake veggie egg muffins for the breakfast. You will chop soft vegetables with the claw grip and whisk the eggs; **the adult runs the oven**. The skill to do well is **checking doneness**: egg dishes are safe at 160 °F, with no runny egg in the center.

PICTURE STUDY



The Gathering of the Manna, James Tissot, about 1896–1902 · Opaque watercolor over graphite on board · The Jewish Museum, New York
Image: [Wikimedia Commons](#), public domain

James Tissot spent his last years painting the stories of the Old Testament. Here the Israelites have come out early in the morning to gather manna from the ground in the wilderness.

Look closely

- Find the people bending and kneeling. What are they gathering, and what are they putting it in?
- Find the woman standing in blue. Where is she looking? What might she be thinking?
- Look at the hills and the ground. Could anyone grow food here?
- Look at the baskets. Are they all very full, or just full enough?

Talk about it

1. Why did God give the people enough manna for just one day at a time?
2. How does planning meals help a family not to waste food?
3. What does it mean to pray, “Give us this day our daily bread”?

Safety first. Wash your hands after cracking eggs. Cut soft vegetables with the claw grip with an adult beside you. The adult puts the muffin pan in and out of the oven with oven mitts. Bake egg muffins until the centers reach 160 °F and are firm; refrigerate leftovers within 2 hours and reheat to 165 °F.

KITCHEN PROJECT

A Day of Meals on Paper and Veggie Egg Muffins

You will plan one full day of balanced meals for your family, write a shopping list for it, and bake a batch of egg muffins for the breakfast.

You will need

- A 12-cup muffin pan and nonstick spray or paper liners
- A large bowl, a whisk and a liquid measuring cup
- A small serrated knife, a cutting board and a damp towel
- An instant-read thermometer
- Oven mitts and a cooling rack
- Paper for a meal plan and shopping list

VEGGIE EGG MUFFINS

Serves 12 muffins (4–6 breakfasts) · Prep 15 min · Bake 20–25 min

Ingredients

- 10 large eggs
- $\frac{1}{3}$ cup milk
- $\frac{1}{2}$ teaspoon salt and $\frac{1}{4}$ teaspoon black pepper
- 1 cup chopped fresh spinach
- $\frac{1}{2}$ red bell pepper, chopped
- 3 green onions, sliced
- $\frac{3}{4}$ cup grated cheddar cheese
- $\frac{1}{2}$ cup diced cooked ham or turkey (optional)

Method

1. An adult heats the oven to 350 °F. Spray the muffin cups well or line them with paper liners.
2. Wash your hands and wash the vegetables. With an adult beside you, chop the pepper and slice the green onions with the claw grip. Tear the spinach into small pieces.

3. Crack the eggs into the bowl (fish out any shell with a bigger piece of shell). Wash your hands. Add the milk, salt and pepper and whisk until smooth.
4. Divide the vegetables, cheese and ham among the muffin cups.
5. Pour the egg mixture over the fillings, filling each cup about three-quarters full.
6. The adult bakes the muffins 20 to 25 minutes, until puffed and set in the center. Check one with the thermometer: 160 °F.
7. Cool 5 minutes, then loosen with a butter knife. Eat some now; cool the rest, refrigerate in a covered container within 2 hours, and reheat to 165 °F within 4 days.
8. Clean up: soak the muffin pan in hot, soapy water, then wash everything.

Allergy check: Contains eggs and milk. For milk-free, use an unsweetened plant milk and leave out the cheese. No wheat or nuts.

Steps

1. **Plan the day.** Make a chart with breakfast, lunch, snack and supper. Fill in a balanced meal for each, using recipes from this year if you like. Check that every meal has at least three food groups and the whole day has all five.
2. **Shopping list.** Write a list of everything you need for your day of meals that is not already in the kitchen, grouped by store section: produce, dairy, meat, grains, pantry.
3. Bake the egg muffins as the recipe says.
4. **Doneness check.** Record the temperature of two muffins. Press the top of one: does it spring back?
5. **Live the plan.** On one day this week, help your family follow your meal plan. At night, write what went well and what you would change.
6. **Taste test and improve it.** Rate the egg muffins from 1 to 5. Plan one change: different vegetables, a little salsa on top, or a different cheese.
7. Clean up: wash, dry and put everything away.

Tips

- Squeeze extra water out of the spinach so the muffins are not soggy.
- Egg muffins puff in the oven and sink as they cool. That is normal.
- A family meal plan on the refrigerator helps everyone know what is coming and saves money at the store.

Check your work

- ☐ I can retell the story of the manna and what it teaches about daily bread.
- ☐ I planned a balanced day of meals with all five food groups and wrote a shopping list.
- ☐ I baked egg muffins with an adult at the oven and checked them to 160 °F.

COOK'S NOTEBOOK

1. Copy your one-day meal plan in a neat chart and color-code the food groups.
2. Draw the Israelites gathering manna, with a basket for each family.
3. Copy the egg muffin recipe onto an index card for your recipe box.

COMMON MISTAKES

- Planning meals with only one or two food groups. Check each meal against MyPlate.
- Taking egg muffins out while the centers are still runny. Bake to 160 °F.
- Buying food without a list, which often means forgetting something and buying things you will not use.

Make it a game • Missing Group Detective. Each of you plans a day of meals and snacks on paper in two minutes: breakfast, lunch, dinner and two snacks. Then trade papers. Circle the food groups in every meal and find any that is missing. Fix your partner's plan. Score a point for each fix. Mention how God gave Israel manna each day.

Scripture. “Then said the LORD unto Moses, Behold, I will rain bread from heaven for you; and the people shall go out and gather a certain rate every day, that I may prove them, whether they will walk in my law, or no.” (Exodus 16:4, KJV)

“A certain rate every day” means just the right amount for each day. God provided faithfully, one day at a time.

8.4 THE FAMILY FEAST

OBJECTIVES

- Plan a three-dish family feast with a menu card, a shopping list and a timeline.
- Cook the feast with an adult beside you, using dishes and skills from this year.
- Set the table correctly, welcome your family, and lead or join in giving thanks.

Warm-up. Look back through your cook's notebook. Which three recipes from this year did your family rate highest? Which one are you proudest of? Make a short list of dishes you could serve at a feast.

WATCH

Learning How to Set the Table - Vocabulary for Kids

Smile and Learn - English · 4:39

<https://www.youtube.com/watch?v=Il1b79NsQZg>

WHEN TO WATCH

Before you set the table for the feast. Point to each piece on your own table as the video names it.

Note: A simple cartoon that names each part of a place setting.

KEY TERMS

menu

A list of the dishes that will be served at a meal.

feast

A special, joyful meal shared with others, often to give thanks or celebrate.

place setting

The plate, napkin, fork, knife, spoon and glass set out for one person.

grace

A prayer of thanks to God before (or after) a meal.

CORE IDEAS

The story. All through the Bible, God's people gathered for feasts to remember His goodness. When Nehemiah and Ezra read God's law to the people of Jerusalem, they told them to celebrate with food and to send portions to those who had nothing

prepared, “for the joy of the LORD is your strength” (Nehemiah 8:10). Jesus Himself shared many meals with His friends, and He fed great crowds. A feast is a way of saying thank you to God together.

How cooks plan a feast. Good hosts plan a feast in steps. First, they choose a **menu** that is balanced and that they know how to cook: a main dish, a side, and a bread or dessert. Next, they make a shopping list and buy the food a day or two ahead. Then they make a **timeline**, working backward from dinnertime, so that each dish is ready on time; dishes that can be made ahead are done first. Finally, they set the table and get ready to welcome everyone, so the cook can sit down too.

The kitchen science. Everything you learned this year comes together. Clean, Separate, Cook, Chill keeps the feast safe. A balanced plate gives everyone good nourishment. Balanced flavors (salty, sweet, sour, savory) make the food delicious. Heat cooks by conduction, convection and radiation in your oven and on your stove. Timing matters: dishes that bake at the same oven temperature can go in together, and hot food stays hot and cold food stays cold until it is served.

Let’s cook. You will plan and cook a three-dish feast **with an adult beside you** for every knife, stove and oven step. A model menu is a sheet-pan lemon-herb chicken and potatoes, a crunchy cucumber and tomato salad (Lesson 1.2) or roasted carrots (Lesson 3.3), and warm cinnamon peaches (Lesson 6.2) or golden cornbread (Lesson 4.4). You will make a menu card, set the table, and lead or join in saying grace.

PICTURE STUDY



Come, Lord Jesus, Be Our Guest (The Mealtime Prayer), Fritz von Uhde, 1885 · Oil on canvas · Alte Nationalgalerie, Berlin

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

Fritz von Uhde painted a German farm family about to eat. They are praying an old table grace: “Come, Lord Jesus, be our guest.” The painter shows Jesus quietly stepping into the room to answer their prayer.

Look closely

- Find each member of the family. What are they doing with their hands and heads?
- Find Jesus. How is He entering the room? Does anyone see Him?
- Look at the table. What is set out for the meal?
- Look at the room. Is this a rich family or a simple one? How can you tell?

Talk about it

1. Why do you think the painter showed Jesus coming in as the family prays?
2. How can a simple meal at home be a feast when the family gives thanks together?
3. What grace will your family pray at your feast?

Safety first. A parent or responsible adult supervises all of the feast cooking and stands beside you for every knife, stove and oven step. Check every dish against your family's allergies. Keep raw chicken separate, cook chicken to 165 °F, keep hot food hot and cold food cold, and refrigerate leftovers within 2 hours.

KITCHEN PROJECT

Our Family Feast

This is the last project of the year: plan, shop for, cook and serve a three-dish family feast, with a menu card, a set table and a grace. Use the model main dish below or choose your own.

You will need

- A large rimmed baking sheet and parchment paper or foil
- Cutting boards (one for raw chicken), a small serrated knife and a damp towel
- A large bowl, measuring cups and spoons
- An instant-read thermometer and oven mitts
- Cardstock and colored pencils for a menu card
- Plates, napkins, forks, knives, spoons and glasses for the table

SHEET-PAN LEMON-HERB CHICKEN AND POTATOES (FEAST MAIN DISH)

Serves 4–6 • Prep 25 min • Roast 35–45 min

Ingredients

- 2 pounds bone-in, skin-on chicken thighs (6 to 8 thighs)
- 1½ pounds small potatoes (such as baby red or Yukon Gold)
- 3 tablespoons olive oil, divided
- 1 lemon
- 2 teaspoons dried Italian herbs or 1 tablespoon fresh rosemary and thyme
- 1 teaspoon garlic powder
- 1½ teaspoons salt and ½ teaspoon black pepper
- Chopped fresh parsley for serving (optional)

Method

1. An adult heats the oven to 425 °F and lines the baking sheet. Wash your hands.

2. Scrub the potatoes. The adult cuts them in half; with the adult beside you, cut any big halves again with the claw grip so they are about the same size. Toss them on the pan with 1½ tablespoons oil, half the herbs and salt, and spread them out.
3. Grate the lemon's yellow peel (zest) with the adult's help, then the adult cuts the lemon in half. In a small bowl, mix the zest, juice of half the lemon, the rest of the oil, herbs, garlic powder, salt and pepper.
4. The adult pats the chicken dry, rubs it with the lemon-herb mix, and nestles the thighs skin side up among the potatoes. Everyone washes hands after touching raw chicken.
5. The adult roasts the pan 35 to 45 minutes, until the skin is golden and the potatoes are tender and browned.
6. With the adult, check the thickest thigh away from the bone: it must read 165 °F (thighs are even better at 175 °F).
7. Squeeze the other lemon half over everything and sprinkle with parsley. Serve on a clean platter.
8. Refrigerate leftovers within 2 hours. Clean up together after the feast.

Allergy check: Contains none of the nine major allergens. Check your side dishes and dessert for allergens and make the swaps your family needs.

Steps

1. **Choose the menu.** Pick three dishes: a main dish, a side (vegetable or salad), and a bread or dessert. Check the meal against MyPlate. Write the menu on a decorated menu card for the table.
2. **Shopping list.** Read all three recipes all the way through. Write one shopping list for the feast, check the pantry, and shop with a parent.
3. **Timeline.** Write a timeline for the feast day, working back from dinnertime. Which dish can be made ahead? Which ones can share the oven?
4. **Cook the feast** with an adult beside you, following your timeline and checking temperatures.
5. **Set the table.** For each place: plate in the middle, napkin and fork on the left, knife (blade facing the plate) and spoon on the right, glass above the knife. Put the menu card in the center.

6. **Welcome and give thanks.** Call your family to the table, lead or join in saying grace, and serve the food. Ask each person to share one thing they are thankful for this year.
7. **Rate and remember.** Ask everyone to rate each dish. Write the feast in your cook's notebook: the menu, the ratings, a drawing or photo of the table, and what you would change next time.
8. Clean up together: clear, wash, dry and put everything away.

Tips

- Choose dishes you have made before. A feast is not the day to try something brand new.
- Dishes that bake at 400–425 °F, like roasted carrots and the chicken, can share the oven.
- Ask a family member to be your helper for setting the table and serving.

Check your work

- ☐ I planned a three-dish feast with a menu card, shopping list and timeline.
- ☐ I cooked the feast safely with an adult beside me and checked the chicken to 165 °F.
- ☐ I set the table correctly, welcomed my family, and gave thanks.

COOK'S NOTEBOOK

1. Paste in (or copy) your menu card, shopping list and timeline.
2. Draw one place setting from above and label the plate, napkin, fork, knife, spoon and glass.
3. Write a thank-you note to God or a grace in your own words, and write your family's ratings of each dish.

COMMON MISTAKES

- Choosing too many new dishes for the feast. Stick with recipes you know.
- Forgetting to plan when each dish goes into the oven, so everything is ready at different times.
- Putting the knife on the left or the fork on the right. Fork left; knife and spoon right.
- Leaving the feast leftovers out during a long, happy visit. Refrigerate them within 2 hours.

Make it a game • Feast Countdown Board. Write dinner time on a card. Then work backwards. Make cards for three dishes and place them on a timeline: when to start each, when to put it in the oven, and when to set the table. Your grown-up tries to find a conflict, like two dishes needing the oven. Solve it and read the plan aloud.

Scripture. “For every creature of God is good, and nothing to be refused, if it be received with thanksgiving:” (1 Timothy 4:4, KJV)

Every good thing God made is a gift to be received with thanks. A family feast is a joyful way to give thanks together for a whole year of food, work and learning.

UNIT 8

MEAL PLANNING & THE FAMILY TABLE

A good meal begins long before anyone picks up a spoon. Someone has to plan it, read the recipes, shop for it, cook it, set the table and welcome the people who will eat it. In this unit you will learn to do all of that. You will hear how Martha served Jesus in her home while her sister Mary sat at His feet, how Ruth Wakefield's careful recipe-reading gave the world the chocolate chip cookie, and how God fed His people with manna one day at a time.

You will cook a simple supper for guests, bake cookies by reading a recipe all the way through, plan a balanced day of meals, and finish the year with a **family feast**: three dishes, a menu card, a set table and a word of thanks. Everything you have learned this year comes together at the family table.

PREREQUISITES

- Knows the five food groups and a balanced plate (Unit 2)
- Cooks at the stove and oven only with an adult beside (Units 1–7)
- Uses the claw grip with an adult beside (Lesson 1.2)
- Knows Clean, Separate, Cook, Chill and the two-hour rule (Unit 1)

MASTERY CHECKLIST

- ☐ I can read a whole recipe before I start, gather my ingredients and tools, and measure carefully.
- ☐ I can plan a balanced day of meals with all five food groups.
- ☐ I can cook a simple supper and serve guests kindly.
- ☐ I can set a table correctly: fork on the left, knife and spoon on the right, glass above the knife.
- ☐ I can plan, cook and serve a three-dish family feast with an adult beside me, and lead or join in giving thanks.

OPTIONAL BOOKS AND TOOLS FOR THIS UNIT

- **MyPlate Kitchen recipes (USDA):** Free; search for it at [MyPlate.gov](https://www.mypyplate.gov). A large collection of simple, balanced recipes from the U.S. Department of Agriculture, useful for planning meals in Lesson 8.3 and the family feast.
- **Index cards or a small notebook for a family recipe box:** Copy your favorite recipes from this year onto cards to keep and share.
- **A cloth tablecloth, napkins and a few candles or flowers:** For the family feast. Anything your family already owns is perfect.

Not required. Every recipe in this unit works in an ordinary home kitchen.

School Launch has no ties to these authors, publishers or companies.

LESSONS IN THIS UNIT

8.1 Martha and Mary	2 sessions of 45–60 minutes
8.2 Reading a Recipe All the Way Through First	2 sessions of 45–60 minutes
8.3 Planning Meals for a Day	2 sessions of 45–60 minutes
8.4 The Family Feast	2 sessions of 60–90 minutes

UNIT 8 REVIEW

Answer each question in a sentence or two. You may answer out loud while a parent writes. The review is worth 50 points.

1. **5 pts**
What did Jesus teach Martha when she was troubled about serving?
2. **5 pts**
How can planning ahead help a cook serve guests and still spend time with them?
3. **5 pts**
Why do we cook pasta only until al dente for a baked pasta dish?

4. (5 pts)

How did Ruth Wakefield create the chocolate chip cookie?

5. (5 pts)

What is mise en place, and why does it help?

6. (5 pts)

Predict: you scoop flour straight from the bag and pack it into the cup. How might your cookies turn out?

7. (5 pts)

What happened when the Israelites tried to keep extra manna overnight? What was God teaching them?

8. (5 pts)

How hot must egg dishes be to be safe? How hot should leftovers be reheated?

9. (5 pts)

Describe a correct place setting.

10. (5 pts)

Name the three dishes on your feast menu and the food groups they include.

ANSWER KEY

1. That serving is good, but one thing is most needful, listening to Him, and Mary had chosen that good part.
2. By making a timeline and preparing dishes ahead, like a casserole, so there is less to do when guests arrive.
3. It keeps soaking up sauce and softening in the oven, so slightly firm pasta ends up just right instead of mushy.
4. Around 1938 at the Toll House Inn, she chopped semisweet chocolate into small pieces and stirred them into cookie dough; the pieces held their shape.
5. Gathering and measuring all your ingredients and tools before you start. It helps you avoid missing ingredients and mistakes.
6. Too much flour will make them dry, puffy and crumbly instead of chewy.
7. It spoiled (except the double portion before the Sabbath). God was teaching them to trust Him for their daily bread one day at a time.
8. Egg dishes 160 °F; leftovers reheated to 165 °F.
9. Plate in the middle; napkin and fork on the left; knife (blade toward the plate) and spoon on the right; glass above the knife.
10. Answers vary. Example: lemon-herb chicken and potatoes (protein, vegetable), cucumber-tomato salad (vegetables), cornbread (grain, dairy).

UNIT CHALLENGE: THE FAMILY FEAST

Your unit challenge is the family feast itself. Plan a balanced three-dish menu, make a decorated menu card, write a shopping list and a timeline for the day, and shop with a parent.

Cook the feast with an adult beside you for every knife, stove and oven step, set the table, welcome your family, and lead or join in giving thanks. Afterward, put your menu card, list, timeline, a photo or drawing of the table, your family's ratings and a thank-you note or written grace in your cook's notebook.

LOOK FOR	WHAT IT MEANS
Plan	A balanced three-dish menu checked against MyPlate, a complete shopping list and a realistic timeline.
Safe cooking	An adult was beside the student for every knife, stove and oven step; raw meat was kept separate; temperatures were checked and recorded.
Table and hospitality	A correctly set table with a menu card, a warm welcome, and grace said together.
Records	Menu card, list, timeline, photo or drawing, ratings and a thank-you note or grace are in the notebook.
Cleanup and reflection	The kitchen was cleaned up together, and the student wrote what went well and what to change next time.