

GRADE 3 PHYSICAL EDUCATION & HEALTH

First edition

5 units

10 lessons • one quarter

A video for every lesson

FIRST EDITION

COURSE GUIDE

This short course follows five strands of health and fitness through one quarter of the school year: keeping active, water, food, strength and the heart and lungs. Each lesson is built around a real person or moment: Bonnie Prudden and Dr. Hans Kraus testing thousands of children with six simple exercises, William Morgan inventing volleyball at the YMCA in Holyoke in 1895, Charles Blagden sitting in a room hot enough to cook an egg, the Roman aqueducts carrying clean water to the city, Captain James Cook keeping his sailors healthy with sauerkraut, George Washington Carver studying the peanut at Tuskegee, Giovanni Borelli finding levers in the human arm, and René Laennec rolling a sheet of paper into the first stethoscope.

Every lesson follows the same path. First comes **the story**. Then **how they figured it out**: the question, what they tried and what they noticed. Then **how your body works**, explained for a third grader: muscles, bones, joints, sweat, kidneys, vitamins, protein, heart and lungs. Last, **try it**: the student plays a game, does a short workout, tests water or cooling, helps make a snack or runs a run-walk course, writes it down in a fitness journal, and tries to do a little better the second time.

God made the body good, and He gave it to us to care for. This course is about thankfulness, strength, joy in movement and good habits. It is never about size or looks: students are measured only against their own effort and their own earlier numbers. The old Latin saying *Fabricando fit faber*, “by making, one becomes a maker,” fits here too: strength and fitness grow by practice, a little more each week. The quarter ends with a family fitness day, when the whole household moves, plays and eats together.

Most videos come from trusted teaching and health channels: SciShow Kids, Learn Bright, Peekaboo Kidz (Dr. Binocs), Homeschool Pop, Owlkids, a museum, two university or nonprofit youth-fitness programs and a few physical education teachers. Every video was

previewed from start to finish in still frames for accuracy and for modest dress. A few are short and simple, or made by small channels, and the lesson notes say so. Some end with an invitation to subscribe; you can stop the video when the teaching ends. Watch together, and do the moves along with any follow-along video.

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 count by fives, tell time on a clock and make a simple tally chart. A parent or teacher reads along, supervises every activity and helps in the kitchen. Nothing needs to be bought: every activity uses household things such as a towel, a sturdy chair, a wall, a step, a balloon, cups, jars and a timer.

HOW TO USE THIS COURSE

1. **The weekly rhythm.** The quarter has 10 lessons, one a week, each with three sessions of 30–40 minutes. Session 1 is the warm-up, the video, the story and the picture study, with a little movement. Session 2 is the activity (the game, the workout, the experiment or the kitchen task) and the fitness journal. Session 3 repeats the activity and tries to do better. In the second week of each unit, save part of Session 3 for the unit review and the unit challenge. On the other days, aim for at least 60 minutes of active play, chores, walking and sport.
2. **Check with your doctor first.** A parent should know about and supervise every activity. If your child has asthma, a heart condition, diabetes, a recent injury or any other health concern, check with your doctor before starting, and follow the doctor's advice about what to change.
3. **Story, then science, then doing.** The core ideas are written to be read aloud together or read by the student. *The story* and *How they figured it out* tell what happened; *How your body works* explains the science; *Try it* explains the activity. After each paragraph, ask the student to tell it back in his or her own words.
4. **Picture study.** Each lesson has one public-domain painting, print, drawing or old photograph chosen for what it shows about play, work, food, water or rest. Look at it quietly for two minutes, put it away and tell everything you remember, then bring it back and work through the “look for” items and questions.

5. **The fitness journal.** Use any notebook for the whole quarter. Every activity is done, written down and done again: reps, seconds, minutes, cups of water, tally marks, heartbeats. Date every page. Write one sentence about how it felt and one about what you will try next time. Honest numbers matter more than big numbers.
6. **Health, not looks.** In this course we talk about what bodies can do and how to care for them, never about size or shape. We do not weigh children, count calories or call foods bad. Foods are “everyday foods” and “sometimes foods,” and feasts and treats are good gifts in their place. Grades come from effort, steady practice and personal improvement, never from comparing one child with another.
7. **Optional books and gear.** Some units list a free children’s-hospital or National Park Service web page, or simple gear such as a beach ball, a water bottle or a jump rope. They are never required.
8. **Unit review and unit challenge.** Each unit ends with a short review (30 points) that may be answered aloud, and a unit challenge: an active-week log, a family volleyball game, a water log, a vitamin-and-protein snack plan, a two-week strength challenge or a run-walk chart. Keep the challenge pages in a folder.
9. **Safety.** Read the safety note before each activity. Warm up first and cool down after. Clear a space with a flat, non-slip floor and wear good shoes. Stop and tell an adult right away at chest pain, dizziness, fainting, trouble breathing or sharp pain; tired muscles are normal, but joint pain is not. Strength work in this course uses body weight only. A parent handles knives and the stove and checks for food allergies before any tasting, especially in the peanut lesson. Exercise and food are never used as a reward or a punishment.
10. **The family fitness day.** In the last week, the student plans and leads a family fitness day: a warm-up, a station from every unit, a water table, a simple snack the student helps make and a family run-walk. Everyone moves at his or her own pace.

SCOPE AND SEQUENCE

UNIT 1 • WEEKS 1–2

Keeping Active

How much activity children need and what moderate and vigorous mean, through Bonnie Prudden and Hans Kraus’s six-exercise test; and William Morgan’s invention of volleyball in 1895, with balloon volleyball at home.

- 1.1 Sixty Minutes a Day
- 1.2 William Morgan Invents Volleyball

UNIT 3 • WEEKS 5–6

Nutrition

Captain Cook’s sauerkraut, vitamin C and colorful fruits and vegetables; and George Washington Carver’s work with the peanut, protein from plants and a snack the student helps make.

- 3.1 Captain Cook’s Sauerkraut
- 3.2 George Washington Carver and the Peanut

UNIT 5 • WEEKS 9–10

Aerobic Training

René Laennec’s paper-tube stethoscope, the heartbeat and pulse before and after exercise; and run-walk pacing with a timed course, a retest and the family fitness day.

- 5.1 Laennec’s Paper Tube: Listening to the Heart
- 5.2 Run-Walk Pacing

UNIT 2 • WEEKS 3–4

Hydration

How sweat cools the body, through Charles Blagden’s hot-room experiment of 1775 and a wet-cloth-and-fan test; and the Roman aqueducts, clean water and a simple filter experiment.

- 2.1 Sweat: Your Body’s Air Conditioner
- 2.2 Clean Water: The Roman Aqueducts

UNIT 4 • WEEKS 7–8

Strength

Bones, muscles and joints working as levers, through Giovanni Borelli’s book on how animals move; and good form in the squat and push-up, with a two-week strength challenge.

- 4.1 Bones, Muscles and Joints: Borelli’s Levers
- 4.2 Good Form: Squats and Push-ups

WEEKLY PACING CALENDAR

WEEK	PLAN
1	• Session 1: Lesson 1.1 Sixty Minutes a Day: warm-up, video, teaching and picture study • Session 2: Lesson 1.1 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it <i>Three short sessions a week is the usual rhythm: one to learn, two to move. Keep moving every day, even on days with no lesson.</i>
2	• Session 1: Lesson 1.2 William Morgan Invents Volleyball: warm-up, video, teaching and picture study • Session 2: Lesson 1.2 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it • Session 3 (end of unit): Unit 1 review and unit challenge
3	• Session 1: Lesson 2.1 Sweat: Your Body’s Air Conditioner: warm-up, video, teaching and picture study • Session 2: Lesson 2.1 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it
4	• Session 1: Lesson 2.2 Clean Water: The Roman Aqueducts: warm-up, video, teaching and picture study • Session 2: Lesson 2.2 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it • Session 3 (end of unit): Unit 2 review and unit challenge
5	• Session 1: Lesson 3.1 Captain Cook’s Sauerkraut: warm-up, video, teaching and picture study • Session 2: Lesson 3.1 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it
6	• Session 1: Lesson 3.2 George Washington Carver and the Peanut: warm-up, video, teaching and picture study • Session 2: Lesson 3.2 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it • Session 3 (end of unit): Unit 3 review and unit challenge
7	• Session 1: Lesson 4.1 Bones, Muscles and Joints: Borelli’s Levers: warm-up, video, teaching and picture study

WEEK	PLAN
	• Session 2: Lesson 4.1 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it
8	• Session 1: Lesson 4.2 Good Form: Squats and Push-ups: warm-up, video, teaching and picture study • Session 2: Lesson 4.2 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it • Session 3 (end of unit): Unit 4 review and unit challenge
9	• Session 1: Lesson 5.1 Laennec's Paper Tube: Listening to the Heart: warm-up, video, teaching and picture study • Session 2: Lesson 5.1 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it
10	• Session 1: Lesson 5.2 Run-Walk Pacing: warm-up, video, teaching and picture study • Session 2: Lesson 5.2 activity and fitness journal • Session 3: Repeat the activity, try to improve, and log it • Session 3 (end of unit): Unit 5 review and unit challenge <i>Last week. Hold a family fitness day: the student leads the family through a warm-up, a favorite activity from each unit and a cool-down, serves a healthy snack and water, and shows the fitness journal.</i>

MATERIALS

Fitness journal (any notebook)

One for the quarter: tally charts, rep counts, water logs, pulse tables, drawings, how it felt and what to try next time.

A timer or stopwatch (a phone timer works)

For timed games, holds, work-and-rest stations, pulse counts and the run-walk.

Good athletic shoes and comfortable, modest clothes for exercise

Every activity lesson.

A towel or mat, a sturdy chair pushed against a wall, a wall and a bottom stair or sturdy step

For push-ups, squats, planks, step-ups and stretches.

Two or three balloons and a piece of string or a row of chairs

For balloon volleyball in Lesson 1.2. A beach ball or soft ball also works.

A cup or water bottle and a measuring cup

For the water log in Unit 2.

Two small cloths, a fan or a piece of cardboard, and an outdoor or kitchen thermometer if you have one

For the cooling test in Lesson 2.1. Your hands can do the test without a thermometer.

A clear plastic bottle or jar, cotton balls or a coffee filter, clean sand, small pebbles and some muddy water

For the filter experiment in Lesson 2.2. The filtered water is never for drinking.

Fruits and vegetables of many colors, cabbage, and a plant-protein food such as beans, peas, lentils or (if no one is allergic) peanut butter

For the vitamin C hunt and the snack in Unit 3.

Cardboard, a paper fastener (brad), string or rubber bands, tape and a sheet of paper

For the model arm in Lesson 4.1 and the paper stethoscope in Lesson 5.1.

Sidewalk chalk or a few cones (cups or shoes work)

To mark a run-walk loop, stations and a volleyball court.

Colored pencils and graph paper

For bar graphs of reps, water and heartbeats.

GRADING

Grades come mostly from the activities and the fitness journal, because fitness is learned by doing, writing it down and doing it again. A student who tries hard, records honestly and improves on his or her own numbers earns full credit, whatever those numbers are.

PART	%
Activities (effort, participation and good form)	40
Fitness journal (dated tallies, logs, charts and sentences)	25
Unit reviews	15
Unit challenges	20

Scale: A 90–100, B 80–89, C 70–79, D 60–69. Below 60: repeat the activity or review with help.

- Fitness marks reward effort, steady practice and improvement against the student's own earlier numbers. They never depend on body size, body measurements or comparison with other children.
- A journal page earns full marks when it has a date, the numbers with their units (reps, seconds, cups, beats), a sentence about how it felt and a sentence about what to try next time.
- Unit reviews may be done aloud; the parent writes down the answers. A student may show a movement as part of an answer.
- A child who finds sport hard, or who has a health condition that limits some activities, is graded on faithful effort within what the doctor allows. Every body can grow stronger; the goal is faithfulness, not being the best.

A NOTE TO PARENTS

You do not need to be a coach to teach this course. Read the story aloud together, watch the video, and then be the timer, the counter and the cheerleader. Join in when you can. Children copy what they see, and a parent playing balloon volleyball or doing wall push-ups in the kitchen teaches more than any speech.

Keep the talk about bodies on what they can do and how to care for them. Praise effort, good form and honest records, not numbers alone. If a brother, sister or friend is faster or stronger, steer back to the journal: “Did you beat your own number from last week?” Exercise is good for the body, and Scripture says plainly that godliness is better still (1 Timothy 4:8). We move, eat, drink and rest to the glory of God.

Two lessons need extra care in the kitchen. Lesson 3.2 is about the peanut: if anyone in your home or group has a peanut allergy, use beans, peas, lentils, chickpeas or sunflower-seed butter instead, and do not bring peanuts into the room. Lesson 2.2 makes muddy water look clean with a homemade filter; make sure your child understands that filtered water from the experiment is never for drinking.

UNIT 1

KEEPING ACTIVE

God made your body to move: to run, climb, jump, throw, carry and play. In this unit you will meet Bonnie Prudden and Dr. Hans Kraus, who in the early 1950s gave thousands of children six simple exercises and discovered that many American children were not moving enough. You will learn how much activity children need every day, what “moderate” and “vigorous” mean, how to tell the difference with the talk test, and why sitting still for too long is not good for growing bodies. Then you will find your own starting numbers and test yourself again.

Next you will travel to Holyoke, Massachusetts, in 1895, where a YMCA teacher named William Morgan invented a new game for men who found basketball too rough. He called it Mintonette; we call it volleyball. You will learn to bump and set, set up a balloon volleyball court at home, count your longest rally and try to beat it.

PREREQUISITES

- Can count by fives and read minutes on a clock or timer
- Can make a tally chart
- Has a fitness journal (any notebook) and a clear space to move

MASTERY CHECKLIST

- ☐ I can say how many minutes of activity children need each day.
- ☐ I can use the talk test to tell moderate activity from vigorous activity.
- ☐ I can tell the story of Bonnie Prudden’s six-exercise test and why children need to move.
- ☐ I can tell how William Morgan invented volleyball and show a bump and a set.
- ☐ I can warm up before activity, cool down after, and write my numbers in my journal.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **Move Your Way (U.S. Department of Health and Human Services)**: Free. The government's activity pages, with a section for kids and parents on the 60-minutes-a-day guideline. For Lesson 1.1.
- **International Volleyball Hall of Fame (Holyoke, Massachusetts)**: Free to browse. The museum in the city where William Morgan invented the game. For Lesson 1.2.
- **A beach ball or a soft volleyball-sized ball**: Optional for Lesson 1.2 and the unit challenge. Balloons work just as well indoors.

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

LESSONS IN THIS UNIT

1.1 Sixty Minutes a Day

3 sessions of 30–40 minutes

1.2 William Morgan Invents Volleyball

3 sessions of 30–40 minutes

UNIT 1 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points. You may show a movement as part of your answer.

1. **5 pts**

How many minutes of physical activity do children need each day? Name two activities you enjoy that count.

2. **5 pts**

Explain the talk test. Give one moderate activity and one vigorous activity.

3. **4 pts**

What did Bonnie Prudden and Dr. Hans Kraus find when they tested children in America and in Europe?

4. **4 pts**

What would happen if a child sat for most of every day and hardly ever played or moved?

5. 4 pts

Why did William Morgan invent volleyball, and what did he first call it?

6. 4 pts

Show or describe a good bump and a good set.

7. 4 pts

Why do we warm up before exercise and cool down after?

ANSWER KEY

1. At least 60 minutes every day, mostly moderate or vigorous. Examples: tag, bike riding, brisk walking, jumping rope, raking leaves, volleyball, swimming.
2. If you can talk but cannot sing, the activity is moderate (a brisk walk, an easy bike ride). If you can say only a few words before taking a breath, it is vigorous (running, jumping rope, fast tag).
3. More than half of the American children could not do at least one of six simple exercises, but fewer than one in ten European children failed. The European children walked, biked, climbed and played outdoors more.
4. The child's muscles, heart, lungs and bones would not grow as strong, the body would feel stiff, and the child might sleep and think less well. Getting up for movement breaks and active play helps.
5. He wanted a gentler indoor game for older or less athletic men at the Holyoke YMCA who found basketball too fast and rough. He called it Mintonette.
6. Bump: knees bent, hands together, arms straight and flat like a platform, hit with the forearms and lift with the legs. Set: hands above the forehead in a triangle window, touch with the finger pads, push up with arms and legs.
7. A warm-up gets the heart beating faster and warms the muscles so they move well and are less likely to be strained. A cool-down lets the heart and breathing slow down gently and stretches the muscles.

UNIT CHALLENGE: MY ACTIVE WEEK AND A FAMILY GAME

For seven days in a row, keep an activity log: each day write what you did, how many minutes, and whether it was moderate or vigorous (use the talk test). Take at least two movement breaks every school day. At the end of the week, make a bar graph of your active minutes for each day with a line across at 60 minutes. Then teach your family balloon volleyball (or beach-ball volleyball outside), play a game together, and record your best family rally. Finish by retesting your four-station fitness check from Lesson 1.1.

LOOK FOR	WHAT IT MEANS
Complete log	All seven days written down honestly, with activities, minutes and moderate or vigorous for each.
Bar graph	A neat graph with a title, the days labeled, minutes up the side and a 60-minute line.
Family game	The student explained the rules and showed the bump and set to the family, and recorded the best rally.
Retest and reflection	The fitness check retested and compared with Day 1, and two sentences about what helped and what to change next week. Effort and improvement count, not the size of the numbers.

1.1 SIXTY MINUTES A DAY

OBJECTIVES

- Tell how Bonnie Prudden and Dr. Hans Kraus tested thousands of children and what they found.
- Explain that children need at least 60 minutes of activity every day, and tell moderate activity from vigorous activity using the talk test.
- Explain why sitting for a long time is hard on the body and plan movement breaks.
- Measure four starting numbers in a fitness check and test them again on another day.

Warm-up. Follow the leader around the room for 3 minutes: march with high knees, walk on tiptoes, take giant steps, hop on one foot 5 times and then the other, and finish with 10 jumping jacks. Then stand still and try to sing “Happy Birthday.” Is it easy or hard to sing right now? Think about it: what does your breathing tell you about how hard you were working?

WATCH

How Does Exercise Keep Me Healthy? - Benefits of Exercise for Kids

Miacademy & MiaPrep Learning Channel • 7:07

<https://www.youtube.com/watch?v=tDaEEexY1cM>

WHEN TO WATCH

After the story, before the talk-test game. Listen for what exercise does for your heart, lungs, muscles and bones.

Note: A clear, gentle lesson from a homeschool curriculum company, made for slightly younger children; it makes a good review for third graders. The description links to the company’s paid program, which is not needed.

KEY TERMS

physical activity

Any movement that makes your body work harder than resting: playing, walking, chores, sports.

moderate activity

Activity that makes you breathe harder and warms you up, but you can still talk (not sing), like a brisk walk or an easy bike ride.

vigorous activity

Hard activity that makes you breathe fast; you can say only a few words before taking a breath, like running, jumping rope or a fast game of tag.

talk test

A quick way to tell how hard you are working: if you can talk but not sing, it is moderate; if you can only say a few words, it is vigorous.

movement break

A short burst of activity (a few minutes) after sitting for a while.

CORE IDEAS

The story. In the early 1950s, Bonnie Prudden taught exercise classes for children in New York. She was a strong mountain climber who loved being outdoors. She worked with Dr. Hans Kraus, a doctor who had come to America from Austria. Dr. Kraus and another doctor, Sonja Weber, had made a test of six very simple exercises, such as lifting your legs off the floor and holding them for ten seconds, and bending to touch the floor with your knees straight. Bonnie Prudden and Dr. Kraus gave the test to thousands of children in the United States and thousands more in Austria, Italy and Switzerland.

How they figured it out. The results surprised everyone. More than half of the American children could not do at least one of the six exercises. In the European towns, fewer than one child in ten failed. Why? Prudden and Kraus noticed that many European children walked or rode bicycles to school, climbed, played outdoors and helped with hard work at home, while many American children rode in cars and buses and spent more time sitting. In 1953 they wrote about what they had found. Two years later the report reached President Eisenhower at the White House, and in 1956 he started a council to help American children become more fit.

How your body works. Today doctors say that children ages 6 to 17 need **at least 60 minutes of activity every day**. Most of it should be **moderate** (you breathe harder but can still talk, like a brisk walk) or **vigorous** (you breathe so fast you can only say a few words, like running or tag). On at least 3 days a week, some of it should be vigorous, some should make your muscles work hard (climbing, push-ups, carrying), and some should pound your bones a little (jumping, skipping, running). When you move, your heart pumps faster, your lungs take in more air, your muscles and bones grow stronger, and you sleep better and think more clearly. When you sit for a long

time, your muscles go quiet and your body gets stiff, so it helps to get up and move for a few minutes every half hour or so. Your body also needs rest: children your age need 9 to 12 hours of sleep each night.

Think it through. The psalm writer wrote, “I will praise thee; for I am fearfully and wonderfully made.” Your heart, lungs, muscles and bones were made to work together, and moving is one way to take good care of the gift of your body. The 60 minutes do not have to come all at once: a walk to the park, a game of tag, raking leaves and riding your bike all count.

Try it. This week you will play a talk-test game to sort activities into moderate and vigorous, then find your starting numbers in a four-station fitness check. These numbers belong to you alone. You will compare them only with your own numbers on a later day.

PICTURE STUDY



Emerson Wight Playground, 4:40 P.M., Lewis Wickes Hine, 1916 · Photograph · Library of Congress, Washington, D.C. (National Child Labor Committee Collection)

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

Lewis Hine traveled across America with his camera to show where children were working too hard in mills and factories. He also photographed places where children could play. This picture shows boys playing baseball after school at a city playground in Springfield, Massachusetts, at 4:40 in the afternoon.

Look closely

- Find the boy throwing the ball and the boy waiting to catch it. What are their arms and legs doing?
- Count all the children you can see on the field, even the tiny ones far away. What might the others be doing?
- Look at their clothes and shoes. Were they dressed for sports, or did they come straight from school?
- Look at the time in the title. What part of the day did these boys use to play?

Talk about it

1. Is baseball moderate or vigorous activity? Does it change when you are running the bases?
2. Why do you think a city would build a playground near people's homes?

3. When in your day could you add active play, the way these boys did after school?

Safety first. A parent should know about and supervise all activity. If you have asthma, a heart condition, diabetes, a recent injury or any health concern, check with your doctor before starting this course. Warm up first and cool down after, and stop and tell an adult right away if you feel chest pain, dizziness, faintness, trouble breathing or sharp pain (tired muscles are normal, but joint pain is not).

ACTIVITY

The Talk-Test Game and My Starting Line

Bonnie Prudden used simple exercises to see how children were doing. You will play a game to learn the difference between moderate and vigorous, and then find four starting numbers of your own. On another day you will test again and try to beat your own numbers.

You will need

- A timer and a helper to time and count
- A towel or mat on a flat, non-slip floor, and a wall
- Fitness journal and pencil
- A cup of water

Steps

1. **Warm up (4 minutes):** march in place 1 minute, 10 arm circles forward and 10 backward, 10 jumping jacks, 5 slow squats, and 30 seconds of easy jogging in place.
2. **The talk-test game (Session 2).** Do each activity for 1 minute, then try to say “I am fearfully and wonderfully made” and try to sing one line of a song: (1) walking around the room, (2) brisk marching with big arm swings, (3) jumping jacks, (4) jogging in place, (5) fast high knees. Rest 1 minute between each one. In your journal, write each activity and circle E (easy), M (moderate: can talk, cannot sing) or V (vigorous: only a few words).
3. **Station 1: Squats (30 seconds).** Feet a little wider than your hips, sit back and down as if onto a chair, chest up, then stand tall. Your helper counts only good squats. Record the number. Rest 1 minute.
4. **Station 2: Wall push-ups (30 seconds).** Hands on the wall at shoulder height, feet a big step back, body straight as a board. Bend your elbows until your nose almost touches the wall, then push back. Count good push-ups. Record the number. Rest 1 minute.
5. **Station 3: Plank hold (up to 60 seconds).** Forearms and knees (or forearms and toes) on the towel, elbows under your shoulders, body in a straight line,

eyes on the floor. Breathe. The clock stops when your hips sag or pop up high. Record the seconds and whether you used knees or toes. Rest 1 minute.

6. **Station 4: Flamingo balance (up to 60 seconds each foot).** Stand on one foot with your hands on your hips and look at one spot on the wall. The clock stops when your other foot touches the floor or your hands leave your hips. Record both feet.
7. **Cool down (3 minutes):** walk slowly around the room, then reach up tall for 10 seconds, reach gently toward your toes for 10 seconds (no bouncing), and stretch each arm across your chest. Drink some water.
8. **Session 3: Retest.** Warm up the same way. Do the four stations again in the same order, with the same rests and the same kind of plank. Write the new numbers next to the old ones and circle every number that went up.
9. **Sitting check.** On one school day, make a tally mark each time you get up for a movement break (stretch, 10 jumping jacks, a walk to get water). Try for one break every 30 minutes of sitting.

Tips

- Good form is worth more than a big number. A slow, deep squat counts; a half squat does not.
- Breathe out as you push or stand up. Never hold your breath.
- Your numbers are your own. A brother or sister's numbers do not matter to yours.

Check your work

- ☐ I can use the talk test to sort activities into easy, moderate and vigorous.
- ☐ I measured my four starting numbers and tested them again on another day.
- ☐ I can say how many minutes of activity I need each day and name ways to get them.

FITNESS JOURNAL

1. Copy your fitness-check table neatly: station, Day 1, Retest. Circle each number that improved.
2. Make two lists: "Moderate" and "Vigorous." Write at least four activities you enjoy in each.

3. Draw a clock and color in the times of day when you could get your 60 minutes: before school, after lunch, after school, after supper.
4. Write one sentence about how you felt during the hardest station and one thing you will try next time.

From history. Bonnie Prudden went on to write many books about exercise for children and families and led fitness programs on radio and television. The council President Eisenhower started in 1956 later created the President's Physical Fitness Award, a test many American schoolchildren took for decades.

COMMON MISTAKES

- Thinking only sports count. Walks, chores, bike rides and active games all count toward your 60 minutes.
- Sitting for hours without a break. Get up and move for a few minutes every half hour or so.
- Rushing reps with poor form to get a bigger number. Slow, good reps build real strength.
- Skipping the warm-up. Cold muscles are stiff and can be strained more easily.

Make it a game • Talk Test Showdown. Do thirty seconds each of marching, jogging in place and jumping jacks. After each, try to say a full sentence. If you can talk easily it is moderate; if you can only say a few words it is vigorous. Your parent scores your labels. Then tell how Bonnie Prudden's test showed that children needed more movement. Beat your total.

Scripture. "I will praise thee; for I am fearfully and wonderfully made: marvellous are thy works; and that my soul knoweth right well." (Psalm 139:14, KJV)

Your heart, lungs, muscles and bones are God's marvellous works. Moving every day is one way to thank Him and take care of what He made.

1.2 WILLIAM MORGAN INVENTS VOLLEYBALL

OBJECTIVES

- Tell how William Morgan invented volleyball at the YMCA in Holyoke, Massachusetts, in 1895, and why.
- Explain how playing games builds coordination, balance and teamwork.
- Show a forearm bump and an overhead set with good form.
- Play balloon volleyball, count rallies and try to beat your best rally.

Warm-up. Balloon keep-up warm-up: tap a balloon into the air with your fingertips and keep it from touching the floor for 30 seconds. Then try 30 seconds using only your right hand, 30 seconds with only your left hand, and 30 seconds using your forearms held together. Finish with 10 jumping jacks and 10 arm circles. Think about it: what did your eyes, hands and feet have to do together?

WATCH

Volley and Volleyball Skills for Elementary Kids

Coach May's PE • 3:14

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

WHEN TO WATCH

In Session 2, before you set up your court. Stand up and copy each skill: the underhand serve, the bump and the set.

Note: A physical education teacher in a T-shirt demonstrates the skills in a school gym, with clear cues for grades 2–5.

BACKUP VIDEO

9th February 1895: Volleyball invented by William G. Morgan

HistoryPod • 2:32

<https://www.youtube.com/watch?v=EclLnVJ1rlw>

After the story, to see old photographs of Morgan, the Holyoke YMCA and the first volleyballs.

KEY TERMS

YMCA

The Young Men's Christian Association, started in London in 1844 to help young men grow strong in spirit, mind and body.

rally

One long run of hits back and forth before the ball touches the ground.

bump

A volleyball pass made with your forearms held together like a flat platform.

volley

To hit a ball (or balloon) back and forth through the air without letting it touch the ground.

coordination

Making your eyes, hands, feet and body work together smoothly.

set

A volleyball pass pushed up with the fingertips of both hands from just above your forehead.

CORE IDEAS

The story. William G. Morgan was born in Lockport, New York, in 1870. He studied at the YMCA training school in Springfield, Massachusetts, where he met James Naismith, the teacher who had just invented basketball. In 1895 Morgan was the director of physical education at the YMCA in Holyoke, Massachusetts. Many of the men in his classes were businessmen who were older or less athletic, and they found basketball too fast and too rough, with too much bumping into each other. Morgan wanted a game they could play indoors in winter that would still keep them moving.

How they figured it out. Morgan tried mixing ideas from other games. From tennis he took the net, but he raised it to about 6 feet 6 inches, higher than a man's head, and he left out the rackets. Players hit the ball over the net with their hands, and the two teams never touched each other. First he tried the rubber bladder from inside a basketball, but it was too light and slow; a whole basketball was too big and heavy. So he asked the Spalding sporting-goods company to make a new ball, and they did. Morgan called his game Mintonette. In 1896 his team showed it to a meeting of YMCA teachers in Springfield. A teacher named Dr. Alfred Halstead watched the players volleying the ball back and forth and said it should be called "volley ball." The name stuck, and YMCA teachers carried the game around the world.

How your body works. Volleyball takes **coordination**: your eyes follow the ball, your brain guesses where it will land, and your feet move you there just in time for your hands and arms to meet it. Every time you practice, the paths between your brain and your muscles get quicker and smoother. Games like this also build balance, quick feet and teamwork, and a long rally is great moderate-to-vigorous activity. Best of all, games are fun. Proverbs says, “A merry heart doeth good like a medicine.”

Good form. Bump: feet apart, knees bent, hands together with thumbs side by side, arms straight to make a flat platform; let the ball hit your forearms, not your hands, and lift gently with your legs. **Set:** hands above your forehead with fingers spread to make a triangle window between your thumbs and first fingers; look through the window, let the ball land on your finger pads, and push up as you straighten your arms and legs. **Underhand serve:** step forward with the opposite foot, hold the ball low in front, and swing your other arm like a pendulum to hit it with the heel of your hand.

Try it. This week you will practice the bump and the set, build a balloon volleyball court in your home or yard, and play. You will count your longest rally and try to beat it on your second day.

PICTURE STUDY



Girls Playing Volley Ball at the Pine Tree Camp, Pocono Pines, Pa., Unknown photographer, About 1910 · Photograph · Library of Congress, Washington, D.C.

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

This old photograph from the Library of Congress shows a summer camp in the Pocono Mountains of Pennsylvania only about fifteen years after William Morgan invented the game. The campers have strung a net from a post to the corner of a cabin and are playing volleyball in their camp uniforms.

Look closely

- Find the girl about to serve. Which arm is she using? Where is the ball?
- Find the net. What is it tied to? How high is it compared with the girls?
- Count the players on each side. Are the teams the same size? How many players are on a team today (six)?
- Look at the players' feet and hands. Who looks ready to move to the ball?

Talk about it

1. Why was volleyball a good game for a camp with many children?
2. How is this game gentler than basketball? Why did William Morgan want that?
3. Where could you string a "net" (a rope, a row of chairs, a blanket) at your home?

Safety first. Play in a clear space away from furniture with sharp corners, lamps, windows and stairs, and wear shoes with good grip (not socks on a smooth floor). Use balloons or a soft ball indoors, and keep balloons away from small children, who can choke on broken pieces. Call “mine!” before going for the ball so you do not bump into anyone.

ACTIVITY

Balloon Volleyball Court

William Morgan made up a new game from a net, a light ball and a few rules. You will do the same at home with a balloon and a string. You will practice your skills, play a game and count your longest rally.

You will need

- Two or three blown-up balloons (or a beach ball outside)
- A piece of string or yarn about 10 feet long, tied between two chairs at about the height of an adult's shoulders (or a row of chairs or a couch back as the net)
- Tape or chalk to mark the edges of the court
- A timer and fitness journal with a rally chart: date, game or drill, best rally, notes

Steps

1. **Warm up (4 minutes):** the balloon keep-up warm-up, then 10 side shuffles each way and 10 squats.
2. **Skill station 1: Bump.** Toss the balloon to yourself and bump it straight up with your forearm platform. Count how many bumps in a row before it touches the floor. Do 3 tries and record your best. Cue: "Flat arms, bend knees, lift with legs."
3. **Skill station 2: Set.** Make your triangle window above your forehead and set the balloon straight up. Count sets in a row. Do 3 tries and record your best. Cue: "Window, fingertips, push up."
4. **Build the court.** Tie the string between two chairs. Mark a small court on each side with tape, about 8 big steps long in all, or use the edges of a rug.
5. **Play.** One or two players on each side. Serve the balloon over the string with an underhand hit. Each side may hit it up to three times before sending it back over. A point is won when the balloon touches the floor on the other side or goes out of the court. Play to 11 points, then switch sides.

6. **Rally challenge.** Now play together instead of against each other: how many times can you send the balloon back and forth over the string without it touching the floor? Do 3 tries and record your best rally.
7. **Cool down (3 minutes):** walk slowly, roll your shoulders 10 times, stretch each arm across your chest for 15 seconds and reach up tall. Drink some water.
8. **Session 3: Beat your best.** Warm up the same way, repeat both skill stations and the rally challenge with the same rules, and record your new numbers next to the old ones. Then teach one person in your family the bump and play a game with them.

Tips

- Move your feet to get under the balloon. Do not just reach with your arms.
- Watch the balloon all the way onto your arms or fingers.
- A balloon is slow, which gives you time to learn good form. Outside, try a beach ball next.

Check your work

- ☐ I can tell how and why William Morgan invented volleyball.
- ☐ I can show a bump and a set and say a form cue for each.
- ☐ I recorded my best bumps, sets and rally on two days and tried to improve.

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1. Copy your rally chart with both days. Circle your best numbers.
2. Draw a stick figure doing a bump and another doing a set. Label the arms, hands and knees with a form cue.
3. Write the rules of your balloon volleyball game so someone else could play it.
4. Was this game moderate or vigorous for you? Write how you know (use the talk test).

From history. The YMCA was started by George Williams in London in 1844. Both basketball (1891) and volleyball (1895) were invented by YMCA teachers in Massachusetts who wanted to help people grow strong in spirit, mind and body. Today the International Volleyball Hall of Fame is in Holyoke, the city where Morgan first played his game.

COMMON MISTAKES

- Swinging the arms hard on a bump. Keep the platform steady and lift with your legs.
- Slapping the ball with flat palms on a set. Use the finger pads and push up.
- Standing still and reaching. Quick feet get you under the ball.
- Playing near breakable things or stairs. Clear the space first.

Make it a game • Volleyball Story Rally. Play balloon volleyball with your parent over a rope or a line of tape, keeping the balloon off the floor. Count the longest rally. Each time the rally ends, the person who missed must tell one fact about William Morgan and the YMCA in Holyoke. Try to beat your record rally.

Scripture. “A merry heart doeth good like a medicine” (Proverbs 17:22, KJV)

Playing a happy game with family and friends is good for the body and the heart. Joy in movement is one of God’s gifts.

UNIT 1

KEEPING ACTIVE

God made your body to move: to run, climb, jump, throw, carry and play. In this unit you will meet Bonnie Prudden and Dr. Hans Kraus, who in the early 1950s gave thousands of children six simple exercises and discovered that many American children were not moving enough. You will learn how much activity children need every day, what “moderate” and “vigorous” mean, how to tell the difference with the talk test, and why sitting still for too long is not good for growing bodies. Then you will find your own starting numbers and test yourself again.

Next you will travel to Holyoke, Massachusetts, in 1895, where a YMCA teacher named William Morgan invented a new game for men who found basketball too rough. He called it Mintonette; we call it volleyball. You will learn to bump and set, set up a balloon volleyball court at home, count your longest rally and try to beat it.

PREREQUISITES

- Can count by fives and read minutes on a clock or timer
- Can make a tally chart
- Has a fitness journal (any notebook) and a clear space to move

MASTERY CHECKLIST

- ☐ I can say how many minutes of activity children need each day.
- ☐ I can use the talk test to tell moderate activity from vigorous activity.
- ☐ I can tell the story of Bonnie Prudden’s six-exercise test and why children need to move.
- ☐ I can tell how William Morgan invented volleyball and show a bump and a set.
- ☐ I can warm up before activity, cool down after, and write my numbers in my journal.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **Move Your Way (U.S. Department of Health and Human Services)**: Free. The government's activity pages, with a section for kids and parents on the 60-minutes-a-day guideline. For Lesson 1.1.
- **International Volleyball Hall of Fame (Holyoke, Massachusetts)**: Free to browse. The museum in the city where William Morgan invented the game. For Lesson 1.2.
- **A beach ball or a soft volleyball-sized ball**: Optional for Lesson 1.2 and the unit challenge. Balloons work just as well indoors.

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

LESSONS IN THIS UNIT

1.1 Sixty Minutes a Day

3 sessions of 30–40 minutes

1.2 William Morgan Invents Volleyball

3 sessions of 30–40 minutes

UNIT 1 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points. You may show a movement as part of your answer.

1. **5 pts**

How many minutes of physical activity do children need each day? Name two activities you enjoy that count.

2. **5 pts**

Explain the talk test. Give one moderate activity and one vigorous activity.

3. **4 pts**

What did Bonnie Prudden and Dr. Hans Kraus find when they tested children in America and in Europe?

4. **4 pts**

What would happen if a child sat for most of every day and hardly ever played or moved?

5. 4 pts

Why did William Morgan invent volleyball, and what did he first call it?

6. 4 pts

Show or describe a good bump and a good set.

7. 4 pts

Why do we warm up before exercise and cool down after?

ANSWER KEY

1. At least 60 minutes every day, mostly moderate or vigorous. Examples: tag, bike riding, brisk walking, jumping rope, raking leaves, volleyball, swimming.
2. If you can talk but cannot sing, the activity is moderate (a brisk walk, an easy bike ride). If you can say only a few words before taking a breath, it is vigorous (running, jumping rope, fast tag).
3. More than half of the American children could not do at least one of six simple exercises, but fewer than one in ten European children failed. The European children walked, biked, climbed and played outdoors more.
4. The child's muscles, heart, lungs and bones would not grow as strong, the body would feel stiff, and the child might sleep and think less well. Getting up for movement breaks and active play helps.
5. He wanted a gentler indoor game for older or less athletic men at the Holyoke YMCA who found basketball too fast and rough. He called it Mintonette.
6. Bump: knees bent, hands together, arms straight and flat like a platform, hit with the forearms and lift with the legs. Set: hands above the forehead in a triangle window, touch with the finger pads, push up with arms and legs.
7. A warm-up gets the heart beating faster and warms the muscles so they move well and are less likely to be strained. A cool-down lets the heart and breathing slow down gently and stretches the muscles.

UNIT CHALLENGE: MY ACTIVE WEEK AND A FAMILY GAME

For seven days in a row, keep an activity log: each day write what you did, how many minutes, and whether it was moderate or vigorous (use the talk test). Take at least two movement breaks every school day. At the end of the week, make a bar graph of your active minutes for each day with a line across at 60 minutes. Then teach your family balloon volleyball (or beach-ball volleyball outside), play a game together, and record your best family rally. Finish by retesting your four-station fitness check from Lesson 1.1.

LOOK FOR	WHAT IT MEANS
Complete log	All seven days written down honestly, with activities, minutes and moderate or vigorous for each.
Bar graph	A neat graph with a title, the days labeled, minutes up the side and a 60-minute line.
Family game	The student explained the rules and showed the bump and set to the family, and recorded the best rally.
Retest and reflection	The fitness check retested and compared with Day 1, and two sentences about what helped and what to change next week. Effort and improvement count, not the size of the numbers.

UNIT 2

HYDRATION

More than half of your body is water, and you lose some of it every day when you breathe, sweat and use the bathroom. In this unit you will meet Dr. Charles Blagden, who in 1775 walked into a room so hot that eggs cooked hard in it, and came out with his body still at its normal temperature. He helped show that sweat is your body's air conditioner. You will test how a wet cloth and moving air cool your skin, watch your own body sweat during exercise, and keep a record of the water you drink.

Then you will visit ancient Rome, where engineers built aqueducts that carried clean spring water for many miles into the city. You will learn why clean water matters for health, build a simple filter to see how dirt can be removed from water (but never drink it), and run an aqueduct relay.

PREREQUISITES

- Knows the talk test and the warm-up and cool-down from Unit 1
- Can measure with a measuring cup and count by halves ($\frac{1}{2}$ cup, 1 cup, $1\frac{1}{2}$ cups)
- Can read a thermometer, or can compare warm and cool by touch

MASTERY CHECKLIST

- ☐ I can explain how sweat cools my body when it dries from my skin.
- ☐ I can tell the story of Charles Blagden's hot room.
- ☐ I can name signs that I need water: thirst, dark yellow urine, headache and feeling tired.
- ☐ I can tell how the Romans brought clean water to their cities and why clean water keeps us healthy.
- ☐ I can keep a water log and drink water before, during and after play.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Why Drinking Water Is the Way to Go” (Nemours KidsHealth):** Free. A short kids’ article on what water does in the body and how to get enough. Read it with Lesson 2.1.
- **“What Is Sweat?” (Nemours KidsHealth):** Free. Explains sweat glands and why we sweat. For Lesson 2.1.
- **A reusable water bottle with ounce marks:** Optional. Makes the water log easy, but any cup and a measuring cup work.

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

LESSONS IN THIS UNIT

2.1 Sweat: Your Body’s Air Conditioner

3 sessions of 30–40 minutes

2.2 Clean Water: The Roman Aqueducts

3 sessions of 30–40 minutes

UNIT 2 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points.

1. **4 pts**

What did Charles Blagden discover in his hot room in 1775?

2. **5 pts**

Explain how sweat cools your body.

3. **4 pts**

Name three signs that your body needs more water.

4. **4 pts**

What would happen if you played hard outside on a very hot afternoon and did not drink any water?

5. **5 pts**

How did the Romans bring clean water into their cities without pumps?

6. 4 pts

Why should you never drink from a pond or stream, even if the water looks clear?

7. 4 pts

When should you drink water during a day of active play?

ANSWER KEY

1. In a room hot enough to cook eggs and steak, his body stayed near its normal temperature because he sweated. He showed that sweat helps the body get rid of heat and stay cool.
2. Sweat glands put salty water on your skin. When the sweat evaporates (dries into the air), it carries heat away from your skin, so you cool down. Moving air helps it dry faster.
3. Any three: feeling thirsty, dark yellow urine, a headache, feeling tired or grumpy, feeling dizzy.
4. You would keep sweating and lose water and salt, so you could become dehydrated: thirsty, tired, with a headache, and maybe dizzy or sick from the heat. You should rest in the shade, sip water and tell an adult.
5. They chose clean springs in the hills and built aqueducts that sloped gently downhill, so gravity made the water flow. They built bridges of arches across valleys and tunnels through hills, and let mud settle in tanks before the water reached fountains.
6. It can carry germs that are too small to see and can make you sick. Tap water has been filtered, treated to destroy germs and tested.
7. Before you start, sips during play (especially in breaks), and again after you finish, with steady drinks through the rest of the day.

UNIT CHALLENGE: MY THREE-DAY WATER LOG

Keep a water log for three days in a row, including at least one active day. Each time you drink, record how much (in half cups or ounces), what you drank and when (before, during or after play, or at a meal). Note your urine color once each day. At the end, make a bar graph of your cups each day and write three sentences: On which day did you drink the most? Did you drink before, during and after play? What one change will help you drink enough water? Add your cooling-test and aqueduct-relay results to the same pages.

LOOK FOR	WHAT IT MEANS
Complete log	Three days recorded honestly, with amounts, drinks and times.
Graph	A neat bar graph with a title, days labeled and cups up the side.
Good habits	The log shows water before, during and after play on the active day.
Reflection	Three thoughtful sentences and one specific change. Effort and honest records count, not the amount alone.

2.1 SWEAT: YOUR BODY'S AIR CONDITIONER

OBJECTIVES

- Tell how Charles Blagden's hot-room experiment of 1775 showed that the body can keep itself cool.
- Explain how sweat cools the skin when it evaporates, and why we need to drink water to replace it.
- Test how a wet cloth and moving air cool the skin, and record what happens.
- Name the signs of needing water and of getting too hot.

Warm-up. Lick the back of one hand and blow on it; then blow on the dry back of your other hand. Which feels cooler? Now do 1 minute of jumping jacks, 1 minute of jogging in place and 1 minute of fast marching with big arm swings. Touch your forehead and the back of your neck. Are they warmer? Are they damp? Think about it: why does your body get damp when you work hard?

WATCH

What if You Never Sweat? | Importance of Sweating | Anhidrosis Syndrome | The Dr. Binocs Show

Peekaboo Kidz · 6:21

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

WHEN TO WATCH

After the “How your body works” paragraph. Watch for the part of the brain that acts like a thermostat and for how sweat cools you as it dries.

Note: A cartoon that imagines life without sweat and explains a rare condition in which a person cannot sweat. The video's written description also says sweat helps remove toxins; in fact the kidneys and liver do that job, and sweat is mainly for cooling.

KEY TERMS

sweat

Salty water that comes out of tiny glands in your skin when your body gets warm.

sweat gland

A tiny coiled tube in your skin that makes sweat. You have millions of them.

evaporate

To change from a liquid into a gas (water vapor) and float away into the air. Evaporating water takes heat with it.

body temperature

How warm the inside of your body is, normally about 98.6 °F (37 °C).

dehydration

Not having enough water in your body. Signs include thirst, dark yellow urine, headache and feeling tired.

CORE IDEAS

The story. In 1775, a young English doctor named Charles Blagden wanted to find out how much heat a person could stand. With a few friends from the Royal Society, a famous club of scientists in London, he heated a small room with a red-hot iron stove until it was far hotter than the hottest summer day, well over 200 °F, hotter than boiling water. Blagden walked in wearing his clothes and stayed for several minutes at a time. To prove how hot the room was, the scientists put eggs inside, and the eggs cooked hard. A piece of steak cooked too. Yet when Blagden checked his own temperature with a thermometer, his body was still close to its normal 98 degrees.

How they figured it out. How could a man stay cool in a room that cooked an egg? Blagden noticed that as soon as he entered the hot room, he began to sweat. The egg had no way to cool itself, but his body did. He reported to the Royal Society that sweating helps the body get rid of heat, and he is remembered as one of the first scientists to explain that sweat keeps the body's temperature steady. (His experiment was dangerous, and no one should ever try anything like it. Today we know heat can make people very sick.)

How your body works. Your body works best at about 98.6 °F. When you run, play or sit in the hot sun, your muscles make heat. A part of your brain acts like a thermostat: when you get too warm, it tells millions of tiny **sweat glands** in your skin to squeeze out sweat. When the sweat **evaporates** (dries and floats away into the air), it carries heat away from your skin, and you cool down. A breeze helps sweat dry faster; very damp, sticky air slows it down, which is why humid days feel so hot. Sweat is mostly water with a little salt, so the more you sweat, the more water you

need to drink. Children your age need roughly 5 to 7 cups of water a day from drinks, plus water in foods like fruit and soup, and more on hot days or when playing hard.

Think it through. Watch for the signs that your body needs water: feeling thirsty, dark yellow urine, a headache, or feeling tired and grumpy. Pale yellow urine is a good sign. Drink water before you play, take sips during play, and drink again after. If you ever feel dizzy, sick to your stomach or very hot during play, stop, get into the shade, sip water and tell an adult right away.

Try it. This week you will test how a wet cloth and moving air cool your skin, watch where you sweat during exercise, and keep a two-day water log.

PICTURE STUDY



The Song of the Lark, Jules Breton, 1884 · Oil on canvas · The Art Institute of Chicago

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

Jules Breton grew up in a farming village in northern France and painted the people who worked in the fields. Here a young woman is on her way to cut grain at sunrise. She has stopped to listen to a lark singing high above her. Farm workers often started at dawn so they could do their hardest work before the hottest part of the day.

Look closely

- Find the sun. Is it morning or evening? How can you tell it will be a long, hot day?
- Look at her tool. What work will she do with it? Will that work make her sweat?
- Look at her clothes and scarf. How might they help her in the sun and heat?
- Search the field. Do you see any shade, or a jug of water? Where might she find a drink?

Talk about it

1. Why would farm workers start at sunrise instead of the middle of the afternoon?
2. What should she bring with her to the field to stay safe in the heat?

3. When is the best time of day for you to play hard outside in summer?

Safety first. Drink water steadily through the day, but never have drinking contests or try to drink a huge amount at once. On hot days, play hard early or late, rest in the shade and keep water close by. If you feel dizzy, sick to your stomach, very tired or have a bad headache while active in the heat, stop, go to the shade, sip water and tell an adult right away.

ACTIVITY

The Cooling Test and My Sweat-and-Sip Log

Charles Blagden discovered that sweat keeps the body cool. You will test the same idea with a wet cloth and a fan, then watch your own body sweat during exercise, and keep a record of the water you drink.

You will need

- Two small cloths (or two paper towels) and a cup of room-temperature water
- A fan, or a piece of cardboard to wave
- A thermometer if you have one (an outdoor or kitchen thermometer); your skin works too
- A timer, a cup, a measuring cup and your fitness journal

Steps

1. **The cooling test (Session 2).** Wet one cloth and squeeze it out so it is damp, not dripping. Leave the other cloth dry. Lay the wet cloth over your left wrist and the dry cloth over your right wrist.
2. Wave the cardboard (or turn on the fan) over both wrists for 2 minutes. Which wrist feels cooler? If you have a thermometer, wrap each cloth around the bulb in turn and wave for 2 minutes; record both temperatures.
3. Write your result: “The wet cloth in moving air felt (or measured) cooler because ...” Use the word *evaporate*.
4. **The sweat check.** Warm up for 3 minutes. Then do 4 rounds of 1 minute of exercise and 30 seconds of rest: round 1 jumping jacks, round 2 jogging in place, round 3 high knees, round 4 skater hops (hop side to side, landing softly). In each rest, touch your forehead, neck, palms and back of your knees and tally where you feel damp.
5. **Cool down** by walking slowly for 2 minutes in front of the fan or in a breezy spot. Notice how the moving air feels on your damp skin. Drink a cup of water.

6. **The sweat-and-sip log.** For two whole days, make a tally mark for each half cup (4 ounces) of water you drink. Mark when you drank it: morning, lunch, afternoon, play time, supper. Also note the color of your urine once each day: pale yellow or dark yellow.
7. **Session 3: Test again.** Repeat the cooling test, this time with both cloths wet, but fan only one of them. Which cools more? Then do the sweat check again with the same rounds. Did you sweat sooner or later than last time? Did you drink before you started?
8. Add up your cups for each day of your log. Did you drink before, during and after play?

Tips

- Your sweat dries fastest when air is moving and the air is not too damp.
- Fill your water bottle in the morning and keep it where you can see it.
- Fruit like watermelon, oranges and grapes has lots of water in it too.

Check your work

- ☐ I can explain how sweat cools my body as it evaporates.
- ☐ I did the cooling test twice and wrote down what happened.
- ☐ I kept a two-day water log and can name three signs that I need water.

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1. Draw a person after a hard game. Draw arrows showing heat leaving the body as sweat dries from the skin. Label the sweat glands.
2. Copy your cooling-test results into a small table: wet or dry, fan or no fan, cooler or warmer.
3. Make a bar graph of your water log: one bar for each day, in cups.
4. Write two sentences: Where did you sweat first? What will you do to drink enough water on a hot day?

From history. Charles Blagden later became the secretary of the Royal Society in London. Other members repeated the hot-room experiment in heavy and light clothing, and found that people kept their normal temperature as long as their sweat could do its work.

COMMON MISTAKES

- Waiting until you are very thirsty to drink. Sip water before, during and after play.
- Thinking sweat is dirty or bad. Sweat is your body's cooling system working well.
- Playing hard in the hottest part of a summer afternoon with no shade or water.
- Drinking a huge amount all at once. Steady sips through the day are best.

Make it a game · Sweat Experts Duel. Wet your arm with a damp cloth and wave it in the air. Say why it feels cool: sweat evaporates and takes heat away. Then tell Blagden's hot-room story in sixty seconds. Your parent slips in one false fact about dehydration or sweat glands; catch it. Switch roles and see who catches the sneaky mistake.

2.2 CLEAN WATER: THE ROMAN AQUEDUCTS

OBJECTIVES

- Tell how the Romans built aqueducts to carry clean water into their cities.
- Explain why we drink clean water and how water is cleaned today.
- Build a simple filter to see how dirt is removed from water, and explain why filtered experiment water is still not safe to drink.
- Run an aqueduct relay and keep moving safely while carrying water.

Warm-up. Water-carrier warm-up: walk around the room for 1 minute carrying an empty cup on your head with one hand steadying it, like a Roman girl carrying a water jar. Then do 10 slow squats holding the cup in front of you with both hands, 10 arm circles each way and 30 seconds of jogging in place. Think about it: if you had to carry all your family's water from a river every day, how strong would you need to be?

WATCH

Roman Aqueducts | Ancient Engineering Made Easy

Bedtime History · 4:44

<https://www.youtube.com/watch?v=tj-4WeOXKco>

WHEN TO WATCH

After the story. Look for how the water flowed downhill all the way to the city and for the arches of the Pont du Gard.

Note: A calm narration over photographs and old paintings, from a children's history podcast. It shows real aqueducts in France, Spain and Italy.

BACKUP VIDEO

Turn Dirty Water into Clean Water! | Chirp Science Corner

Owlkids · 1:48

https://www.youtube.com/watch?v=vh_63fV1lgl

In Session 2, just before you build your own filter.

KEY TERMS

aqueduct

A channel built to carry water a long way, using a gentle downhill slope. Some cross valleys on tall bridges of arches.

gravity

The pull that makes water flow downhill and things fall to the ground.

germs

Living things too small to see that can make people sick. Clean, treated water has had them removed or destroyed.

spring

A place where clean water flows naturally out of the ground.

filter

Something with tiny spaces that lets water through but catches dirt and bits.

CORE IDEAS

The story. More than two thousand years ago, the city of Rome was growing fast, and its river, the Tiber, was muddy and dirty. In 312 BC, a leader named Appius Claudius built the first aqueduct, the Aqua Appia, to bring fresh water from springs in the hills. Over the next few hundred years the Romans built eleven aqueducts for the city of Rome alone, and many more across their empire. One of the most famous still stands in southern France: the Pont du Gard, a bridge of three rows of stone arches about 160 feet high, built in the first century AD to carry water across a river valley to the city of Nîmes.

How they figured it out. Roman engineers had no pumps, so they let **gravity** do the work. They chose clean springs high in the hills and built a covered channel that sloped very gently downhill all the way to the city, sometimes for dozens of miles. The water channel to Nîmes drops only about 40 feet over 30 miles, a slope so gentle you could not see it with your eyes. Where the land dipped, they built bridges of arches; where a hill was in the way, they dug tunnels. Near the city, the water passed through tanks where mud could sink to the bottom. Then it flowed to public fountains, where people filled their jars. Around AD 97 a Roman official named

Frontinus was put in charge of the city's water, and he wrote a whole book about caring for the aqueducts and keeping the water clean.

How your body works. Your body uses water every minute: to make sweat, to carry food and oxygen in your blood, to cushion your joints, and to help your kidneys wash wastes out of your body in urine. But water must be **clean**. Muddy or dirty water can carry **germs** that cause sickness in the stomach and bowels. Today, the water from your tap has been cleaned at a treatment plant: it is filtered through sand and gravel and treated with a tiny amount of chlorine to destroy germs, and then it is tested to make sure it is safe. That is why we never drink from puddles, ponds or streams, even if the water looks clear.

Think it through. In the wilderness, when the Israelites had no water, God told Moses to hit the rock at Horeb, “and there shall come water out of it, that the people may drink.” Clean water is a gift from God, and the Roman engineers, and the workers at your town's water plant, help bring that gift to people. Give thanks for it every time you fill your cup.

Try it. This week you will build a simple filter to see how sand and gravel catch dirt (but you will not drink the water), run an aqueduct relay carrying water across the yard, and keep your water log going.

PICTURE STUDY



The Pont du Gard, Hubert Robert, 1786 · Oil on canvas · Musée du Louvre, Paris

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

Hubert Robert was a French painter who loved to paint ancient Roman ruins. Almost 1,700 years after the Pont du Gard was built, he painted it at sunset, with local women filling their water jars at the river below.

Look closely

- Count the rows of arches. Which row is the smallest? (The water channel ran along the very top.)
- Find the women at the river. What are they carrying? How do they hold the heavy jars?
- Find the boat and the travelers on the far bank. How small do they look next to the bridge?
- Look at the stones. How do you think the Romans lifted stones that big?

Talk about it

1. Why did the Romans carry water on top of a bridge instead of letting it run down into the river valley?
2. Is river water safe to drink without cleaning? Why or why not?
3. Carrying water is hard work. Which muscles would you use to carry a full jar like these women?

Safety first. The filtered water in this experiment is never for drinking, even if it looks clear; pour it on a plant or down the drain and wash your hands. Have an adult cut any plastic bottle. For the relay, run on grass or a flat, dry surface, walk (do not run) on wet or slippery ground, and use plastic cups only.

ACTIVITY

Build a Filter and Run the Aqueduct Relay

Roman engineers let mud settle out of their water, and modern water plants filter water through sand and gravel. You will build a small filter to see how it works. Then you will become an aqueduct yourself and carry water across the yard as carefully and quickly as you can.

You will need

- A clear plastic bottle with the bottom cut off by an adult (or a funnel over a clear jar)
- Cotton balls or a coffee filter, clean sand, small pebbles or gravel
- A jar of muddy water (a spoonful of garden soil stirred into water) and a clear glass to catch the filtered water
- For the relay: two buckets or large bowls, a plastic cup for each player, a measuring cup, a timer and chalk or cones
- Fitness journal

Steps

1. **Build the filter (Session 2).** Turn the bottle upside down over the clear glass (cap off). Push cotton balls or a coffee filter into the neck. Add a layer of clean sand about 2 inches deep, then a layer of pebbles about 2 inches deep on top.
2. Stir the muddy water and pour half of it slowly into the filter. Leave the other half in its jar to compare. Watch the water drip through. Draw the before-and-after jars in your journal and write which looks cleaner.
3. Remember: the filter catches dirt you can see, but not the germs you cannot see. That is why real water plants also treat water to destroy germs and test it. Pour the filtered water on a plant and wash your hands.
4. **Warm up for the relay (4 minutes):** jog in place, 10 side shuffles each way, 10 squats and 10 arm circles.
5. **The aqueduct relay.** Outside, set a full bucket of water at the start line and an empty bucket 20 big steps away. Fill your cup, walk or jog to the empty

bucket without spilling, pour it in, and run back. Keep going for 3 minutes. Rest 1 minute and drink a cup of clean water from the tap.

6. Measure how much water you moved with the measuring cup. Record the amount in cups. Then do a second 3-minute round and measure again.
7. **Cool down (3 minutes):** walk slowly, shake out your arms, stretch your shoulders and calves.
8. **Session 3: Beat your aqueduct.** Run the relay again with the same distance and time. Try a smoother, steadier pace to spill less. Did you move more water? Write your new number next to your old one, and keep adding to your water log.

Tips

- Hold the cup with two hands at chest height and keep your eyes on the cup and the path.
- Like a Roman aqueduct, a smooth, steady flow beats a fast, sloppy one.
- Pour the filtered water slowly so the sand layer is not stirred up.

Check your work

- ☐ I can tell how the Romans used gravity and aqueducts to bring clean spring water to the city.
- ☐ I built a filter and can explain why filtered water from an experiment is still not safe to drink.
- ☐ I ran the aqueduct relay twice, measured the water I moved, and tried to improve.

FITNESS JOURNAL

1. Draw an aqueduct from a spring in the hills to a city fountain. Show the gentle slope with an arrow and label the arches, the tunnel and the settling tank.
2. Draw your filter and label each layer. Write what each layer catches.
3. Record both relay rounds and your Session 3 rounds in a table: round, cups of water moved, how it felt.
4. Write a thank-you prayer or sentence for clean water, and name the people who help bring it to your home.

From history. Some Roman aqueducts still carry water today. The Aqua Virgo, finished in 19 BC, still feeds fountains in Rome, including the famous Trevi Fountain. The Pont du Gard stood strong for so long that people used its lower level as a road bridge for centuries.

COMMON MISTAKES

- Thinking clear water must be clean. Germs are too small to see.
- Drinking from streams, ponds or puddles when hiking or playing.
- Running on wet, slippery ground during water games.
- Forgetting to drink during outdoor play because you are having fun.

Make it a game • Aqueduct Relay. Line up cups from a high spot to a low one, like a Roman aqueduct using gravity. Pass a spoon of water from cup to cup along the line without spilling. Count your spills. Then say why a filter and clean water matter. Race again and beat your spill count.

Scripture. “thou shalt smite the rock, and there shall come water out of it, that the people may drink.” (Exodus 17:6, KJV)

God gave His thirsty people water in the desert. Clean water is still His gift, and we can thank Him for it each time we drink.

UNIT 2

HYDRATION

More than half of your body is water, and you lose some of it every day when you breathe, sweat and use the bathroom. In this unit you will meet Dr. Charles Blagden, who in 1775 walked into a room so hot that eggs cooked hard in it, and came out with his body still at its normal temperature. He helped show that sweat is your body's air conditioner. You will test how a wet cloth and moving air cool your skin, watch your own body sweat during exercise, and keep a record of the water you drink.

Then you will visit ancient Rome, where engineers built aqueducts that carried clean spring water for many miles into the city. You will learn why clean water matters for health, build a simple filter to see how dirt can be removed from water (but never drink it), and run an aqueduct relay.

PREREQUISITES

- Knows the talk test and the warm-up and cool-down from Unit 1
- Can measure with a measuring cup and count by halves ($\frac{1}{2}$ cup, 1 cup, $1\frac{1}{2}$ cups)
- Can read a thermometer, or can compare warm and cool by touch

MASTERY CHECKLIST

- ☐ I can explain how sweat cools my body when it dries from my skin.
- ☐ I can tell the story of Charles Blagden's hot room.
- ☐ I can name signs that I need water: thirst, dark yellow urine, headache and feeling tired.
- ☐ I can tell how the Romans brought clean water to their cities and why clean water keeps us healthy.
- ☐ I can keep a water log and drink water before, during and after play.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Why Drinking Water Is the Way to Go” (Nemours KidsHealth):** Free. A short kids’ article on what water does in the body and how to get enough. Read it with Lesson 2.1.
- **“What Is Sweat?” (Nemours KidsHealth):** Free. Explains sweat glands and why we sweat. For Lesson 2.1.
- **A reusable water bottle with ounce marks:** Optional. Makes the water log easy, but any cup and a measuring cup work.

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

LESSONS IN THIS UNIT

2.1 Sweat: Your Body’s Air Conditioner

3 sessions of 30–40 minutes

2.2 Clean Water: The Roman Aqueducts

3 sessions of 30–40 minutes

UNIT 2 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points.

1. **4 pts**

What did Charles Blagden discover in his hot room in 1775?

2. **5 pts**

Explain how sweat cools your body.

3. **4 pts**

Name three signs that your body needs more water.

4. **4 pts**

What would happen if you played hard outside on a very hot afternoon and did not drink any water?

5. **5 pts**

How did the Romans bring clean water into their cities without pumps?

6. 4 pts

Why should you never drink from a pond or stream, even if the water looks clear?

7. 4 pts

When should you drink water during a day of active play?

ANSWER KEY

1. In a room hot enough to cook eggs and steak, his body stayed near its normal temperature because he sweated. He showed that sweat helps the body get rid of heat and stay cool.
2. Sweat glands put salty water on your skin. When the sweat evaporates (dries into the air), it carries heat away from your skin, so you cool down. Moving air helps it dry faster.
3. Any three: feeling thirsty, dark yellow urine, a headache, feeling tired or grumpy, feeling dizzy.
4. You would keep sweating and lose water and salt, so you could become dehydrated: thirsty, tired, with a headache, and maybe dizzy or sick from the heat. You should rest in the shade, sip water and tell an adult.
5. They chose clean springs in the hills and built aqueducts that sloped gently downhill, so gravity made the water flow. They built bridges of arches across valleys and tunnels through hills, and let mud settle in tanks before the water reached fountains.
6. It can carry germs that are too small to see and can make you sick. Tap water has been filtered, treated to destroy germs and tested.
7. Before you start, sips during play (especially in breaks), and again after you finish, with steady drinks through the rest of the day.

UNIT CHALLENGE: MY THREE-DAY WATER LOG

Keep a water log for three days in a row, including at least one active day. Each time you drink, record how much (in half cups or ounces), what you drank and when (before, during or after play, or at a meal). Note your urine color once each day. At the end, make a bar graph of your cups each day and write three sentences: On which day did you drink the most? Did you drink before, during and after play? What one change will help you drink enough water? Add your cooling-test and aqueduct-relay results to the same pages.

LOOK FOR	WHAT IT MEANS
Complete log	Three days recorded honestly, with amounts, drinks and times.
Graph	A neat bar graph with a title, days labeled and cups up the side.
Good habits	The log shows water before, during and after play on the active day.
Reflection	Three thoughtful sentences and one specific change. Effort and honest records count, not the amount alone.

UNIT 3

NUTRITION

Food is God's gift and your body's fuel. It gives you energy to run and play and the building blocks to grow. In this unit you will sail with Captain James Cook, who kept his sailors healthy on voyages around the world in the 1770s by feeding them sauerkraut and every fresh fruit and vegetable he could find. You will learn what vitamin C does in your body, go on a vitamin C hunt in your kitchen and help make a crunchy cabbage salad.

Then you will meet George Washington Carver, the scientist at Tuskegee Institute in Alabama who helped farmers grow peanuts and sweet potatoes and found hundreds of ways to use them. You will learn how protein builds and repairs your body, discover that beans, peas, lentils and peanuts are plant proteins, plant a seed and help make a protein snack.

PREREQUISITES

- Knows that water is the best everyday drink (Unit 2)
- Can wash hands well and follow a simple recipe with a grown-up
- Knows the food allergies in the family (a parent checks before any tasting)

MASTERY CHECKLIST

- ☐ I can tell how Captain Cook kept his sailors healthy with sauerkraut and fresh food.
- ☐ I can explain what vitamin C does and name five foods that have it.
- ☐ I can tell the story of George Washington Carver and the peanut.
- ☐ I can explain what protein does and name plant and animal protein foods.
- ☐ I can help make a simple snack safely and give thanks for my food.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Vitamins” (Nemours KidsHealth):** Free. A kids’ article on what each vitamin does and which foods have it. For Lesson 3.1.
- **George Washington Carver National Monument (National Park Service):** Free. The park at Carver’s boyhood home in Diamond, Missouri, with his story and pages for young visitors. For Lesson 3.2.
- ***A Weed Is a Flower: The Life of George Washington Carver*, by Alik:** A gentle picture-book biography, easy for a third grader to read aloud. Look for it at your library. For Lesson 3.2.

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

LESSONS IN THIS UNIT

3.1 Captain Cook’s Sauerkraut

3 sessions of 30–40 minutes

3.2 George Washington Carver and the Peanut

3 sessions of 30–40 minutes

UNIT 3 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points.

1. **4 pts**

What sickness did sailors on long voyages get, and how did Captain Cook help prevent it?

2. **4 pts**

What does vitamin C do in your body? Name four foods that have it.

3. **4 pts**

What would happen if someone ate no fruits or vegetables at all for many weeks?

4. **5 pts**

How did George Washington Carver help Southern farmers?

5. **4 pts**

What does protein do? Name two plant proteins and two animal proteins.

6. **4 pts**

Is a peanut a nut? Explain.

7. **5 pts**

Name three kitchen safety rules you followed in this unit.

ANSWER KEY

1. Scurvy, which made them tired and weak with sore, bleeding gums. Cook fed his crew sauerkraut and gathered fresh fruit, vegetables and green plants at every landing; he served the sauerkraut at the officers' table so the sailors would want it too.
2. It helps keep gums, skin and blood vessels strong, helps cuts heal and helps the body take in iron. Foods: oranges, strawberries, kiwis, bell peppers, broccoli, tomatoes, cabbage, potatoes (any four).
3. They would not get enough vitamin C (and other vitamins), so they could get scurvy: feeling tired and weak, with sore gums and cuts that heal slowly.
4. He taught them crop rotation: planting peanuts, sweet potatoes or cowpeas in some years instead of only cotton, which made the soil rich again. He also found hundreds of uses and recipes for peanuts and sweet potatoes so farmers could use and sell their crops.
5. Protein builds and repairs muscles, skin, hair and blood. Plant: beans, peas, lentils, peanuts, nuts, seeds (any two). Animal: eggs, milk, cheese, yogurt, meat, chicken, fish (any two).
6. No. A peanut is a legume, like beans and peas. Its pods grow underground.
7. Any three: check for food allergies (especially peanuts) before tasting; wash hands and food; a parent handles sharp knives, the stove and the blender; keep fingers back when grating; clean up spills.

UNIT CHALLENGE: A SAILOR-AND-FARMER LUNCH

Plan and help make a lunch for your family that includes at least one vitamin C fruit or vegetable, one plant protein (beans, peas, lentils, or peanuts if no one is allergic) and water to drink. Write the menu, list the ingredients, and with a parent's help, prepare it safely. Before eating, tell your family the stories of Captain Cook and George Washington Carver. After lunch, ask each person to rate the meal, and write two sentences about what went well and what you would change. Add your five-day vitamin C tally, your protein tally and your seed diary to the same pages.

LOOK FOR	WHAT IT MEANS
Plan	A written menu with a vitamin C food, a plant protein and water, and a list of ingredients.
Safe preparation	Hands and food washed, allergies checked, and a parent handled sharp knives and the stove.
Records	The vitamin C tally, protein tally and seed diary are complete and dated.
Telling and reflecting	The student told both stories to the family and wrote what went well and what to change. Effort and care count most.

3.1 CAPTAIN COOK’S SAUERKRAUT

OBJECTIVES

- Tell how Captain James Cook kept his sailors healthy on long voyages with sauerkraut and fresh food.
- Explain what vitamin C does in the body and why we need it every day.
- Find and sort vitamin C foods, and help make a simple cabbage salad safely.
- Keep a tally of vitamin C foods for several days and try to add a new one.

Warm-up. Ship’s crew warm-up: “Swab the deck” (8 squats sweeping your arms side to side), “Hoist the sail” (8 times reach high and pull your hands down to your chest, as if pulling a rope), “Climb to the crow’s nest” (march in place for 30 seconds lifting knees high and reaching up hand over hand), and “Look out!” (stand on one foot for 10 seconds with a hand shading your eyes, then switch). Repeat once. Think about it: what food would you pack for a voyage of three years?

WATCH

Captain Cook's Cures for Scurvy!

Captain Cook Memorial Museum • 2:10

<https://www.youtube.com/watch?v=mHOR9GTF2I8>

WHEN TO WATCH

After the story. Watch for the plants Cook’s crew gathered on shore and the old botanical prints the museum keeps.

Note: A short talk by the museum in Whitby, England, in the house where young James Cook lodged as an apprentice seaman. It is a small channel, but the museum is a careful source.

KEY TERMS

voyage

A long journey by sea.

scurvy

A sickness caused by not getting enough vitamin C for many weeks. It made sailors tired and weak, with sore, bleeding gums.

sauerkraut

Finely cut cabbage that has been salted and left to turn sour (ferment), so it keeps for a long time.

vitamin

A tiny helper in food that your body needs to work and grow. You need only a little, but you need it often.

vitamin C

A vitamin found in many fruits and vegetables that helps keep your gums, skin and blood vessels healthy and helps cuts heal.

CORE IDEAS

The story. James Cook grew up on a farm in Yorkshire, England, and became one of the greatest sea captains who ever lived. In 1768 he sailed from England in a small ship called HMS *Endeavour* on a voyage around the world that lasted nearly three years. In those days, sailors on long voyages often fell sick with **scurvy**. They grew tired and weak, their gums became sore and bled, and their cuts would not heal. Many ships lost more men to scurvy than to storms. Cook was determined to keep his crew healthy.

How they figured it out. Nobody in Cook's time knew about vitamins. But some doctors and captains had noticed that fresh food seemed to prevent scurvy, and a Scottish navy doctor named James Lind had shown in 1747 that oranges and lemons helped sick sailors. Cook packed barrels and barrels of **sauerkraut**, sour pickled cabbage that would keep for months at sea. At every island and coast where the ship stopped, his men gathered fresh fruit, vegetables and green plants. At first the sailors refused to eat the sour cabbage. So Cook wrote in his journal that he had it served every day at the officers' table, and let the crew take some if they wished. When the sailors saw their officers eating it, they soon wanted it too! On his second voyage, from 1772 to 1775, Cook again kept his ship clean, his men dry and his food fresh, and very few of his sailors became sick with scurvy. In 1776 the Royal Society gave him its highest honor, the Copley Medal, for his report on keeping his crew healthy.

How your body works. Today we know that scurvy happens when a person goes many weeks without enough **vitamin C**. Your body uses vitamin C to build strong gums, skin and blood vessels, almost like a glue that holds you together. It helps cuts

and scrapes heal, and it helps your body take iron from food. Your body cannot make vitamin C or store much of it, so you need some every day. It is easy to get: one orange gives a child your age more than a whole day's worth. Strawberries, kiwis, bell peppers, broccoli, tomatoes, cabbage and potatoes have vitamin C too. Fresh, colorful fruits and vegetables are everyday foods, and they help you play and grow.

Try it. This week you will go on a vitamin C hunt in your kitchen, help make a crunchy cabbage salad, and keep a tally of the vitamin C foods you eat for five days. Give thanks before you eat: every good food is a gift.

PICTURE STUDY



Still Life with Oranges and Walnuts, Luis Egidio Meléndez, 1772 · Oil on canvas · The National Gallery, London

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

Luis Meléndez was a Spanish painter who loved to paint ordinary food so carefully that it looks real enough to pick up. He painted this picture in 1772, the same year Captain Cook set out on his second great voyage. Look how the light shines on the oranges.

Look closely

- Count the oranges. Which one is hiding off by itself? Which foods in this picture have vitamin C?
- Find the melon, the walnuts, the barrel and the jars. What do you think is stored in the jars and boxes?
- Look at the long golden boxes. They held sweets. Is that an everyday food or a sometimes food?
- Look at the leaves on the oranges. Why might fresh leaves tell you the fruit was picked recently?

Talk about it

1. Which of these foods would keep well on a long sea voyage, and which would spoil quickly?

2. If Captain Cook's sailors could choose one food from this table, which would help them most?
3. What fruits and vegetables with vitamin C are in your kitchen today?

Safety first. Check with a parent about food allergies before any tasting. Wash your hands, the cabbage and the fruit before you start. A parent does any cutting with a sharp knife; you may shred cabbage with a box grater held flat on a board (keep fingers well back and stop when the piece gets small) or cut soft leaves with kitchen scissors.

ACTIVITY

Vitamin C Hunt and Captain Cook's Crunchy Slaw

Captain Cook's sailors stayed healthy with cabbage and fresh food. You will hunt for vitamin C foods, help make a cabbage salad, and keep a vitamin C tally for five days, trying to add a new food each time.

You will need

- Fruits and vegetables from your kitchen (fresh, frozen or canned)
- For the slaw: about 2 cups of cabbage (green or red), 1 carrot, 1 orange or apple, 1 tablespoon of oil, 1 tablespoon of lemon juice or vinegar, a pinch of salt
- A box grater or kitchen scissors, a cutting board, a large bowl, measuring spoons
- A jar of store-bought sauerkraut to taste, if your family likes it (optional)
- Fitness journal with a vitamin C tally chart: day, foods, number of servings

Steps

1. **Vitamin C hunt (Session 2).** With a parent, look in your refrigerator, fruit bowl and pantry. Make two piles or lists: foods with lots of vitamin C (citrus fruits, strawberries, kiwi, bell peppers, broccoli, tomatoes, cabbage, potatoes) and other foods. Count how many vitamin C foods you found.
2. **Wash and prepare.** Wash your hands. Rinse the cabbage, carrot and fruit. A parent cuts the cabbage into wedges and the orange into sections. You grate or snip the cabbage and the carrot into the bowl.
3. **Mix the dressing.** Measure the oil, lemon juice and a pinch of salt into a small cup and stir. Pour it over the vegetables. Add the orange pieces (or apple, cut by a parent) and toss with two spoons.
4. **Taste test.** Give thanks, then serve the slaw with a meal. If your family has sauerkraut, taste a forkful of it too, the way Cook's sailors did. Rate each one from 1 (not for me) to 5 (delicious) in your journal. It is fine to take a small "sailor's bite" of a new food.

5. **Active cleanup.** Do a 3-minute ship's crew cleanup: squat to pick up every scrap, reach high to put things away, and carry the bowl to the sink with both hands.
6. **The vitamin C tally.** For five days, make a tally mark each time you eat a fruit or vegetable with vitamin C. Write which one. Goal: at least one every day, and two or more on most days.
7. **Session 3: Add a new one.** Help make a second vitamin C snack: orange slices, strawberries, bell pepper strips or broccoli with a dip. Choose a food you have not tried this week. Rate it, and keep going with your tally.
8. At the end of five days, count your tallies and circle the day with the most.

Tips

- Red cabbage turns the slaw a beautiful purple.
- Frozen and canned fruits and vegetables still have vitamins and are fine everyday foods.
- Trying a new food takes courage. Many people need to taste a food several times before they like it.

Check your work

- ☐ I can tell how Captain Cook kept his sailors healthy.
- ☐ I can name five foods with vitamin C and say what vitamin C does.
- ☐ I helped make a cabbage salad safely and kept a five-day vitamin C tally.

FITNESS JOURNAL

1. Draw Captain Cook's ship and, beside it, the foods that kept his sailors healthy: sauerkraut, fresh fruit, green plants.
2. Copy your five-day vitamin C tally neatly and make a bar graph of it.
3. Write your slaw recipe so someone else could make it, and your ratings from the taste test.
4. Write one sentence about a new food you tried and how it tasted.

From history. Captain Cook made three great voyages and drew maps of New Zealand, the east coast of Australia and many Pacific islands so carefully that sailors used them for many years. Scientists did not discover vitamin C itself until the 1920s and 1930s, more than 150 years after Cook's voyages.

COMMON MISTAKES

- Thinking you can eat vitamin C once a week. Your body needs some every day.
- Thinking only oranges have vitamin C. Peppers, broccoli, strawberries, cabbage and potatoes do too.
- Deciding you dislike a food after one taste. Try small bites on different days.
- Grating too close to your fingers. Stop when the piece gets small, and let a parent handle sharp knives.

Make it a game • Vitamin C Treasure Hunt. Set a two-minute timer and hunt the kitchen for foods with vitamin C, like oranges, peppers and cabbage. Line them up on the counter and name what vitamin C does in the body. Then tell Captain Cook's voyage in your own words, using the word scurvy. Score one point per true food found.

3.2 GEORGE WASHINGTON CARVER AND THE PEANUT

OBJECTIVES

- Tell how George Washington Carver helped farmers grow peanuts and other crops and found many uses for them.
- Explain what protein does in the body and name plant and animal protein foods.
- Plant a bean or peanut seed and watch it grow.
- Help make a plant-protein snack safely and keep a protein tally.

Warm-up. Farmer’s field warm-up: “Dig the soil” (8 squats, reaching your hands to the ground and back up), “Plant the seeds” (8 lunges, 4 on each leg, touching the floor beside your front foot), “Pull the weeds” (8 times reach low and pull up, as if pulling a stubborn weed), and “Carry the harvest” (walk around the room for 30 seconds holding a heavy book or a bag of beans in both arms, standing tall). Think about it: what does a farmer need to be strong for a long day of work?

WATCH

[The Story of George Washington Carver | Amazing Scientists | SciShow Kids](#)

[SciShow Kids](#) · 5:11

<https://www.youtube.com/watch?v=6mYW0pkvYWA>

WHEN TO WATCH

After the story. Watch for why Carver told farmers to plant peanuts instead of cotton every year.

Note: The host and a puppet tell Carver’s story with old photographs and explain how peanut plants put nitrogen back into the soil. It mentions plainly that Carver was born into slavery.

BACKUP VIDEO

[Facts About George Washington Carver for Kids | Biography](#)

[Homeschool Pop](#) · 2:55

<https://www.youtube.com/watch?v=i9XyhcyjkyI>

A short review of Carver’s life after the lesson.

KEY TERMS

protein

A building block in food that your body uses to build and repair muscles, skin, hair and blood.

legume

A plant that grows its seeds in pods, such as beans, peas, lentils and peanuts. Legumes are full of protein.

crop rotation

Planting different crops in a field in different years, so the soil stays healthy.

botanist

A scientist who studies plants.

food allergy

When a person's body reacts badly to a food, such as peanuts; it can be dangerous, so allergy foods must be kept away.

CORE IDEAS

The story. George Washington Carver was born on a farm near Diamond, Missouri, around 1864, during the Civil War, into slavery. After slavery ended, he was raised by Moses and Susan Carver on their farm. He was a small, often sickly boy, but he loved plants so much that neighbors called him “the plant doctor.” He worked hard for years to get an education and became the first Black student and teacher at Iowa State, where he studied plants. In 1896 Booker T. Washington invited him to teach at Tuskegee Institute in Alabama. Carver stayed at Tuskegee for the rest of his life, nearly fifty years. He was a man of deep Christian faith who prayed every morning and taught a Bible class for students for many years.

How they figured it out. Many farmers in the South grew cotton in the same fields year after year, and the soil was wearing out. Carver discovered that if farmers planted peanuts, sweet potatoes or cowpeas in some years, the soil grew rich again, because peanuts and peas put a plant food called nitrogen back into the ground. This is called **crop rotation**. But farmers asked, “What will we do with all these peanuts?” So Carver went to work in his laboratory and found hundreds of uses for peanuts and sweet potatoes. In 1916 he wrote a booklet called *How to Grow the Peanut and 105 Ways of Preparing It for Human Consumption*, full of recipes: soups, breads, salads and

more. (He did not invent peanut butter, though many people think so. People were already making it.) Carver loved to say that God had made every plant for a purpose, and his job was to find it.

How your body works. Your body is always building: growing taller, making new skin, repairing muscles after you play. The building blocks it uses come from **protein**. Protein is found in eggs, milk, cheese, yogurt, meat, chicken and fish. It is also found in plants, especially **legumes**: beans, peas, lentils and peanuts. (A peanut is not really a nut! It is a legume that grows its pods underground.) Two tablespoons of peanut butter or half a cup of cooked beans give you about 7 grams of protein, and children your age need roughly 20 to 34 grams a day, which ordinary meals easily give. Eat some protein at each meal, along with fruits, vegetables and whole grains, and your body will have what it needs to grow strong.

Think it through. God said, “Behold, I have given you every herb bearing seed, which is upon the face of all the earth.” Carver saw the humble peanut as one of those good gifts and spent his life finding ways it could feed people and help farmers. When you eat beans, peas or peanuts, you are eating seeds full of food for growing.

Try it. This week you will plant a seed and watch it sprout, help make a plant-protein snack, and keep a protein tally. If anyone in your home has a peanut allergy, use beans, chickpeas, lentils or sunflower-seed butter instead, and keep peanuts out of the house.

PICTURE STUDY



George Washington Carver, Frances Benjamin Johnston, 1906 · Photograph · Library of Congress, Washington, D.C.

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

Frances Benjamin Johnston was one of America's first well-known women photographers. In 1906 she visited Tuskegee Institute and photographed its teachers and students, including this portrait of Professor Carver. He almost always wore a fresh flower or a sprig of green in his buttonhole.

Look closely

- Find the flower on his jacket. Why do you think a botanist would wear one every day?
- Look at his face and eyes. What kind of person do you think he was: kind, serious, curious?
- Look at his clothes. What do they tell you about how he wanted to look when he taught his students?
- Look at the plain background. Why might the photographer have chosen it?

Talk about it

1. Carver called his laboratory "God's Little Workshop." What do you think he meant?
2. How did Carver's work with peanuts help farmers and help people eat well?

3. Which plant foods with protein do you like best: beans, peas, lentils, peanuts or seeds?

Safety first. Peanuts can cause a dangerous allergy. A parent checks for allergies in your home and among any visitors before this lesson; if anyone is allergic, use beans, chickpeas, lentils or sunflower-seed butter instead and do not bring peanuts in. Wash your hands before and after handling food, and let a parent run the blender or food processor and cut with any sharp knife.

ACTIVITY

Carver's Kitchen: Plant a Seed and Make a Protein Snack

George Washington Carver grew plants, studied them and turned them into good food. You will do the same: plant a seed to watch it grow, help make a protein snack from a legume, and count the protein foods you eat.

You will need

- A clear cup or jar, a paper towel, and two or three dried beans (or raw, unroasted peanuts in their shells, if no one is allergic)
- For the snack, choose one: a can of chickpeas or white beans (rinsed), 1 tablespoon of oil, 1 tablespoon of lemon juice, a pinch of salt and garlic powder (bean dip); or peanut butter or sunflower-seed butter with apple slices or celery sticks
- A fork or potato masher (or a blender run by a parent), a bowl, measuring spoons
- Vegetable sticks, whole-grain crackers or apple slices for dipping
- Fitness journal with a protein tally chart: day, breakfast, lunch, supper, snack

Steps

1. **Plant a seed (Session 2).** Fold a damp paper towel and line the inside of a clear cup with it. Slip two or three beans (or shelled raw peanuts) between the towel and the cup, about halfway down. Add a little water to the bottom so the towel stays damp. Set it in a warm, bright spot.
2. **Make the snack.** Wash your hands. For bean dip, mash the rinsed chickpeas or beans in a bowl with the oil, lemon juice, salt and garlic powder until smooth (or a parent blends it). For the other choice, spread 1 tablespoon of peanut butter or sunflower-seed butter on apple slices or celery sticks that a parent has cut.
3. **Serve and give thanks.** Share the snack with your family. Ask each person to rate it from 1 to 5. Write the ratings in your journal.
4. **Active farm chores.** Do 5 minutes of real work: carry groceries or laundry, sweep the kitchen floor, or pull weeds in the yard. Notice which muscles you

used.

5. **The protein tally.** For three days, write down the protein foods you eat at each meal and snack: P for plant protein (beans, peas, lentils, peanuts, nuts, seeds) and A for animal protein (eggs, milk, cheese, yogurt, meat, chicken, fish). Goal: some protein at every meal.
6. **Watch your seed grow.** Each day, check your seed and keep the towel damp. Write the date and draw what you see: the seed coat splitting, the root pushing down, the shoot growing up.
7. **Session 3: A second recipe.** Help make a different legume food: lentil soup, bean tacos, peas with supper or the other snack choice. Compare the ratings of your two recipes.
8. Count your P and A tallies after three days. Did you eat some protein at every meal? Which plant protein will you try next?

Tips

- Beans sprout fastest in a warm place; you should see a root in two to five days.
- Squeeze a little extra lemon into bean dip for a brighter taste; lemon juice adds vitamin C too.
- Plant and animal proteins are both good everyday foods. A mix through the day is best.

Check your work

- ☐ I can tell how George Washington Carver helped farmers with peanuts and crop rotation.
- ☐ I can explain what protein does and name three plant protein foods.
- ☐ I planted a seed, helped make a protein snack safely and kept a three-day protein tally.

FITNESS JOURNAL

1. Draw a peanut plant with its leaves above ground and its pods growing under the soil. Label the root, the stem, the leaves and the pods.
2. Keep a seed diary for one week: a dated drawing each day of your sprouting seed.
3. Copy your three-day protein tally and circle your plant proteins.

4. Write your snack recipe and your family's ratings, and one sentence about what you would change next time.

From history. In 1921 Carver spoke to a committee of the United States Congress about peanuts. He was given ten minutes, but the members were so interested in the many products he showed them that they let him talk for almost two hours. The George Washington Carver National Monument in Diamond, Missouri, set aside in 1943, was the first national monument to honor someone other than a president.

COMMON MISTAKES

- Thinking peanuts are nuts. They are legumes, like beans and peas.
- Thinking only meat has protein. Beans, peas, lentils, peanuts, eggs and milk have protein too.
- Forgetting to check for allergies before serving a snack to others, especially peanuts.
- Thinking George Washington Carver invented peanut butter. He found many other uses and recipes for peanuts.

Make it a game · Protein Sort Sprint. Write plant protein and animal protein on two sheets of paper. Your parent calls foods, like peanuts, eggs, beans or fish, and you place a finger on the right sheet and shout what protein does for the body. Tell one way George Washington Carver helped farmers. Beat your score on a second round.

Scripture. “Behold, I have given you every herb bearing seed, which is upon the face of all the earth” (Genesis 1:29, KJV)

God made seeds like beans, peas and peanuts to grow new plants and to feed us. Carver spent his life finding the good uses God had put in them.

UNIT 3

NUTRITION

Food is God's gift and your body's fuel. It gives you energy to run and play and the building blocks to grow. In this unit you will sail with Captain James Cook, who kept his sailors healthy on voyages around the world in the 1770s by feeding them sauerkraut and every fresh fruit and vegetable he could find. You will learn what vitamin C does in your body, go on a vitamin C hunt in your kitchen and help make a crunchy cabbage salad.

Then you will meet George Washington Carver, the scientist at Tuskegee Institute in Alabama who helped farmers grow peanuts and sweet potatoes and found hundreds of ways to use them. You will learn how protein builds and repairs your body, discover that beans, peas, lentils and peanuts are plant proteins, plant a seed and help make a protein snack.

PREREQUISITES

- Knows that water is the best everyday drink (Unit 2)
- Can wash hands well and follow a simple recipe with a grown-up
- Knows the food allergies in the family (a parent checks before any tasting)

MASTERY CHECKLIST

- ☐ I can tell how Captain Cook kept his sailors healthy with sauerkraut and fresh food.
- ☐ I can explain what vitamin C does and name five foods that have it.
- ☐ I can tell the story of George Washington Carver and the peanut.
- ☐ I can explain what protein does and name plant and animal protein foods.
- ☐ I can help make a simple snack safely and give thanks for my food.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Vitamins” (Nemours KidsHealth):** Free. A kids’ article on what each vitamin does and which foods have it. For Lesson 3.1.
- **George Washington Carver National Monument (National Park Service):** Free. The park at Carver’s boyhood home in Diamond, Missouri, with his story and pages for young visitors. For Lesson 3.2.
- ***A Weed Is a Flower: The Life of George Washington Carver*, by Alik:** A gentle picture-book biography, easy for a third grader to read aloud. Look for it at your library. For Lesson 3.2.

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

LESSONS IN THIS UNIT

3.1 Captain Cook’s Sauerkraut

3 sessions of 30–40 minutes

3.2 George Washington Carver and the Peanut

3 sessions of 30–40 minutes

UNIT 3 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points.

1. **4 pts**

What sickness did sailors on long voyages get, and how did Captain Cook help prevent it?

2. **4 pts**

What does vitamin C do in your body? Name four foods that have it.

3. **4 pts**

What would happen if someone ate no fruits or vegetables at all for many weeks?

4. **5 pts**

How did George Washington Carver help Southern farmers?

5. 4 pts

What does protein do? Name two plant proteins and two animal proteins.

6. 4 pts

Is a peanut a nut? Explain.

7. 5 pts

Name three kitchen safety rules you followed in this unit.

ANSWER KEY

1. Scurvy, which made them tired and weak with sore, bleeding gums. Cook fed his crew sauerkraut and gathered fresh fruit, vegetables and green plants at every landing; he served the sauerkraut at the officers' table so the sailors would want it too.
2. It helps keep gums, skin and blood vessels strong, helps cuts heal and helps the body take in iron. Foods: oranges, strawberries, kiwis, bell peppers, broccoli, tomatoes, cabbage, potatoes (any four).
3. They would not get enough vitamin C (and other vitamins), so they could get scurvy: feeling tired and weak, with sore gums and cuts that heal slowly.
4. He taught them crop rotation: planting peanuts, sweet potatoes or cowpeas in some years instead of only cotton, which made the soil rich again. He also found hundreds of uses and recipes for peanuts and sweet potatoes so farmers could use and sell their crops.
5. Protein builds and repairs muscles, skin, hair and blood. Plant: beans, peas, lentils, peanuts, nuts, seeds (any two). Animal: eggs, milk, cheese, yogurt, meat, chicken, fish (any two).
6. No. A peanut is a legume, like beans and peas. Its pods grow underground.
7. Any three: check for food allergies (especially peanuts) before tasting; wash hands and food; a parent handles sharp knives, the stove and the blender; keep fingers back when grating; clean up spills.

UNIT CHALLENGE: A SAILOR-AND-FARMER LUNCH

Plan and help make a lunch for your family that includes at least one vitamin C fruit or vegetable, one plant protein (beans, peas, lentils, or peanuts if no one is allergic) and water to drink. Write the menu, list the ingredients, and with a parent’s help, prepare it safely. Before eating, tell your family the stories of Captain Cook and George Washington Carver. After lunch, ask each person to rate the meal, and write two sentences about what went well and what you would change. Add your five-day vitamin C tally, your protein tally and your seed diary to the same pages.

LOOK FOR	WHAT IT MEANS
Plan	A written menu with a vitamin C food, a plant protein and water, and a list of ingredients.
Safe preparation	Hands and food washed, allergies checked, and a parent handled sharp knives and the stove.
Records	The vitamin C tally, protein tally and seed diary are complete and dated.
Telling and reflecting	The student told both stories to the family and wrote what went well and what to change. Effort and care count most.

UNIT 4

STRENGTH

Strength is the power to push, pull, lift, carry and hold your body steady. You use it to climb a tree, carry groceries, help with chores and sit up tall. In this unit you will meet Giovanni Borelli, an Italian scientist of the 1600s who studied how people and animals move and showed that your bones and muscles work like levers. You will build a model arm, feel your own muscles pull, and find your starting numbers in a set of strength stations.

Then you will learn good form for two of the most important exercises, the squat and the push-up, with help from the story of Walter Camp, the football coach who made up a short set of everyday exercises for busy people. You will hold a form clinic, then begin a two-week challenge, adding one rep at a time.

PREREQUISITES

- Has done the fitness check in Lesson 1.1 and knows the warm-up and cool-down
- Knows that protein builds and repairs the body (Lesson 3.2)
- Can count reps and keep a simple table

MASTERY CHECKLIST

- ☐ I can name the parts that work together to move my body: bones, muscles, tendons and joints.
- ☐ I can explain how my arm works like a lever, with the elbow as the pivot.
- ☐ I can explain that muscles grow stronger with work, rest, good food and sleep.
- ☐ I can show good form in the squat and the push-up and say two cues for each.
- ☐ I can follow a two-week plan, add one rep at a time, and record my numbers.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Your Bones” (Nemours KidsHealth):** Free. A kids’ article on bones, joints and how to keep bones strong. For Lesson 4.1.
- **“Your Muscles” (Nemours KidsHealth):** Free. Explains the kinds of muscles and how they pull on bones. For Lessons 4.1–4.2.

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

LESSONS IN THIS UNIT

4.1 Bones, Muscles and Joints: Borelli’s Levers

3 sessions of 30–40 minutes

4.2 Good Form: Squats and Push-ups

3 sessions of 30–40 minutes

UNIT 4 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points. You may show a movement as part of your answer.

1. **4 pts**

What did Giovanni Borelli discover about how the body moves?

2. **5 pts**

Name the parts that work together when you bend your elbow: what pulls, what is pulled, what connects them, and where it moves.

3. **4 pts**

Why do muscles work in pairs?

4. **4 pts**

Name three things your muscles and bones need to grow stronger.

5. **5 pts**

Give two form cues for the squat and two for the push-up.

6. 4 pts

What would happen if you did squats very fast with your knees caving in and your heels lifting?

7. 4 pts

What was Walter Camp's Daily Dozen, and what idea did it teach?

ANSWER KEY

1. He showed that bones work like the bars of levers, joints are the pivot points (fulcrums), and muscles pull on the bones to move them. He wrote about it in his book *On the Movement of Animals* (1680–1681).
2. The biceps muscle pulls; it pulls on the forearm bone; a tendon connects the muscle to the bone; the movement happens at the elbow joint. The triceps relaxes (and pulls to straighten the arm).
3. Muscles can only pull, not push, so one muscle pulls to bend a joint and another pulls the other way to straighten it.
4. Any three: exercise or hard work, rest days, good food with protein, calcium (milk, cheese, yogurt, leafy greens), sleep, jumping and running for bones.
5. Squat (any two): feet shoulder-width, sit back as onto a chair, chest up, knees over toes, heels down, thighs about level with the floor. Push-up (any two): hands under shoulders, straight as a board, no sagging or poking hips, elbows angled back, chest to a fist from the floor, breathe out as you push.
6. The work would not go to the right muscles, your knees would be strained and could get hurt, and you would not get as strong. Slow, good-form squats are safer and build more strength.
7. A set of twelve short, simple exercises that took about eight minutes, made for sailors and busy people. It taught that a few minutes of good exercise every day is better than a long workout once in a while.

UNIT CHALLENGE: TWO-WEEK SQUAT AND PUSH-UP CHALLENGE

Use your 30-second squat and push-up numbers from Lesson 4.2 as your before numbers. For two weeks, train every other day on your ladder, adding one rep to each set every workout while keeping good form, and rest, play, eat well and sleep on the days between. Record every workout. At the end, repeat the 30-second test in exactly the same way and at the same push-up level. Make a before-and-after bar graph for each exercise and write three sentences: what improved, what was hard, and which form cue helped you most. Add your five-station retest from Lesson 4.1.

LOOK FOR	WHAT IT MEANS
Faithful training	About 7 workouts in two weeks, each written down with the date and numbers, with rest days in between.
Good form	A parent watches the after test and confirms the form cues were followed.
Fair test	The same time, the same push-up level and the same rules for the before and after tests, with honest numbers.
Graph and sentences	A neat before-and-after bar graph and three sentences. Effort and improvement count, not the size of the numbers.

4.1 BONES, MUSCLES AND JOINTS: BORELLI'S LEVERS

OBJECTIVES

- Tell how Giovanni Borelli showed that bones and muscles work like levers.
- Name bones, muscles, tendons and joints and explain how they work together.
- Build a model arm that bends and straightens like a real elbow.
- Find starting numbers at five strength stations and test them again.

Warm-up. Joint explorer warm-up: nod your head yes and shake it no 5 times each (slowly), roll your shoulders 10 times, bend and straighten your elbows 10 times, circle your wrists, circle your hips 5 times each way, do 10 slow squats (knees bending), and rise up on your toes 10 times (ankles). Finish with 10 jumping jacks. Think about it: which joints bend like a door hinge, and which can move in a circle?

WATCH

How Do Our Bodies Move?

SciShow Kids · 3:35

<https://www.youtube.com/watch?v=j918PoWWaB0>

WHEN TO WATCH

After the “How your body works” paragraph. Watch for how the biceps squeezes (contracts) and the triceps relaxes when you bend your arm.

Note: Clear and friendly, with drawings of the arm muscles. It uses the word “skeleton” for the bones of the body.

BACKUP VIDEO

Super Simple Machines: Levers

SciShow Kids · 3:20

<https://www.youtube.com/watch?v=lueqE0lxLyc>

Before building the model arm, to learn the parts of a lever: the bar, the fulcrum, the load and the push.

KEY TERMS

bone

A hard, living part of your body's frame that holds you up and protects your heart, lungs and brain.

tendon

A strong cord that fastens a muscle to a bone.

lever

A stiff bar that turns on a pivot point (the fulcrum) to lift or move a load. A seesaw is a lever.

muscle

Body tissue that pulls (contracts) to make you move. Muscles can only pull, never push.

joint

A place where two bones meet and can move, such as the elbow, knee, shoulder or hip.

fulcrum

The pivot point a lever turns on. In your arm, the elbow joint is the fulcrum.

CORE IDEAS

The story. Giovanni Alfonso Borelli was born in Italy in 1608. He was a mathematician and scientist who taught at the University of Pisa, the same town where Galileo had once taught. Borelli was fascinated by how living things move: how a man walks, runs, jumps and lifts, how a horse gallops, how a bird flies and how a fish swims. He spent his last years in Rome, living and teaching with a community of Christian teachers, and there he finished his great book, *On the Movement of Animals*. It was printed in 1680 and 1681, just after he died.

How they figured it out. Borelli looked at the human body the way an engineer looks at a machine. He studied how each muscle was attached to the bones and drew careful diagrams. He saw that a bone acts like the stiff bar of a **lever**, a **joint** acts like the pivot point, or **fulcrum**, and a muscle pulls on the bone to make it turn. He even used mathematics to figure out how hard muscles must pull to lift a load. Because the muscle is fastened very close to the joint, it has to pull much harder than the weight in your hand, but in return your hand moves far and fast. Borelli's book helped begin a whole science of how bodies move.

How your body works. A grown-up has 206 **bones**; children have a few more, which join together as you grow. Bones hold you up and protect your brain, heart and lungs. More than 600 **muscles** move those bones. Each one is fastened to bones by

tough cords called **tendons**, and it pulls across a joint. Muscles can only pull, so they work in pairs. To bend your elbow, the **biceps** on the front of your upper arm squeezes and pulls your forearm up, while the **triceps** on the back relaxes. To straighten it, the triceps pulls and the biceps relaxes. When you make your muscles work hard, then rest, eat good food (especially protein) and sleep well, they grow a little stronger. Running, jumping and climbing make your bones stronger too, and milk, cheese, yogurt and leafy greens give your bones calcium. Truly, you are fearfully and wonderfully made.

Good form. Doctors agree that strength exercises are safe and good for children when a grown-up is watching, the exercises use good form and the work starts easy. In this course you will use only your own body weight. Warm up first, move slowly and with control, breathe out as you push, and stop if anything hurts in a sharp way or in a joint. Tired, warm muscles are normal; joint pain is a signal to stop and tell an adult.

Try it. This week you will build a model arm with a working elbow, feel your own biceps and triceps take turns, and find your starting numbers at five strength stations. On another day you will test again.

PICTURE STUDY



Seesaw, Gloucester, Massachusetts, Winslow Homer, 1874 · Wood engraving (from *Harper's Weekly*) ·

Library of Congress, Washington, D.C.

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

Before he became a famous painter, Winslow Homer drew pictures for a magazine called *Harper's Weekly*, and they were carved into wood blocks for printing. This one shows children in the fishing town of Gloucester, Massachusetts, playing on a homemade seesaw: a long plank balanced over a rock or log.

Look closely

- Find the two ends of the seesaw. Who is sitting on each end?
- Find the boy standing near the middle. What is he doing with his arms to keep his balance?
- Look for the fulcrum, the place the plank pivots. What do you think it is resting on?
- Find the girls and the fishing net. What else tells you this is a seaside town?

Talk about it

1. A seesaw is a lever. How is your forearm like this plank? What is the fulcrum in your arm?
2. Which muscles do the children use to push off the ground and make the seesaw go up?

3. What lever could you find at your house (a broom, a door, a pair of scissors)?

Safety first. Use body weight only. Warm up first, move slowly with good form, and breathe out as you push; never hold your breath. Exercise on a flat, non-slip floor in shoes with good grip. Stop and tell an adult if you feel sharp pain, pain in a joint, dizziness or chest pain. Use scissors carefully when making the model arm, and let a parent poke the holes.

ACTIVITY

Borelli's Model Arm and the Five Strength Stations

Borelli studied the body like a machine. You will build a working model of your arm to see how a muscle pulls a bone around a joint. Then you will put your own muscles to work at five stations and record your starting numbers.

You will need

- Two strips of stiff cardboard about 2 inches wide and 10 inches long, a paper fastener (brad), two pieces of string or two rubber bands, tape, a hole punch or pencil, scissors
- A towel or mat, a wall, a timer and a helper
- Fitness journal with a station chart: station, Day 1, Retest
- A water bottle

Steps

1. **Build the arm (Session 2).** One strip is the upper arm bone and one is the forearm. A parent pokes a hole near one end of each strip. Join the two strips with the brad so the forearm swings like an elbow. Draw a hand on the end of the forearm.
2. Tape one string (the biceps) to the front of the upper arm near the top, and tape its other end to the front of the forearm just below the elbow. Tape a second string (the triceps) along the back the same way. Pull the biceps string: the forearm lifts. Pull the triceps string: it straightens. Label the bones, muscles, tendons (the tape) and the joint (the brad).
3. Now feel your own arm: put your left hand on your right biceps and slowly bend and straighten your right elbow 5 times. Then hold the back of your arm (triceps). Which muscle gets hard when you bend? When you straighten?
4. **Warm up (4 minutes):** the joint explorer warm-up, plus 30 seconds of jogging in place.
5. **The five strength stations.** Work 30 seconds at each, rest 1 minute between, and record the number: (1) squats; (2) wall push-ups, or incline push-ups with hands on a sturdy chair pushed against a wall; (3) glute bridges (lie on your back, knees bent, feet flat; squeeze your seat and lift your hips until

your body is straight from shoulders to knees, then lower slowly); (4) calf raises (hold a wall, rise up on your toes, lower slowly); (5) bear crawl, counting how many times you can crawl across the room and back on hands and feet with knees just off the floor.

6. **Cool down (3 minutes):** walk slowly, then hold gentle stretches for 15 seconds each: thigh (hold a chair, pull your heel toward your seat), calves (press against a wall), chest (clasp your hands behind your back) and upper arms (one arm across your chest). Drink water.
7. **Rest day.** The next day, play and help with chores, but do not repeat the stations. Your muscles are rebuilding.
8. **Session 3: Retest.** Warm up the same way and do the five stations again with the same times, rests and push-up level. Record the new numbers next to the old ones and circle each one that went up.

Tips

- Good form first, numbers second. A slow, full rep builds more strength than three rushed ones.
- Count out loud on the way up. It reminds you to breathe out as you push.
- If a push-up is too hard, move your hands higher on the wall. If it is too easy, use the chair.

Check your work

- ☐ I built a model arm and can show how the biceps and triceps take turns pulling.
- ☐ I can explain how my arm is a lever with the elbow as the fulcrum.
- ☐ I recorded my five station numbers on two days, with a rest day between.

FITNESS JOURNAL

1. Draw your arm bent and straight. Label the upper arm bone, the forearm bones, the biceps, the triceps, a tendon and the elbow joint. Color the muscle that is pulling.
2. Copy your five-station table with Day 1 and Retest numbers.
3. Go on a lever hunt at home. Draw three levers you find and circle the fulcrum on each.
4. Write which station was hardest and what you will do next time.

From history. Borelli also studied the stars and the moons of Jupiter, and he did experiments on how the heart pumps and how birds use their wing muscles. Scientists who study the movement of the body are still called biomechanists, and many of them call Borelli the father of their science.

COMMON MISTAKES

- Thinking muscles push. Muscles only pull; a different muscle pulls the other way.
- Rushing reps with sloppy form. Slow and steady builds strength and protects your joints.
- Doing hard strength work every day with no rest. Muscles grow stronger during rest and sleep.
- Thinking you need weights. Your own body weight is plenty at your age.

Make it a game · Borelli's Lever Challenge. Build a model arm: elbow joint as the fulcrum. Bend and straighten your arm and point to the bone, muscle, tendon and joint as your parent names them. Then lift a book with one arm and explain how Borelli saw bones as levers. Switch and quiz each other using only body parts. Fastest correct answers win.

4.2 GOOD FORM: SQUATS AND PUSH-UPS

OBJECTIVES

- Tell how Walter Camp made a short set of daily exercises for busy people.
- Show good form in the squat and the push-up and say two cues for each.
- Explain why good form keeps knees, backs and shoulders safe.
- Begin a two-week squat and push-up challenge, adding one rep at a time.

Warm-up. Mirror warm-up with a partner (or a mirror): face each other and copy each other's moves for 3 minutes: 10 arm circles each way, 10 slow "half squats" (bend a little and stand), 10 "chair taps" (sit back until you just touch a chair, then stand), 5 slow inchworms (bend, walk your hands out to a push-up position, walk your feet up to your hands), and 30 seconds of jogging in place. Think about it: what does a squat look like when it is done well?

WATCH

How to Teach Kids the Push Up

[ghostlightcreative](https://www.youtube.com/watch?v=Fv10F2eCv34) · 3:01

<https://www.youtube.com/watch?v=Fv10F2eCv34>

WHEN TO WATCH

In Session 2, at the start of the form clinic. Watch for the "spaghetti back" and "inchworm" mistakes, and the easier push-up with hands on a box.

Note: A youth fitness coach in a T-shirt teaches two children in a gym, with friendly names for common mistakes. The description links to the coach's program, which is not needed.

BACKUP VIDEO

Teaching Kids How to Squat

[ghostlightcreative](https://www.youtube.com/watch?v=8R_17mEolgw) · 3:10

https://www.youtube.com/watch?v=8R_17mEolgw

Before the squat part of the form clinic.

KEY TERMS

form

The right way to do an exercise: how your body is lined up, how far you move and how fast.

form cue

A short reminder that helps you move well, such as “chest up” or “straight as a board.”

repetition (rep)

One complete movement, such as one squat. A set is a group of reps done in a row.

core

The muscles around your middle (stomach, sides and back) that hold your body steady.

progress

Getting a little better over time, such as one more rep than last time.

CORE IDEAS

The story. Walter Camp was born in Connecticut in 1859 and played football at Yale College. He wrote so many of the rules of American football that he is called the “father of American football.” During World War I, the navy asked him to make up exercises to keep sailors fit. Camp noticed that many men, especially those who worked at desks, did not have time for long workouts. So he made a set of twelve short, simple exercises, with names like “crouch,” “crawl,” “grind” and “wing,” that took only about eight minutes. He called it the **Daily Dozen**. After the war it was printed in newspapers and books and sold on phonograph records, so families could exercise together at home every morning.

How they figured it out. Camp believed that a few minutes of exercise done well every day was better than a long workout done once in a while. He paid close attention to how each exercise was done. A quick, sloppy movement does not train the right muscles and can strain a joint; a slow, controlled one builds strength safely. Coaches today agree. That is why we learn **form** first and numbers second.

Good form. Squat: feet about shoulder-width apart, toes turned out a little; arms out in front for balance; sit back and down as if onto a chair; chest up and eyes forward; knees point the same way as your toes (do not let them cave in); heels stay flat on the floor; go down until your thighs are about level with the floor, or as low as you can with good form, then stand up tall and squeeze your seat. **Push-up:** hands flat under

your shoulders; body straight as a board from your head to your heels (or knees), with your stomach and seat squeezed tight; no “spaghetti back” sagging down and no “inchworm” hips poking up; bend your elbows back at an angle, not straight out to the sides; lower your chest until it is about a fist from the floor (or wall or chair); push back up and breathe out. Start with the level where you can keep good form: wall, then hands on a sturdy chair against the wall, then knees, then toes.

How your body works. Squats train the big muscles of your thighs and hips, which you use to run, jump, climb stairs and lift things off the floor safely. Push-ups train your chest, your shoulders and the triceps in the back of your arms, and they make your core work hard to keep your body straight. Good form spreads the work across the right muscles and protects your knees, back and shoulders. And when you add just a little more work over time, such as one more rep each workout, with rest days in between, your muscles get stronger step by step. Ecclesiastes says, “Whatsoever thy hand findeth to do, do it with thy might.” Doing each rep well is one way to do your work with your might.

Try it. In Session 2 you will hold a form clinic with a helper or mirror. In Session 3 you will count your “before” numbers and begin a two-week challenge, adding one rep each workout.

PICTURE STUDY



The Gleaners, Jean-François Millet, 1857 · Oil on canvas · Musée d'Orsay, Paris

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

Jean-François Millet grew up on a farm in France and painted the hard work of country people. After the harvest, poor women were allowed to walk the fields and pick up the stalks of grain left behind. This was called gleaning. In the Bible, Ruth gleaned in the fields of Boaz in the same way.

Look closely

- Look at how each woman is bending. Which one bends her knees? Which one bends mostly at her back?
- Find the woman standing more upright. What is she holding behind her back?
- Look far into the background. What are the other workers doing with the grain?
- How many times do you think these women bent down in one day?

Talk about it

1. Lifting from the floor is a kind of squat. Why is it safer to bend your knees and keep your back straight when you lift something heavy?
2. Which muscles would be tired at the end of a day of gleaning?

3. What jobs at your house make you squat, bend or lift? How can you do them with good form?

Safety first. Body weight only. Exercise on a flat, non-slip floor in shoes with good grip, with space around you. If you use a chair for incline push-ups, push it firmly against a wall so it cannot slide. Keep good form, breathe steadily, rest at least one day between hard workouts, and stop if you feel sharp or joint pain.

ACTIVITY

Form Clinic and the Two-Week Squat and Push-up Challenge

Walter Camp believed in a few minutes of good exercise every day. You will become your own coach: first checking your form with a helper, then counting your “before” numbers and climbing one rep at a time for two weeks.

You will need

- A towel or mat, a sturdy chair pushed against a wall, and clear floor space
- A mirror or a helper
- A timer
- Fitness journal with a challenge chart: date, squats set 1, squats set 2, push-ups set 1, push-ups set 2, notes

Steps

1. **Form clinic (Session 2).** After the warm-up, watch the video. Then do 5 slow squats while your helper checks one cue at a time: feet, chest up, knees over toes, heels down, depth. The helper says “good” or “fix.” Write the cue you most need to work on.
2. **Find your push-up level:** try 3 push-ups at the wall, 3 with hands on the chair, and 3 on your knees. Your level is the hardest one where your body stays straight as a board. Do 5 slow push-ups at that level while your helper checks: hands under shoulders, straight body, elbows angled back, chest to a fist away.
3. **Chair-tap squats.** Place a chair behind you. Do 5 squats, lightly tapping the chair with your seat each time, then standing tall. This teaches you to sit back and keep your heels down.
4. **Before numbers (Session 3).** Warm up. Do as many good-form squats as you can in 30 seconds and record the number. Rest 2 minutes. Do as many good-form push-ups at your level as you can in 30 seconds and record the number and the level.
5. **Set your ladder.** Your starting number for each exercise is half your 30-second number, rounded up. (If you did 15 squats, start with 8.) Do 2 sets of each at your starting number, resting 1 minute between sets.

6. **Climb the ladder.** Train every other day for two weeks (about 7 workouts). Each workout, add 1 rep to every set. If you cannot finish a set with good form, stay at the same number next time; that is fine.
7. **Cool down** after every workout: walk for 2 minutes, then stretch your thighs, hips, chest and shoulders for 15 seconds each. Drink water.
8. **After test.** At the end of two weeks, repeat the 30-second test in exactly the same way, at the same push-up level, and compare it with your before numbers. This is your unit challenge.

Tips

- Imagine a string pulling the top of your head up toward the ceiling to keep your chest up in a squat.
- A straight push-up at the chair is better than a sagging push-up on the floor.
- Eat a meal or snack with protein after a workout, and get a good night's sleep.

Check your work

- ☐ I can tell about Walter Camp's Daily Dozen and why form matters.
- ☐ I can show good form and say two cues each for the squat and the push-up.
- ☐ I recorded my before numbers and began my two-week ladder.

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1. Draw a stick figure doing a good squat and another doing a good push-up. Write two form cues beside each.
2. Draw a "spaghetti back" push-up and an "inchworm" push-up, and cross them out. Write how to fix each.
3. Keep your ladder chart for every workout. Make a line graph of your squats per set over two weeks.
4. After each workout, write one word for how it felt: easy, just right or hard.

From history. Walter Camp once led members of President Woodrow Wilson's cabinet through his exercises, and newspapers joked about the busy men stretching together. Camp also wrote many books for boys about sports, fair play and good character.

COMMON MISTAKES

- Squat: knees caving inward or heels lifting off the floor. Push your knees out over your toes and keep your heels down.
- Squat: rounding the back and looking at the floor. Keep your chest up and eyes forward.
- Push-up: hips sagging or poking up. Squeeze your stomach and seat and stay straight as a board.
- Push-up: tiny bends at the elbows. Lower until your chest is about a fist away, at a level where you can do it well.

Make it a game • Form Clinic Coach. Be the coach and give your parent two form cues for a squat and two for a push-up. Watch her try, then correct her form. She must sneak in one wrong cue; catch it. Switch roles and let her coach you. Do five good reps each. Tell why Walter Camp wanted short daily exercises.

Scripture. “Whatsoever thy hand findeth to do, do it with thy might” (Ecclesiastes 9:10, KJV)

Doing each rep carefully and well, even when no one is counting, is a way to do your work with your might.

UNIT 4

STRENGTH

Strength is the power to push, pull, lift, carry and hold your body steady. You use it to climb a tree, carry groceries, help with chores and sit up tall. In this unit you will meet Giovanni Borelli, an Italian scientist of the 1600s who studied how people and animals move and showed that your bones and muscles work like levers. You will build a model arm, feel your own muscles pull, and find your starting numbers in a set of strength stations.

Then you will learn good form for two of the most important exercises, the squat and the push-up, with help from the story of Walter Camp, the football coach who made up a short set of everyday exercises for busy people. You will hold a form clinic, then begin a two-week challenge, adding one rep at a time.

PREREQUISITES

- Has done the fitness check in Lesson 1.1 and knows the warm-up and cool-down
- Knows that protein builds and repairs the body (Lesson 3.2)
- Can count reps and keep a simple table

MASTERY CHECKLIST

- ☐ I can name the parts that work together to move my body: bones, muscles, tendons and joints.
- ☐ I can explain how my arm works like a lever, with the elbow as the pivot.
- ☐ I can explain that muscles grow stronger with work, rest, good food and sleep.
- ☐ I can show good form in the squat and the push-up and say two cues for each.
- ☐ I can follow a two-week plan, add one rep at a time, and record my numbers.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Your Bones” (Nemours KidsHealth):** Free. A kids’ article on bones, joints and how to keep bones strong. For Lesson 4.1.
- **“Your Muscles” (Nemours KidsHealth):** Free. Explains the kinds of muscles and how they pull on bones. For Lessons 4.1–4.2.

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

LESSONS IN THIS UNIT

4.1 Bones, Muscles and Joints: Borelli’s Levers

3 sessions of 30–40 minutes

4.2 Good Form: Squats and Push-ups

3 sessions of 30–40 minutes

UNIT 4 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points. You may show a movement as part of your answer.

1. **4 pts**

What did Giovanni Borelli discover about how the body moves?

2. **5 pts**

Name the parts that work together when you bend your elbow: what pulls, what is pulled, what connects them, and where it moves.

3. **4 pts**

Why do muscles work in pairs?

4. **4 pts**

Name three things your muscles and bones need to grow stronger.

5. **5 pts**

Give two form cues for the squat and two for the push-up.

6. 4 pts

What would happen if you did squats very fast with your knees caving in and your heels lifting?

7. 4 pts

What was Walter Camp's Daily Dozen, and what idea did it teach?

ANSWER KEY

1. He showed that bones work like the bars of levers, joints are the pivot points (fulcrums), and muscles pull on the bones to move them. He wrote about it in his book *On the Movement of Animals* (1680–1681).
2. The biceps muscle pulls; it pulls on the forearm bone; a tendon connects the muscle to the bone; the movement happens at the elbow joint. The triceps relaxes (and pulls to straighten the arm).
3. Muscles can only pull, not push, so one muscle pulls to bend a joint and another pulls the other way to straighten it.
4. Any three: exercise or hard work, rest days, good food with protein, calcium (milk, cheese, yogurt, leafy greens), sleep, jumping and running for bones.
5. Squat (any two): feet shoulder-width, sit back as onto a chair, chest up, knees over toes, heels down, thighs about level with the floor. Push-up (any two): hands under shoulders, straight as a board, no sagging or poking hips, elbows angled back, chest to a fist from the floor, breathe out as you push.
6. The work would not go to the right muscles, your knees would be strained and could get hurt, and you would not get as strong. Slow, good-form squats are safer and build more strength.
7. A set of twelve short, simple exercises that took about eight minutes, made for sailors and busy people. It taught that a few minutes of good exercise every day is better than a long workout once in a while.

UNIT CHALLENGE: TWO-WEEK SQUAT AND PUSH-UP CHALLENGE

Use your 30-second squat and push-up numbers from Lesson 4.2 as your before numbers. For two weeks, train every other day on your ladder, adding one rep to each set every workout while keeping good form, and rest, play, eat well and sleep on the days between. Record every workout. At the end, repeat the 30-second test in exactly the same way and at the same push-up level. Make a before-and-after bar graph for each exercise and write three sentences: what improved, what was hard, and which form cue helped you most. Add your five-station retest from Lesson 4.1.

LOOK FOR	WHAT IT MEANS
Faithful training	About 7 workouts in two weeks, each written down with the date and numbers, with rest days in between.
Good form	A parent watches the after test and confirms the form cues were followed.
Fair test	The same time, the same push-up level and the same rules for the before and after tests, with honest numbers.
Graph and sentences	A neat before-and-after bar graph and three sentences. Effort and improvement count, not the size of the numbers.

UNIT 5

AEROBIC TRAINING

Your heart is a muscle about the size of your fist, and it beats about a hundred thousand times every day without ever taking a day off. In this unit you will meet René Laennec, a French doctor who in 1816 rolled a sheet of paper into a tube and invented the stethoscope, so doctors could listen to the heart. You will make your own paper stethoscope, learn to find your pulse, and count how your heartbeat speeds up when you exercise and slows down when you rest.

Then you will meet Edward Payson Weston, who at seventy years old walked all the way across America by keeping a steady pace day after day. You will learn about pacing, run a timed run-walk course on a marked loop, test yourself again to see if you can go farther, and lead your family in a family fitness day to finish the quarter.

PREREQUISITES

- Can count by fours or add a number four times (for 15-second pulse counts), with help if needed
- Knows the talk test (Lesson 1.1) and how to drink water before, during and after play (Unit 2)
- Has done the warm-up and cool-down many times

MASTERY CHECKLIST

- ☐ I can tell how René Laennec invented the stethoscope.
- ☐ I can explain that my heart is a muscle that pumps blood to carry oxygen all around my body.
- ☐ I can find my pulse at my wrist and count my heartbeats before and after exercise.
- ☐ I can explain pacing and why a steady pace lets me go farther.
- ☐ I can run a run-walk course, record my laps and try to improve.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Your Heart & Circulatory System” (Nemours KidsHealth):** Free. A kids’ article on how the heart and blood vessels work. Read it with Lesson 5.1.
- **A jump rope:** Optional. A fun extra station for the family fitness day.
- **Sidewalk chalk and a stopwatch with a lap button:** Optional. For marking the run-walk loop and timing laps; a phone timer and cups as markers work too.

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

LESSONS IN THIS UNIT

5.1 Laennec’s Paper Tube: Listening to the Heart

3 sessions of 30–40 minutes

5.2 Run-Walk Pacing

3 sessions of 30–40 minutes

UNIT 5 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points. You may show a movement as part of your answer.

1. **4 pts**

How did René Laennec invent the stethoscope?

2. **5 pts**

What does your heart do, and why does it beat faster when you exercise?

3. **4 pts**

Explain how to take your pulse and find your heart rate.

4. **4 pts**

Your heart beat 20 times in 15 seconds at rest and 35 times in 15 seconds after jumping jacks. What were your heart rates in beats per minute?

5. **4 pts**

What would happen if you sprinted as fast as you could at the start of an 8-minute run?

6. 5 pts

How did Edward Payson Weston walk across America at age seventy?

7. 4 pts

Name two ways aerobic exercise helps your body.

ANSWER KEY

1. In 1816 he needed to listen to a young woman's heart. Remembering children listening to a scratch through a long piece of wood, he rolled paper into a tube, put one end on her chest and his ear to the other, and heard her heart clearly. Later he made a wooden tube and named it the stethoscope.
2. The heart is a muscle that pumps blood to the lungs to pick up oxygen and then out to the whole body. During exercise your muscles need more oxygen, so the heart beats faster and harder to deliver it.
3. Press two fingers (not the thumb) gently on the thumb side of the wrist, count the beats for 15 seconds, and multiply by 4 to get beats per minute.
4. At rest: $20 \times 4 = 80$ beats per minute. After jumping jacks: $35 \times 4 = 140$ beats per minute.
5. You would run out of quick energy and get out of breath, so you would have to slow down a lot or stop, and you would probably cover fewer laps than with a steady pace.
6. In 1909 he walked from New York to San Francisco, about 4,000 miles in a little over three months, by keeping a steady pace of about 40 miles a day, resting, eating well and starting again each day.
7. Any two: it makes the heart muscle stronger so it pumps more blood with each beat, strengthens breathing, builds endurance so you can play longer, helps you sleep and feel good.

UNIT CHALLENGE: MY RUN-WALK CHART AND FAMILY FITNESS DAY

Keep a run-walk chart for two weeks: do your 8-minute run-walk at least four times, on the same loop, recording your laps in each 2-minute block, your total laps, your pulse after the cool-down and how it felt. Make a line graph of your total laps. Then plan and lead your family fitness day with a warm-up, a station from each unit, a water table and snack, a family run-walk and a cool-down. Write three sentences about your progress and three about the family fitness day, and finish the quarter by retesting your four-station fitness check from Lesson 1.1.

LOOK FOR	WHAT IT MEANS
Faithful training	At least four run-walks recorded with dates, laps for each block, totals and pulse.
Pacing	The chart shows the student working toward an even pace, using the talk test, and trying to improve.
Family fitness day	A written plan with a station from every unit, led by the student with clear explanations and good form.
Reflection and retest	A neat graph, six thoughtful sentences and the final fitness-check retest compared with Lesson 1.1. Effort and improvement count, not speed.

5.1 LAENNEC'S PAPER TUBE: LISTENING TO THE HEART

OBJECTIVES

- Tell how René Laennec invented the stethoscope in 1816.
- Explain how the heart pumps blood to carry oxygen to the body, and why it beats faster during exercise.
- Make a paper stethoscope and find your pulse at the wrist.
- Count and graph your heart rate at rest, after exercise and after resting.

Warm-up. Sit quietly for 1 minute with your hand flat on the left side of your chest. Can you feel a soft thump? Then do 30 seconds of jumping jacks and put your hand back on your chest. Now do 30 seconds of fast high knees and feel again. Finish with 1 minute of slow walking and 5 deep breaths. Think about it: why does your heart beat harder when you move?

WATCH

How to Feel Your Heart Beat

SciShow Kids · 3:35

<https://www.youtube.com/watch?v=tF9-jLZNM10>

WHEN TO WATCH

In Session 1, after the story. Pause the video and practice finding your pulse at your wrist and neck along with the host.

Note: Teaches how the heart pumps oxygen-rich blood and how to take your pulse. In this course we take the pulse at the wrist, pressing gently.

BACKUP VIDEO

The Human Heart for Kids | Educational video to learn all about how the heart works

Learn Bright · 6:10

<https://www.youtube.com/watch?v=rnIUFRx0DjI>

For a closer look at the four rooms of the heart and the valves that make the “lub-dub” sound.

KEY TERMS

heart

A strong muscle in your chest, about the size of your fist, that pumps blood all around your body.

pulse

The beat you can feel in a blood vessel (at your wrist or neck) each time your heart pumps.

oxygen

A gas in the air that every part of your body needs. Your lungs take it in, and your blood carries it everywhere.

stethoscope

A tool doctors use to listen to the heart and lungs. The name comes from Greek words meaning “to look at the chest.”

heart rate

How many times your heart beats in one minute.

aerobic exercise

Steady exercise, like walking fast, jogging, skipping or biking, that makes your heart and lungs work harder for a while.

CORE IDEAS

The story. René Laennec was born in 1781 in Brittany, in the west of France, and became a doctor in Paris. In 1816, at the Necker Hospital, a young woman came to him with a sick heart. In those days, a doctor listened to a patient’s heart by pressing his ear right against her chest, but that was not proper with a young lady, and it was hard to hear well anyway. Laennec remembered something he had seen in the courtyard of the Louvre palace: children playing with a long piece of wood. One child scratched a pin on one end, and another child, with an ear pressed to the other end, could hear the scratch clearly.

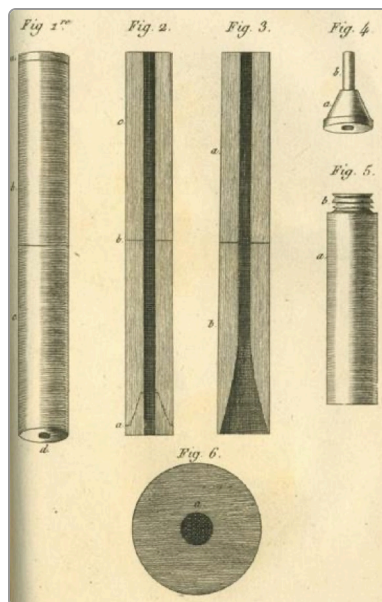
How they figured it out. Laennec took a few sheets of paper and rolled them into a tight tube. He put one end on the woman’s chest and his ear to the other end. To his delight, he could hear her heartbeat more clearly than he ever had before! Then he made a better tube out of wood, about a foot long, and spent three years listening to the hearts and lungs of hundreds of patients, writing down every sound: healthy hearts and sick ones, clear lungs and crackling ones. In 1819 he published a book about it, and he named his tube the **stethoscope**. Laennec was a man of strong Christian faith, and he was known for his kindness to the poor patients in his

hospital. Today every doctor carries a stethoscope, the great-grandchild of his paper tube.

How your body works. Almost 200 years before Laennec, an English doctor named William Harvey showed that the heart pumps blood around the body in a great circle. Your **heart** is a muscle with two pumps side by side. One pump sends blood to your lungs to pick up **oxygen**; the other sends that oxygen-rich blood out to every part of your body through tubes called arteries, and veins bring it back. Each squeeze makes a beat you can feel as your **pulse**. The “lub-dub” sound is the little doors (valves) inside your heart snapping shut. When you sit still, a child’s heart beats roughly 70 to 110 times a minute. When you run and play, your muscles need much more oxygen, so your heart beats faster and harder and you breathe faster. Then, when you rest, it slows down again. **Aerobic exercise**, like running, skipping, biking and swimming, makes your heart muscle stronger, so it can pump more blood with each beat.

Try it. This week you will make a paper stethoscope like Laennec’s, listen to a family member’s heart, and count your own heart rate at rest, after exercise and after a rest. To find your pulse, turn your hand palm up and press two fingers (not your thumb) gently on the thumb side of your wrist. Count the beats for 15 seconds, then multiply by 4 (or add the number four times) to get beats per minute.

PICTURE STUDY



Drawings of the Stethoscope, from On Mediate Auscultation, René Laennec, 1819 · Engraving (book illustration) · From Laennec's book De l'auscultation médiate, published in Paris

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

This page from Laennec's book shows the wooden stethoscope he made after his first paper tube. Figure 1 shows the whole tube. Figures 2 and 3 show it cut in half so you can see the hole running through it. Figures 4 and 5 show pieces that fit together, and Figure 6 shows the end.

Look closely

- Find Figure 1, the whole stethoscope. How long do you think it was? (About a foot.)
- Look at Figures 2 and 3. What runs down the middle of the tube?
- Find the funnel-shaped piece in Figure 4. Why might a wide end help catch sounds?
- Find the screw threads in Figure 5. Why would a doctor want a stethoscope that comes apart?

Talk about it

1. How is this wooden tube like the paper tube you will make?
2. What do you think a doctor can learn by listening to a heart beat?

3. Why does your heart beat faster during exercise, and what happens when you rest?

Safety first. Take your pulse at the wrist, pressing gently with two fingers. When listening with a paper tube, never shout into it and never put anything inside your ear. During the exercise bouts, stop and tell an adult right away if you feel chest pain, dizziness, faintness or trouble breathing.

ACTIVITY

My Paper Stethoscope and the Heartbeat Test

René Laennec listened to hearts with a rolled-up paper tube. You will make one, listen to a heartbeat, and then count your own pulse before and after exercise to see how your heart answers when your muscles need more oxygen.

You will need

- A sheet of stiff paper or light cardboard (or an empty paper-towel tube) and tape
- A quiet room and a family member to listen to
- A timer that shows seconds, and a helper to call “start” and “stop”
- Fitness journal with a heart-rate table: rest, after exercise, after 1 minute of rest, after 2 minutes of rest

Steps

1. **Make the stethoscope (Session 2).** Roll the paper into a tight tube about as wide as a quarter and tape it closed (or use the paper-towel tube).
2. **Listen.** In a quiet room, gently place one end of the tube over a family member’s heart (on the left side of the chest, over a shirt) and press your ear lightly to the other end. Listen for “lub-dub.” Then listen with just your ear against their back. Which is clearer? Write what you heard.
3. **Resting pulse.** Sit quietly for 2 minutes. Find your pulse at your wrist. When your helper says “start,” count beats until “stop” 15 seconds later. Multiply by 4 and record your resting heart rate.
4. **Exercise bout.** Do 1 minute of jumping jacks as fast as you can with good form. Right away, count your pulse for 15 seconds and record it (times 4).
5. **Recovery.** Sit and rest. Count your pulse again after 1 minute of rest and after 2 minutes of rest. Record both. Your heart slows down as it catches up.
6. **Listen again.** Have your family member do 1 minute of jumping jacks and listen to their heart with your stethoscope. Is it faster? Louder?
7. **Session 3: Test again.** Repeat the resting pulse, then try a different 1-minute exercise: jogging in place, high knees or step-ups on the bottom stair. Count

after the exercise and after 1 and 2 minutes of rest. Which exercise made your heart beat fastest? How quickly did it slow down?

8. **Cool down** with 2 minutes of slow walking and a drink of water. Then make a bar graph with four bars: rest, right after exercise, 1 minute later, 2 minutes later.

Tips

- If you cannot find your pulse, move your fingers a little and press a bit more gently; pressing too hard can hide it.
- Count the first beat as “one,” not “zero.”
- Your numbers are your own. A healthy heart rate is different for everyone, and it changes with exercise, rest and even excitement.

Check your work

- ☐ I can tell how René Laennec invented the stethoscope.
- ☐ I made a paper stethoscope and heard a heartbeat.
- ☐ I counted my heart rate at rest, after exercise and after resting, and made a bar graph.

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1. Draw a heart with two pumps. Draw arrows to show blood going to the lungs to pick up oxygen and out to the body. Color oxygen-rich blood red and returning blood blue.
2. Copy your heart-rate table from both sessions and make a bar graph.
3. Draw Laennec listening with his tube, and write one sentence about how he got the idea.
4. Write one sentence: how did your body feel right after exercise, and how did it feel 2 minutes later?

From history. Laennec’s wooden stethoscope had only one earpiece. The stethoscope with two earpieces and rubber tubes, like the ones doctors wear today, came along in the 1850s. Laennec’s 1819 book taught doctors around the world what the heart and lungs sound like when they are healthy and when they are sick.

COMMON MISTAKES

- Using your thumb to find a pulse. Your thumb has its own pulse; use two fingers.

- Pressing too hard on the wrist or neck. Press gently.
- Waiting too long to count after exercise. Count right away, because your heart starts slowing down quickly.
- Thinking the heart is shaped like a valentine. It is a strong, rounded muscle about the size of your fist.

Make it a game • Paper Stethoscope Duel. Roll a paper tube like Laennec and listen to your parent's heartbeat for fifteen seconds, counting beats. Then jump in place for thirty seconds and listen again. Predict if the beats rise or fall and explain why. Record both numbers. Switch and see whose count rises more after jumping.

5.2 RUN-WALK PACING

OBJECTIVES

- Tell how Edward Payson Weston walked across America at age seventy by keeping a steady pace.
- Explain pacing and why starting too fast makes you tire early.
- Run a timed run-walk course on a marked loop, count laps and check your pace with the talk test.
- Retest the run-walk to improve, and plan and lead a family fitness day.

Warm-up. Running drills along a 10-step stretch, twice each: walking high knees, heel kicks (heels toward your seat), skipping with big arm swings, side shuffles each way, and a slow jog. Then 10 arm swings as if running: elbows bent, hands swinging from chin to hip, not across your body. Think about it: if you had to keep moving for 8 minutes, would you start fast or steady?

WATCH

KIDDO: Learn how to run

KIDDO · 2:10

<https://www.youtube.com/watch?v=Ly-Zh-rXeh4>

WHEN TO WATCH

In Session 2, after the warm-up. Watch the boy's mistakes in the first half and his good form in the second half, then copy the arm swing and the slight forward lean.

Note: A short, quiet video with on-screen cues from KIDDO, a children's movement-skills program at a Canadian university. A boy in a T-shirt and shorts runs across a field.

BACKUP VIDEO

Running Form & Mechanics | Kidz In Shape

Kidz In Shape · 4:39

<https://www.youtube.com/watch?v=jVuHI5nGi2I>

For extra practice on the arm swing, done sitting, kneeling and standing.

KEY TERMS

pace

How fast you are moving. A steady pace is one you can keep for a long time.

endurance

Being able to keep going for a long time without getting worn out.

run-walk

A way of training in which you jog for a set time, then walk for a set time, and repeat.

lap

One time around a course or loop.

interval

A set stretch of time, such as 1 minute of jogging or 1 minute of walking.

CORE IDEAS

The story. Edward Payson Weston was born in Providence, Rhode Island, in 1839, and he became the most famous walker in the world. He walked hundreds and even thousands of miles in long-distance walking events, and crowds came out to watch. In 1884, in England, he walked 5,000 miles in 100 days, resting every Sunday. Then, on his seventieth birthday in March 1909, Weston set out from New York City to walk all the way to San Francisco. Through heat, wind, rain and mosquitoes, often walking alone, he covered about 40 miles a day. He arrived in San Francisco a little more than three months later, after walking about 4,000 miles.

How they figured it out. How could a seventy-year-old man walk across a whole country? Weston did not race the first day and collapse the next. He kept a **steady pace** he could hold for hours, rested and ate well, and got up and went again the next day. He also spent his later years telling people that walking was one of the best things they could do for their health, and he warned that riding everywhere in automobiles was making people lazy. His secret was not speed but **endurance**: faithfulness, mile after mile.

How your body works. When you start too fast, your muscles use up their quick energy and your heart and lungs cannot bring in oxygen fast enough. You soon have to slow down or stop, breathing hard. When you choose a steady pace, your heart and lungs can keep up, and you can keep going much longer. A **run-walk** is a smart

way to build endurance: jog for a short time, walk to let your heart and breathing settle, then jog again. Over a few weeks your heart grows stronger and you can jog longer and walk less. Use the talk test: during the jog you should be able to say a few words; during the walk you should be able to talk easily.

Think it through. Isaiah wrote that those who wait upon the Lord “shall run, and not be weary; and they shall walk, and not faint.” Strength for the long road comes from God. In running, as in life, a steady, faithful pace takes you far.

Try it. This week you will mark a loop, run-walk for 8 minutes, count your laps and check how even your pace was. In Session 3 you will try again, and then you will lead your family in a family fitness day.

PICTURE STUDY



The Skating Minister (The Reverend Robert Walker Skating on Duddingston Loch), Attributed to Sir Henry Raeburn, About 1795 · Oil on canvas · Scottish National Gallery, Edinburgh

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

The Reverend Robert Walker was a minister of the Church of Scotland and a member of the Edinburgh Skating Club, one of the first skating clubs in the world. Here he glides calmly across the frozen loch near Edinburgh. Notice how smooth and steady he looks.

Look closely

- Look at his legs. Which leg is pushing, and which is gliding?
- Look at his arms. Why might he fold them across his chest instead of waving them?
- Look at his face. Does he look rushed or calm? What does that tell you about his pace?
- Look at the ice and the hills. Can you find the scratch marks from skates?

Talk about it

1. Skating, like running, can be done fast or steady. Which pace could he keep up for a long time?
2. How does balance help a skater, or a runner, move smoothly?

3. What steady, aerobic activity could your family do together in each season of the year?

Safety first. Run in daylight on a safe path, track or yard away from traffic, with an adult or buddy, and wear good running shoes. Warm up first and walk at least 3 minutes after you finish. Walking is always allowed. On hot days run early or late, keep water nearby, and stop and tell an adult right away at chest pain, dizziness, faintness, trouble breathing or sharp pain.

ACTIVITY

The Eight-Minute Run-Walk and the Family Fitness Day

Edward Weston crossed America with a steady pace. You will build your own endurance with a run-walk on a marked loop, count your laps, test yourself again, and then lead your family through a fitness day that brings together everything you learned this quarter.

You will need

- A safe loop marked with chalk, cones, cups or shoes (about 50 big steps around a yard, or a short loop at a park or track)
- A timer that beeps each minute, or a helper calling “jog” and “walk”
- A pencil or a handful of small stones to count laps
- Water, and a fitness journal with a run-walk chart: date, laps in each 2-minute block, total laps, talk test, how it felt

Steps

1. **Warm up (5 minutes):** walk one lap, jog one easy lap, then the running drills from the warm-up.
2. **The eight-minute run-walk (Session 2).** Jog for 1 minute, walk for 1 minute, and repeat 4 times (8 minutes in all). Each time you pass the start line, drop a stone or make a tally mark. Your helper writes down how many laps you finished at the end of each 2-minute block.
3. **Check your pace.** During one jog, try the talk test: say “I can run and not be weary.” If you cannot say it, slow down a little. Your goal is about the same number of laps in every 2-minute block. That is an even pace.
4. **Cool down (3–5 minutes):** walk a lap slowly, then stretch your calves, thighs and the backs of your legs for 15 seconds each. Drink water. Take your pulse and write it down.
5. **Record.** Write your total laps and the laps in each block. Did you start too fast? Was your pace even?
6. **Session 3: Retest.** Warm up the same way and do the same 8-minute run-walk on the same loop. Try to keep an even pace and finish at least one more

lap, or try jogging 90 seconds and walking 30 seconds if the first plan felt easy. Record your new numbers next to the old ones.

7. **Plan the family fitness day.** Choose a day and time. Make a simple plan: (1) you lead the warm-up; (2) four stations, one from each unit, such as balloon volleyball (Unit 1), the aqueduct relay (Unit 2), squats and wall push-ups with good form (Unit 4) and a heartbeat check with your paper stethoscope (Unit 5); (3) a water table and a snack you help make, such as your slaw or bean dip (Unit 3); (4) a family run-walk around your loop, where everyone moves at their own pace; (5) a cool-down and a prayer of thanks.
8. **Lead it.** On the family fitness day, explain each station, show good form, cheer everyone on, and record how many family members took part and what everyone enjoyed most.

Tips

- Start slower than you think you need to. You can always speed up in the last 2 minutes.
- Swing your arms forward and back, not across your body, and run tall with a slight lean.
- On the family fitness day, the goal is joy and everyone moving, not winning.

Check your work

- ☐ I can tell how Edward Payson Weston walked across America with a steady pace.
- ☐ I ran the 8-minute run-walk twice, counted my laps and checked my pace.
- ☐ I planned and led a family fitness day with a station from every unit.

FITNESS JOURNAL

1. Copy your run-walk chart from both sessions. Make a bar graph of laps in each 2-minute block to see if your pace was even.
2. Draw a map of your loop with the start line, the cones and an arrow showing which way you ran.
3. Write your family fitness day plan: the warm-up, the four stations, the snack, the run-walk and the cool-down.
4. After the family fitness day, write three sentences about what went well, what was hard and what your family enjoyed most.

From history. Edward Payson Weston kept walking long distances into his seventies. In 1910, the year after his walk to San Francisco, he walked across America again, this time from Los Angeles to New York. His walks helped many Americans see that walking is good exercise for people of any age.

COMMON MISTAKES

- Sprinting the first lap and having to stop. Start steady.
- Skipping the walk breaks to look tough. The walks are part of the plan and help you go farther.
- Running with arms swinging across the body or with tight fists. Relax and swing forward and back.
- Forgetting water and a cool-down. Drink and walk after every run.

Make it a game • Pace the Walker. Walk across the room and back with your parent timing you, first racing too fast and then pacing yourself like Edward Payson Weston. Keep going until a timer rings at three minutes. Who tires first? Then explain why starting too fast makes you tire early. Try a run-walk and score the longest steady effort.

Scripture. “they shall run, and not be weary; and they shall walk, and not faint.” (Isaiah 40:31, KJV)

Endurance grows little by little, and true strength comes from the Lord. Run and walk with a steady, faithful pace.

UNIT 5

AEROBIC TRAINING

Your heart is a muscle about the size of your fist, and it beats about a hundred thousand times every day without ever taking a day off. In this unit you will meet René Laennec, a French doctor who in 1816 rolled a sheet of paper into a tube and invented the stethoscope, so doctors could listen to the heart. You will make your own paper stethoscope, learn to find your pulse, and count how your heartbeat speeds up when you exercise and slows down when you rest.

Then you will meet Edward Payson Weston, who at seventy years old walked all the way across America by keeping a steady pace day after day. You will learn about pacing, run a timed run-walk course on a marked loop, test yourself again to see if you can go farther, and lead your family in a family fitness day to finish the quarter.

PREREQUISITES

- Can count by fours or add a number four times (for 15-second pulse counts), with help if needed
- Knows the talk test (Lesson 1.1) and how to drink water before, during and after play (Unit 2)
- Has done the warm-up and cool-down many times

MASTERY CHECKLIST

- ☐ I can tell how René Laennec invented the stethoscope.
- ☐ I can explain that my heart is a muscle that pumps blood to carry oxygen all around my body.
- ☐ I can find my pulse at my wrist and count my heartbeats before and after exercise.
- ☐ I can explain pacing and why a steady pace lets me go farther.
- ☐ I can run a run-walk course, record my laps and try to improve.

OPTIONAL BOOKS AND GEAR FOR THIS UNIT

- **“Your Heart & Circulatory System” (Nemours KidsHealth):** Free. A kids’ article on how the heart and blood vessels work. Read it with Lesson 5.1.
- **A jump rope:** Optional. A fun extra station for the family fitness day.
- **Sidewalk chalk and a stopwatch with a lap button:** Optional. For marking the run-walk loop and timing laps; a phone timer and cups as markers work too.

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

LESSONS IN THIS UNIT

5.1 Laennec’s Paper Tube: Listening to the Heart

3 sessions of 30–40 minutes

5.2 Run-Walk Pacing

3 sessions of 30–40 minutes

UNIT 5 REVIEW

Answer each question in complete sentences, aloud or in writing. The review is worth 30 points. You may show a movement as part of your answer.

1. **4 pts**

How did René Laennec invent the stethoscope?

2. **5 pts**

What does your heart do, and why does it beat faster when you exercise?

3. **4 pts**

Explain how to take your pulse and find your heart rate.

4. **4 pts**

Your heart beat 20 times in 15 seconds at rest and 35 times in 15 seconds after jumping jacks. What were your heart rates in beats per minute?

5. **4 pts**

What would happen if you sprinted as fast as you could at the start of an 8-minute run?

6. 5 pts

How did Edward Payson Weston walk across America at age seventy?

7. 4 pts

Name two ways aerobic exercise helps your body.

ANSWER KEY

1. In 1816 he needed to listen to a young woman's heart. Remembering children listening to a scratch through a long piece of wood, he rolled paper into a tube, put one end on her chest and his ear to the other, and heard her heart clearly. Later he made a wooden tube and named it the stethoscope.
2. The heart is a muscle that pumps blood to the lungs to pick up oxygen and then out to the whole body. During exercise your muscles need more oxygen, so the heart beats faster and harder to deliver it.
3. Press two fingers (not the thumb) gently on the thumb side of the wrist, count the beats for 15 seconds, and multiply by 4 to get beats per minute.
4. At rest: $20 \times 4 = 80$ beats per minute. After jumping jacks: $35 \times 4 = 140$ beats per minute.
5. You would run out of quick energy and get out of breath, so you would have to slow down a lot or stop, and you would probably cover fewer laps than with a steady pace.
6. In 1909 he walked from New York to San Francisco, about 4,000 miles in a little over three months, by keeping a steady pace of about 40 miles a day, resting, eating well and starting again each day.
7. Any two: it makes the heart muscle stronger so it pumps more blood with each beat, strengthens breathing, builds endurance so you can play longer, helps you sleep and feel good.

UNIT CHALLENGE: MY RUN-WALK CHART AND FAMILY FITNESS DAY

Keep a run-walk chart for two weeks: do your 8-minute run-walk at least four times, on the same loop, recording your laps in each 2-minute block, your total laps, your pulse after the cool-down and how it felt. Make a line graph of your total laps. Then plan and lead your family fitness day with a warm-up, a station from each unit, a water table and snack, a family run-walk and a cool-down. Write three sentences about your progress and three about the family fitness day, and finish the quarter by retesting your four-station fitness check from Lesson 1.1.

LOOK FOR	WHAT IT MEANS
Faithful training	At least four run-walks recorded with dates, laps for each block, totals and pulse.
Pacing	The chart shows the student working toward an even pace, using the talk test, and trying to improve.
Family fitness day	A written plan with a station from every unit, led by the student with clear explanations and good form.
Reflection and retest	A neat graph, six thoughtful sentences and the final fitness-check retest compared with Lesson 1.1. Effort and improvement count, not speed.