

GRADE 1 GEOGRAPHY: MAPS AND JOURNEYS

A year of first maps and real journeys, from a picture of the neighborhood drawn from above and a needle compass floating on a leaf to the Rocky Mountains, the water that runs to the sea, the hot lands and the cold lands, the animals' homelands on every continent, and the explorers who went where feet alone could not go: Leif Erikson's longship, Columbus's three small ships, Lewis and Clark's canoes and the covered wagons on the plains.

First edition

"And hath made of one blood all nations of men for to dwell on all the face of the earth, and hath determined the times before appointed, and the bounds of their habitation;" (Acts 17:26, KJV)

COURSE GUIDE

This course teaches a first grader to read a real map and to see the wide world God made. It follows eight steps through one school year: map symbols and keys, the four directions, the shapes of the land, the water cycle, hot and cold places, my state and my country, animals and their homelands, and the explorers who crossed land and sea. Each unit is built around real places and real moments: a bird's-eye town view from the 1880s, a compass rose from an old sailing chart, the Rocky Mountains, the Sahara, Mount Kilimanjaro with snow on its top, Washington, D.C., the bamboo forests of the pandas, and the long journeys of Leif Erikson about AD 1000, Columbus in 1492 and Lewis and Clark from 1804 to 1806.

Every lesson follows the same simple path. First comes **the story**, read aloud: a real place, a real person or a real thing that happens outside the window. Then **the big idea**, told in short, plain sentences: a map is a picture from above, the sun rises in the east, water goes up and comes back down. Then the student **looks** at a real painting, print or old map, and last the student **makes or does** something with his or her hands: a map with a key, a needle compass, a salt-dough mountain, a water cycle in a bag, a paper sailing ship.

A thread runs through the whole year: **people use what they make to go where the land and water would stop them**. A magnetized needle shows the way north. A canoe carries people up a river, a sailing ship carries them across the ocean, and a covered wagon carries a family across the plains. Lessons in this thread are marked ⚙, and the whole last unit belongs to it. It is the first step in one of the great stories of the world, technology overcoming geography, which the School Launch Geography series follows all the way to railroads, airplanes and satellites.

The course begins and ends with the Creator. "The earth is the LORD's, and the fulness thereof; the world, and they that dwell therein" (Psalm 24:1). The mountains, the rain, the hot lands and the cold lands, and the animals in their homes are His work, and so are the peoples who live in every land: God "hath made of one blood all nations of men for to dwell on all the face of the earth, and hath determined the times before appointed, and the bounds of their habitation;" (Acts 17:26). The year ends with an optional bonus unit, **Map Lab**: a compass walk, a symbol-matching game, a tea-stained pirate map and a globe spin game.

WHO IT IS FOR

Written for students in grade 1 (about ages 6–7), read aloud by a parent or teacher. The student does not need to read on his or her own; he or she listens, points, tells back, draws, counts, colors and builds. A parent sits alongside for every lesson, leads the walks around the block and the yard, and helps with the needle, the flashlight and the kitchen projects. Nothing needs to be bought beyond ordinary household things: paper, crayons, a flashlight, a ball or globe, a sewing needle and magnet, and flour and salt for dough.

HOW TO USE THIS COURSE

The weekly rhythm. The year has 32 lessons, one a week, in eight units of four, plus the optional four-lesson Map Lab. Session 1 (30–40 minutes) is the warm-up, the story and big idea read aloud, the video and the picture study. Session 2 (30–40 minutes) is the project, the worked example, the practice and a page in the map notebook. In the last week of each unit, add a short third session for the unit review and the unit project. The explorers unit fits well near Columbus Day in October if your family wants to move it.

The quarter path and the technology thread. Ten lessons are marked ★. Together they make a one-quarter version of the course for families who want a shorter year or a summer study; they keep the core map skills and the explorers. Lessons marked ⚙ carry the technology thread: the needle compass and the canoes, ships and wagons that let people go where they could not walk.

Picture study and the map notebook. Each unit has a real painting, print or old map, such as Bierstadt’s *The Rocky Mountains, Lander’s Peak* or a compass rose from a 16th-century sailing chart. Look at it quietly for one minute, put it away, and have the student tell everything he or she remembers; then bring it back and find the “look for” items. Use one large unlined or primary-ruled notebook for the whole year. Every lesson adds one page: a drawn map, a key, a compass rose, a colored band of the world or an animal on its continent. Write the date and one word the student chooses as a title.

Worked examples and practice. Each lesson has one very simple worked example to do together (count the squares from the house to the tree, point to north, which river is longer) and five short practice items, most of them oral: point, draw, match, count or tell. The answers are printed with the lesson, so a parent can check at a glance. A wrong answer is a reason to look at the map again together, not a mark against the child.

Unit reviews and unit projects. Each unit ends with a short review of 6–8 questions a parent asks aloud (20 points) and a unit project that pulls the unit together: a neighborhood map with a key, a needle compass, a salt-dough landform map, a water cycle in a bag, the flashlight-and-globe test, a salt-dough state, an animal-homeland world map, and a paper ship and shoebox wagon. Keep the unit projects, or photographs of them, in one folder for the year.

Part of a series. This is the second year of the School Launch Geography series, which runs from kindergarten to high school; Grade 2, *Our Country, Coast to Coast*, builds on the state and country lessons here. The course pairs well with the School Launch Engineering and Physics course, which explains how boats, wheels and magnets work, and with the Business and Finance course, which shows why people traveled and traded in the first place.

SCOPE AND SEQUENCE

Unit 1: Map Symbols and Keys (1–4)

A map is a picture of a place from above, drawn smaller; little pictures stand for trees, houses, roads and water; a key tells what each symbol means; and the student walks the block and draws a neighborhood map.

Unit 2: North, South, East and West (5-8)

The compass rose and the four directions; the sun rising in the east and setting in the west; a magnetized needle that points north; and giving directions using only north, south, east and west.

Unit 3: The Shape of the Land (9-12)

Mountains, hills and plateaus from the Rockies to the flat-topped mesa; the Great Plains and their farms; the Sahara and the saguaro cactus; and coasts, bays and beaches where land meets sea.

Unit 4: The Water Cycle (13-16)

Water goes up as a puddle dries in the sun, gathers in clouds and falls as rain, runs in rivers to the sea, and waits underground in springs and wells, from Jacob's well to the family well.

Unit 5: Hot, Cold and In-Between (17-20)

Why the lands near the equator are hot and the poles are icy; the temperate lands with four seasons; and why Kilimanjaro has snow on its top even near the equator.

Unit 6: My State and My Country (21-24)

The shape, capital and one special place of my state; the fifty states and Washington, D.C.; our neighbors Canada and Mexico; and the flag, the bald eagle and the Liberty Bell.

Unit 7: Animals and Their Homelands (25-28)

Lions and zebras on Africa's savanna; pandas and yaks in Asia's bamboo forests and mountains; bison and sloths in the Americas; and kangaroos, koalas and emperor penguins in Australia and Antarctica.

Unit 8: Explorers by Land and Sea (29-32)

Leif Erikson's longships reach Vinland about AD 1000; Columbus crosses the ocean in 1492; Lewis and Clark paddle up the Missouri with Sacagawea's help; and families cross the plains in covered wagons.

Unit 9: Map Lab (optional bonus) (Any time)

Map games and puzzles to use after the year or alongside it: a compass walk, a symbol-matching game, a tea-stained pirate map and a globe spin game.

MATERIALS

- **Map notebook (a large unlined or primary-ruled composition book):** One for the whole year: drawn maps, keys, compass roses, colored world bands and animals on their continents.
- **Crayons, colored pencils, a pencil, a ruler, scissors and glue:** Used in nearly every lesson for drawing, coloring and cutting out symbols and animals.
- **A globe or a world map, and a map of the United States:** An inexpensive inflatable globe works well. A printed or library atlas is fine for the U.S. map.
- **A sewing needle, a bar or fridge magnet, a leaf or cork, and a bowl of water:** For the needle compass in Unit 2 and the compass walk in Map Lab. A parent handles the needle.
- **Flour, salt and water for salt dough, and a baking tray:** For the landform map in Unit 3 and the salt-dough state in Unit 6. Sand in a tray works for the coastline.
- **A flashlight, a ball or orange, a zip-top bag, a clear jar and a glass of ice water:** For the flashlight-and-globe sunlight test and the water cycle lessons.
- **Household things for the explorer projects:** Paper for a sailing ship, a shoebox, string and white paper or cloth for a covered wagon, and a cold tea bag for the pirate map.
- **A folder for unit projects:** Keep each unit project or a photograph of it for the year.
- **Optional: picture books, atlases or free map resources listed in a unit:** Never required. See the list in each unit.

GRADING

In first grade, grades come mostly from doing and telling: the projects, the map notebook and the spoken answers. A child who tries carefully, points to the right place and can tell back what he or she learned is doing first-grade geography well. Neat drawing matters less than a map that shows where things are.

- Projects (effort, following the steps and telling what was made): 35%
- Map notebook (one dated page a lesson, with a title and labels or a key): 25%
- Unit reviews (asked aloud): 15%
- Unit projects: 25%

A 90–100, B 80–89, C 70–79, D 60–69. Below 60: look at the map again together and redo the review or project with help.

- Grade the process, not just the result. Did the student look carefully, point to the right place, try the project and tell back the big idea in his or her own words?
- A map notebook page earns full marks when it has a date, a title and something labeled: a key, a compass rose, a named place or an animal on its continent. The parent may write the words the child dictates.
- Unit reviews are done aloud. The parent asks the questions, the child answers by telling, pointing or drawing, and the parent marks the score.

- Keep the unit projects in one folder. At the end of the year, let the student show them to family and tell the story of each one.

A NOTE TO PARENTS

You do not need to be a geographer to teach this course. Read the story aloud, look at the picture together, and then walk, build and draw with your child. Ask “Which way is north?”, “What is this little picture on the map?” and “How would you get there?” Those three questions are most of what a good geography teacher does in first grade. When you are not sure of an answer, look at the map together; that is the skill the course is building.

The course tells history honestly and simply. The explorers in Unit 8 were brave and skilled, and they crossed dangerous water and wild country. The lessons tell what they did and how they did it, and at a first grader’s level they also say plainly that the people who already lived in those lands were real people with homes and families, and that explorers did not always treat them rightly. Sacagawea’s help to Lewis and Clark is told as the true story it is. Nothing in the course asks you or your child to take a side in present-day public debates.

A word about time. This course is written from a Christian view of creation (Genesis 1:1) and the Flood (Genesis 6-9). Young children do not need ages in the millions of years, and the lessons give none. When your child meets one on a museum sign, in a library book or in a video, you can use the simple habit the later grades call “Thinking About Time”: some things we can watch and measure today, such as how fast a river carries sand or how much a beach changes after a storm, and the very large ages come from assuming things always went at today’s speed. Names such as “Ice Age” are taught as museum words, so your child can read any sign and still know that “in the beginning God created the heaven and the earth” (Genesis 1:1).

Above all, the course hopes to raise a child who looks at a map with curiosity, at a mountain or a rainstorm with wonder, and at people in faraway lands as neighbors made by the same God. Keep the needle and the flashlight close, let the salt dough get messy, and go outside often to watch where the sun comes up.

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- 1.1 What a Map Is ★
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- 1.3 The Map Key
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Unit 3: The Shape of the Land

- 3.1 Mountains, Hills and Plateaus ★
- 3.2 Plains and Prairies
- 3.3 Deserts
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Unit 4: The Water Cycle

- 4.1 Water Goes Up ★
- 4.2 Clouds and Rain
- 4.3 Rivers Run to the Sea ★
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Unit 5: Hot, Cold and In-Between

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- 5.3 Places with Four Seasons
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Unit 6: My State and My Country

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- 6.4 Symbols of the Nation

Unit 7: Animals and Their Homelands

- 7.1 Africa's Grasslands ★
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Unit 8: Explorers by Land and Sea

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- 8.2 Columbus Crosses the Ocean ★ ☼
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Unit 9: Bonus: Map Lab (optional)

9.1 Compass Walk

9.2 Symbol Match

9.3 Pirate Map

9.4 Globe Spin Game

★ quarter path · ⚙ technology overcoming geography

MAP SYMBOLS AND KEYS

A map is a picture of a place from above, drawn smaller. In this unit your child learns to look at the world the way a bird does, and then to read and make real maps. We begin with a pigeon that carried a tiny camera over a German town in 1907. We visit the plan for Central Park, where little round marks stood for trees, and the colorful fire insurance maps of Daniel Alfred Sanborn, whose key told what every color meant. We end with Thaddeus Mortimer Fowler, who walked the streets of hundreds of American towns and then drew each one from high in the sky.

Along the way your child learns three big ideas: a **map** shows a place from above, a **symbol** is a little picture that stands for a real thing, and a **key** tells what each symbol means. Every lesson has a picture to study and something to make: a traced toy town, a set of symbol cards, a park map with a key, and finally a map of your own neighborhood, drawn after a real walk around the block.

God “hath made of one blood all nations of men for to dwell on all the face of the earth, and hath determined the times before appointed, and the bounds of their habitation;” (Acts 17:26). He has placed each family in its own home and its own neighborhood. Learning to map that small place is the first step to understanding the great world He made.

BEFORE YOU BEGIN

- Can count objects to 10
- Can name simple shapes: circle, square, rectangle and triangle
- Can hold a crayon and draw simple shapes
- Knows the colors blue, green, yellow and pink

MASTERY CHECKLIST

- I can say what a map is: a picture of a place from above, drawn smaller.
- I can tell how a house and a tree look from above.
- I can draw symbols for a tree, a house, a road and water.
- I can use a map key to find and count things on a map.
- I can draw a map of my neighborhood with a key.

OPTIONAL BOOKS AND RESOURCES

- **Panoramic Maps, Library of Congress** (<https://www.loc.gov/collections/panoramic-maps/>): Free. More than a thousand bird’s-eye views of American towns and cities, including many by Thaddeus Mortimer Fowler. Search for your state or a town near you for the Lesson 1.4 picture study.
- **Sanborn Maps, Library of Congress** (<https://www.loc.gov/collections/sanborn-maps/>): Free. Colored fire insurance maps of American towns. A parent can search for

your town to find a page for the Lesson 1.3 picture study.

- **Central Park Conservancy** (<https://www.centralparknyc.org/>): Free. The park's own website, with a modern park map and its key. Compare it with the 1858 Greensward Plan in Lesson 1.2.

1.1 WHAT A MAP IS ★

OBJECTIVES

- Say what a map is: a picture of a place from above, drawn smaller.
- Tell how a house and a tree look from the side and from above.
- Tell the story of Julius Neubronner and his pigeon camera.

Warm-up. Put a cup, a book and a spoon on the floor. First crouch down and look at them from the side. Then stand on a sturdy chair (with a grown-up holding it) and look straight down. What changed? Which shapes do you see from up high?

Video. Coming soon. Kid-friendly videos under 8 minutes: a read-aloud of *Me on the Map* by Joan Sweeney, and a short animation on “what is a map” and the bird’s-eye view. Search Homeschool Pop (Alternate), SciShow Kids and the Library of Congress; candidates (need vetting): National Geographic Kids, Free School, Brightly Storytime-style read-alouds.

KEY TERMS

map

A picture of a place as it looks from above, drawn smaller than the real place.

from above

Looking straight down from high up, the way a bird sees the ground.

bird’s-eye view

What you would see if you were a bird flying over a place.

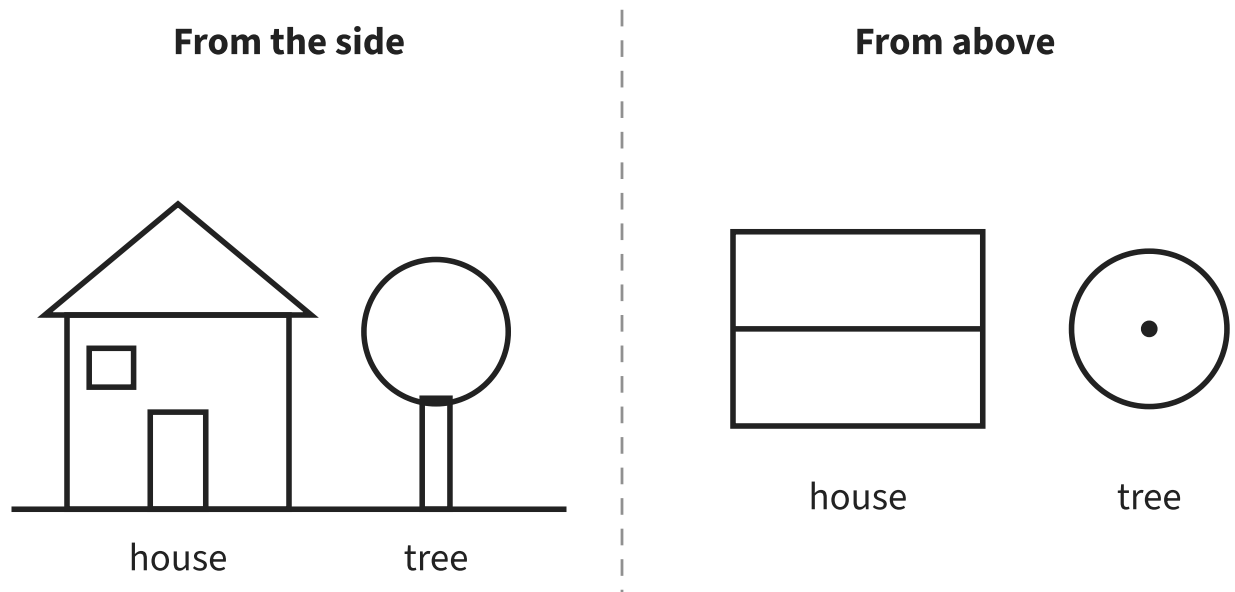
CORE IDEAS

The story. In the year 1907, in a little German town called Kronberg, there lived a man named Julius Neubronner. He was a pharmacist. That means he made and sold medicine. Mr. Neubronner kept pigeons. Pigeons can find their way home from far away, and his pigeons carried little notes for him. One day he had an idea. What does the town look like to a pigeon? He built a tiny camera, light enough for a pigeon to carry. He fastened it to a pigeon’s chest with a soft harness. Then he let the pigeon go. Up it flew over the rooftops, and click! The little camera took a picture all by itself.

How it worked. When people saw the pigeon pictures, they were amazed. They saw the town *from above*. They saw roofs, not doors. They saw the tops of trees, round like balls. They saw streets as long stripes between the houses. In some of the pictures you can even see the tips of the pigeon’s wings! Mr. Neubronner showed his pigeon pictures to crowds of people, and he sold some of them as postcards.

The big idea. A **map** is a lot like a pigeon's picture. It shows a place **from above**, the way a bird sees it. But a map is drawn, not photographed, and it is drawn much **smaller** than the real place. A whole town can fit on one sheet of paper. A whole country can fit on one page of a book. When you look at a map, pretend you are a bird looking down.

On the map. From the side, a house has a door, windows and a pointed roof. From above, you see only the roof, so the house looks like a rectangle. From the side, a tree has a trunk and leaves. From above, it looks like a circle. Look at the picture below. Can you find the house and the tree from above? God made the whole wide earth, and a map helps us see a little part of it all at once.



The same house and tree from the side (left) and from above (right). A map always looks from above.

PICTURE STUDY



A Photograph Taken by a Pigeon Camera, Julius Neubronner (the camera was carried by one of his pigeons), about 1908 · Black-and-white photograph · Taken near Kronberg im Taunus, Germany; the original is in the Kronberg town archive (Stadtarchiv Kronberg); public-domain copy on Wikimedia Commons

Julius Neubronner was a pharmacist in Kronberg, Germany, who loved his pigeons. He made a tiny camera that a pigeon could wear, with a timer that snapped a picture while the bird was flying. These are some of the very first pictures ever taken from the air by a bird.

In this pigeon photograph you can see houses, trees, fields and roads near Kronberg. Look at the left side: that big dark shadow is the tip of the pigeon's own wing!

Look closely

- Find a roof. What shape is it from above?
- Find the top of a tree. Is it round or square?
- Can you find a road or a path? What does it look like from up high?
- Look at the edges of the picture. Do you see a bit of the pigeon's wing?

Talk about it

1. Where was the pigeon when it took this picture: on the ground or up in the sky?
2. If you were a pigeon flying over your house, what would you see first?
3. How is this photograph like a map? How is it different?

PROJECT: TRACE A TOY TOWN

You will build a little town on paper, look at it from above like a pigeon, and trace it. When you lift the toys away, the outlines that are left are your very first map.

You will need

- A large sheet of paper or a paper grocery bag cut open
- Five to eight blocks, small boxes or toy cars
- A crayon or pencil
- A sturdy chair and a grown-up to help

Steps

1. Lay the paper on the floor. Set your blocks and boxes on it to make a little town. Leave space for a road.
2. Crouch down and look at your town from the side. Say what you see: tall blocks, short blocks, doors you pretend are there.
3. With a grown-up holding the chair, stand up and look straight down. Now you are a pigeon! Say what shapes you see.
4. Get down and trace around the bottom of each block with your crayon.
5. Draw two lines for a road between the blocks.
6. Lift all the blocks away. Look at the shapes left on the paper. This is a map of your toy town!
7. Write a title at the top, such as “Map of Toy Town.” A grown-up can help with the letters.

Tips

- Hold the crayon straight up and down when you trace so the shapes come out the right size.
- Put one block back on its outline and see if it fits. That shows the map matches the town.

Check your work

- I can say what a map is.
- I can point to the shape of a block from above.
- I made a map by looking down from above.

MAP NOTEBOOK

1. Draw your bed two ways: from the side and from above.
2. Draw a tree from the side. Next to it, draw the same tree from above as a pigeon would see it.
3. Draw a pigeon with a little camera on its chest, flying over a house.

From history. Mr. Neubronner’s pigeons had a real job before they ever carried cameras. They carried small messages, such as orders for medicine, between his shop in Kronberg and a hospital in a nearby town. He asked the German government for a patent on his pigeon camera and received it in 1908. A patent is a paper that says, “This is my invention.”

WORKED EXAMPLES

Example 1. Look at the picture. One side shows the house and tree from the side. One side shows them from above, the way a bird sees them. Which side is from above?

(Use the map or drawing “Which side is from above?” shown earlier in this lesson.)

1. Look at the left side. You can see a door, a window and a trunk. You only see those from the side.
2. Look at the right side. The house is a rectangle. That is the roof. The tree is a circle. That is the top of the tree.
3. From above, you see roofs and treetops, not doors and trunks.

Answer: The right side shows the house and tree from above.

PRACTICE

1. **EASY** Point to the tree seen from above in the picture. What shape is it?
(Use the map or drawing “Find the tree from above.” shown earlier in this lesson.)
2. **EASY** Which is bigger: your real bed, or a drawing of your bed on a map of your room?
3. **EASY** A pigeon flies over your house. Does it see your front door or your roof?
4. **MEDIUM** Look straight down at a round plate and then at a closed book. What shape is each one from above?
5. **MEDIUM** Draw a cup from the side. Then draw it from above.

COMMON MISTAKES

- Drawing doors and windows on a map. From above you see roofs, not doors.
- Thinking a map is the same size as the real place. A map is always drawn much smaller.
- Drawing trees with trunks on a map. From above, a tree top looks like a circle.

Make it a game • Bird or Ant?. A grown-up holds up a toy or a household thing. If the grown-up says “Bird!” you draw it the way a bird would see it from above. If the grown-up says “Ant!” you draw it the way an ant would see it from the side on the ground. Take turns and guess each other’s drawings.

Scripture. “The earth is the LORD’S, and the fulness thereof; the world, and they that dwell therein.” (Psalm 24:1, KJV)

Every town, every street and every tree we put on a map belongs to God, who made the whole earth. When we draw a map, we are learning to look carefully at His world.

Practice answers

1. The circle on the right side. It is a circle.

2. The real bed. A map is drawn smaller than the real place.
3. The roof.
4. The plate is a circle. The book is a rectangle.
5. From the side it is a tall shape (with a handle if it has one). From above it is a circle, like a ring, with the handle sticking out.

1.2 SYMBOLS

OBJECTIVES

- Say what a symbol is: a little picture that stands for a real thing.
- Draw and read map symbols for a tree, a house, a road and water.
- Tell how Frederick Law Olmsted and Calvert Vaux drew their plan for Central Park.

Warm-up. Look around your home for little pictures that stand for something: the picture on a light switch plate, a trash can sign, the arrows on a remote, a heart on a card. Name three. What does each little picture tell you?

Video. Coming soon. Kid-friendly videos under 8 minutes: a short animation on map symbols for young children, and a read-aloud of *Mapping Penny's World* by Loreen Leedy or *There's a Map on My Lap!* by Tish Rabe. Search Homeschool Pop (Alternate), SciShow Kids and Smithsonian; candidates (need vetting): National Geographic Kids, Free School, Brightly Storytime-style read-alouds.

KEY TERMS

symbol

A little picture or mark that stands for a real thing.

plan

A drawing from above that shows how a place will be built or laid out.

park

A green place with trees, grass and paths where everyone can walk and play.

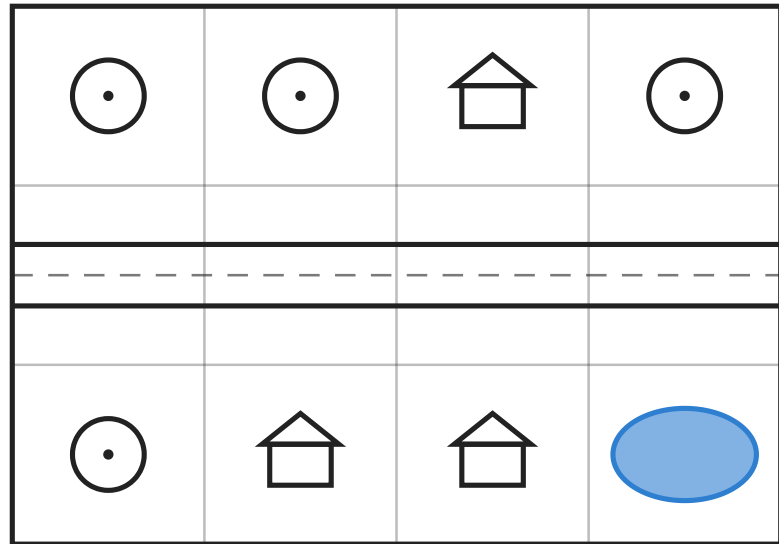
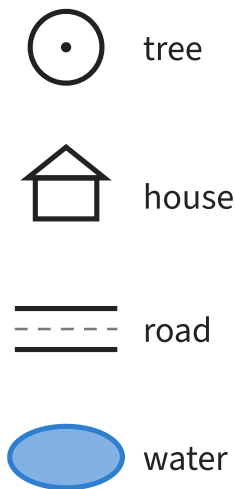
CORE IDEAS

The story. Long ago, in 1858, the great city of New York wanted a big new park. It would be a place where families could walk under trees and play on the grass, away from the noisy streets. The city held a contest. Anyone could draw a plan for the park, and the best plan would win. Two friends, Frederick Law Olmsted and Calvert Vaux, worked on a plan together in the evenings. They named it “Greensward.” A greensward is a wide field of green grass. Their plan won! The park they planned is Central Park, and families still walk and play there today.

How it worked. Mr. Olmsted and Mr. Vaux had a problem. The park was very, very big, but their drawing had to fit on paper. They could not draw every leaf on every tree. So they drew little marks instead. A small round puff meant a tree. Curvy lines meant paths and roads for walking and riding. Smooth shapes showed the lakes and ponds. Each little mark stood for something real in the park.

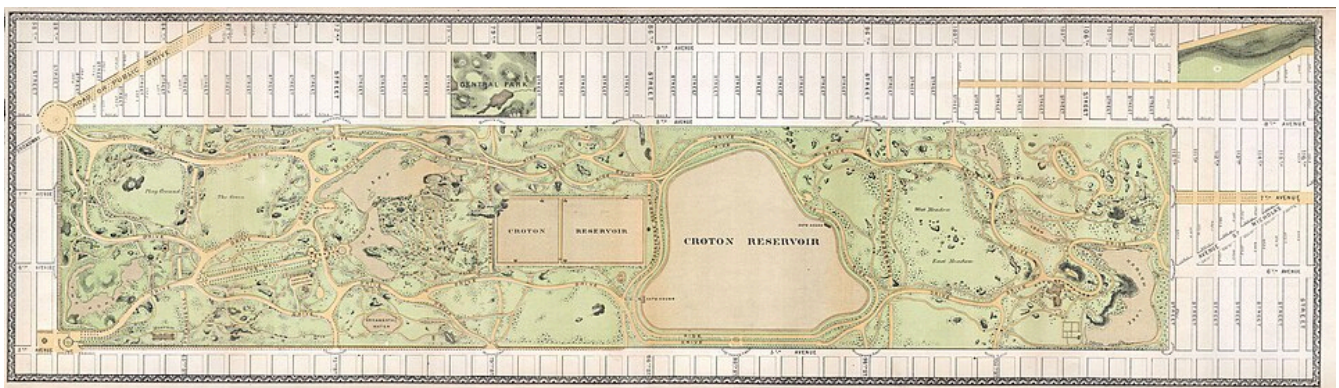
The big idea. A little picture that stands for a real thing is called a **symbol**. Maps are full of symbols. A real tree is tall and has a trunk and leaves. On a map, a tree can be a small circle. A real house has walls, a door and a roof. On a map, it can be a tiny house shape. Symbols are small and simple, so a whole park or a whole town can fit on one map.

On the map. Here are four symbols you will see on many maps. A *tree* is a circle. A *house* is a tiny square with a pointed roof. A *road* is two lines side by side. *Water* is colored blue. Look at the little map below. Can you find the trees, the houses, the road and the water? God made real trees and real water. Mapmakers only draw little pictures of them.



Four symbols (left) and a little picture map that uses them (right).

PICTURE STUDY



Map of the Central Park, Frederick Law Olmsted and Calvert Vaux (designers); printed by the Sarony lithography company, New York, 1868 · Lithograph (a printed map) colored by hand · Printed in a yearly report of the Board of Commissioners of the Central Park, New York; public-domain copy on Wikimedia Commons

In 1858 Frederick Law Olmsted and Calvert Vaux won a contest to plan Central Park in New York City. Ten years later, while the park was being built, the park commissioners printed

this map of it. The park is long and thin, like a ruler, with city streets all around it.

Look closely. The mapmakers used little marks for trees, lines for paths and smooth shapes for water. Those little marks are symbols.

Look closely

- Find some trees. What do they look like on the map?
- Find a path. Is it straight or curvy?
- Find a pond or the big reservoir. How can you tell it is water?
- Look at the edges. Do the city streets look straight or curvy?

Talk about it

1. Why do you think Mr. Olmsted and Mr. Vaux made the paths curvy instead of straight?
2. If you were planning a park, what would you put in it?
3. Why didn't the mapmakers draw every leaf on every tree?

PROJECT: SYMBOL CARDS AND A TABLE-TOP MAP

You will make your own set of map symbol cards and lay them out to build a picture map of a pretend place. Then you will move them around to make a new map.

You will need

- An index card or a piece of heavy paper cut into 12 small squares
- Crayons, including blue and green
- A large sheet of paper for the base of the map
- Child-safe scissors (a grown-up can cut)

Steps

1. Draw a tree symbol (a circle) on four cards. Color them green.
2. Draw a house symbol (a tiny square with a pointed roof) on four cards.
3. Draw a road symbol (two lines side by side) on two cards.
4. Color two cards blue for water.
5. Lay the big sheet of paper on the table. Put the road cards down first, then the houses beside the road.
6. Add the trees and the water wherever you like. Now you have a picture map!
7. Tell a grown-up about your map: "Here are the houses. Here is the pond." Then mix up the cards and build a new map.

Tips

- Keep each symbol small and simple. A symbol is not a big drawing.
- Make all the tree cards look the same, so everyone knows they mean the same thing.

Check your work

- I can say what a symbol is.
- I can draw symbols for a tree, a house, a road and water.
- I built a picture map using symbols.

MAP NOTEBOOK

1. Draw the four symbols from the lesson: tree, house, road and water. Say the name of each one.
2. Make up a new symbol for something in a park, such as a slide or a swing.
3. Draw a tiny map of a pond with three trees around it.

From history. Before the park could be built, the land was rocky and swampy in many places. Workers blasted rocks, dug out new lakes and planted a great many trees and bushes. Frederick Law Olmsted went on to plan many other parks across America, and people often call him the father of American landscape architecture. A landscape architect is a person who plans parks and gardens.

WORKED EXAMPLES

Example 1. Look at the little map on the right side of the picture. A circle is the symbol for a tree. How many trees are on the little map?

(Use the map or drawing “Count the tree symbols on the little map.” shown earlier in this lesson.)

1. Look at the symbols on the left. The tree symbol is a circle.
2. Now look at the little map. Put your finger on each circle as you count it.
3. There are three circles in the top row and one circle in the bottom row.
4. Three and one more make four.

Answer: There are 4 trees.

PRACTICE

1. **EASY** Look at the little map. How many houses are there?
(Use the map or drawing “Count the houses.” shown earlier in this lesson.)
2. **EASY** Point to the water on the little map. How do you know it is water?
3. **EASY** What do two lines side by side stand for on the little map?
4. **MEDIUM** Match each real thing to its symbol: a tall oak tree, a pond, a street, your house.
5. **MEDIUM** Draw your own symbol for a barn. Tell why you chose it.

COMMON MISTAKES

- Drawing big, detailed pictures instead of small, simple symbols.
- Using a different symbol for each tree. All the trees on one map should use the same symbol.

- Coloring water green or brown. On most maps, water is blue.

Make it a game • Symbol Charades. A grown-up draws one map symbol on a card and holds it up. You act out the real thing it stands for: stand tall with your arms out like a tree, pretend to swim for water, drive a pretend car for a road, or make a roof with your hands for a house. Then switch, and you draw the symbol while the grown-up acts.

Scripture. “And out of the ground made the LORD God to grow every tree that is pleasant to the sight, and good for food; the tree of life also in the midst of the garden, and the tree of knowledge of good and evil.” (Genesis 2:9, KJV)

God planted the very first garden, full of trees. When people plant parks and draw little tree symbols on maps, they are enjoying and caring for the good things God made.

Practice answers

1. 3 houses.
2. The blue oval in the bottom right corner. Water is shown in blue.
3. A road.
4. Oak tree: a circle. Pond: a blue shape. Street: two lines. House: a tiny house shape.
5. Any small, simple picture is fine, such as a house shape colored red or with a big door. It should be easy to tell apart from the house symbol.

1.3 THE MAP KEY

OBJECTIVES

- Say what a map key is: the box that tells what each symbol means.
- Use a key to find and count things on a map of a park.
- Make a map of a park with a key of my own.

Warm-up. A grown-up draws three secret symbols on a paper, such as a star, a square and a wavy line, without saying what they mean. Can you guess what they stand for? Now the grown-up writes what each one means beside it. Is it easier now? That little list is a key!

Video. Coming soon. Kid-friendly videos under 8 minutes: a short animation on reading a map key (map legend) for young children, and a read-aloud of a picture book about maps, such as *Me on the Map* by Joan Sweeney. Search Homeschool Pop (Alternate), SciShow Kids and the Library of Congress (Sanborn maps); candidates (need vetting): National Geographic Kids, Free School, Brightly Storytime-style read-alouds.

KEY TERMS

map key

A box on a map that shows each symbol and tells what it means. It is also called a legend.

symbol

A little picture, mark or color that stands for a real thing.

fire insurance map

A map that showed which buildings were made of wood, brick or stone, so people could tell how easily each one might burn.

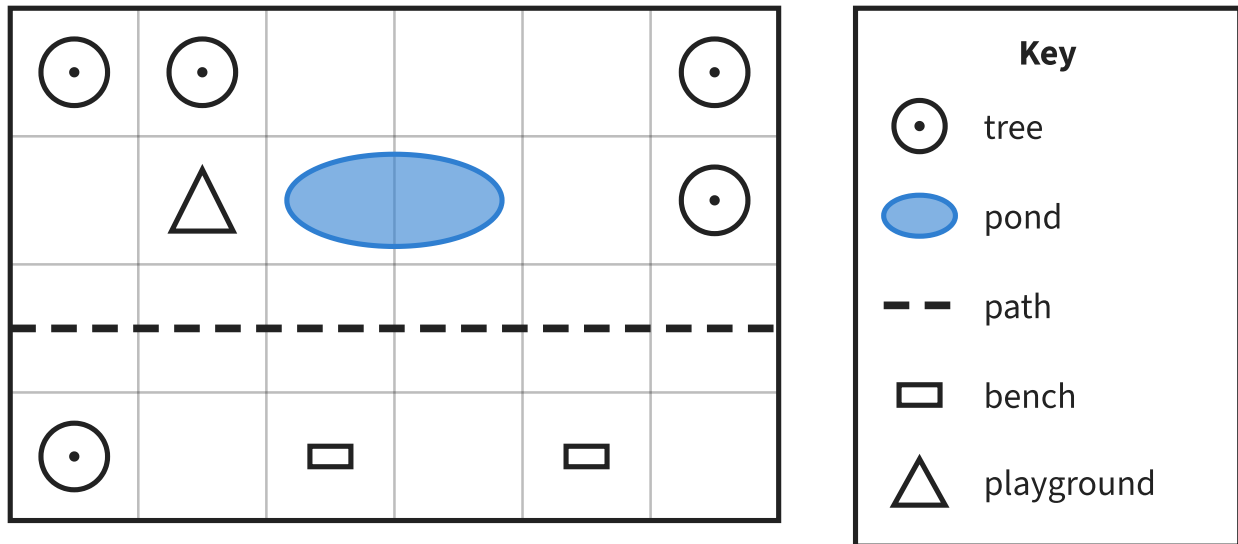
CORE IDEAS

The story. In 1867, in New York, a mapmaker named Daniel Alfred Sanborn began making a special kind of map. In those days many houses and stores burned in fires. Some companies helped people pay to fix their buildings after a fire. These companies needed to know about every building. Was it made of wood? Wood burns fast. Was it made of brick or stone? Brick and stone do not catch fire easily. So Mr. Sanborn and his helpers walked through town after town and drew maps of every building.

How it worked. Mr. Sanborn used colors as symbols. A building colored yellow was made of wood. A building colored pink was made of brick. A building colored blue was made of stone. He wrote letters on the buildings too. A *D* stood for a dwelling, which is a house where people live. An *S* stood for a store. But how could anyone know that yellow meant wood? Mr. Sanborn printed a page that showed every color and mark and told what each one meant. That page was a **key**.

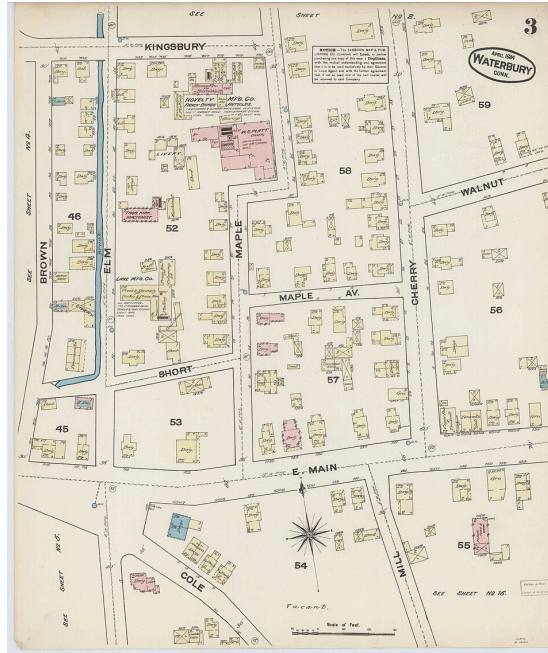
The big idea. A **map key** is a little box on a map. It shows each symbol and tells what it means. A key is like a secret decoder. Without it, a circle could mean a tree, a ball or a cookie! With the key, everyone who reads the map knows just what the mapmaker meant. A good mapmaker always puts a key on the map.

On the map. Look at the map of a park below. On the right side is the key. It shows five symbols: a tree, a pond, a path, a bench and a playground. To read the map, find a symbol in the key first. Then look for that same symbol on the map. Now you can count the trees, find the pond and walk the path with your finger.



A map of a park with its key. Find each symbol in the key, then find it on the map.

PICTURE STUDY



Sanborn Fire Insurance Map of Waterbury, Connecticut, Sheet 3, Sanborn Map Company (begun by Daniel Alfred Sanborn), April 1884 · Printed map colored by hand · Library of Congress, Geography and Map Division

The Sanborn Map Company made maps of thousands of American towns and cities. Each building is drawn from above and colored to show what it was made of. The Library of Congress keeps a great many of these maps, and you can look at them for free.

Ask a grown-up to help you find a Sanborn map page of your own town or a town nearby. You might even find your own street!

Look closely

- Find a yellow building. Yellow meant it was built of wood.
- Find a pink building. Pink meant it was built of brick.
- Look for a building marked “Dwg.” What do you think those letters stand for? (It means dwelling, a house where people live.)
- Find a street name. Read it with a grown-up.

Talk about it

1. How would you know what the colors mean if there were no key?
2. Why would it matter if a building was made of wood or of brick?
3. Are there more yellow buildings or pink buildings on your page?

PROJECT: MAKE A KEY FOR A MAP OF THE PARK

You will draw a map of a park, either a real park near your home or a pretend one, and give it a key so anyone can read it. Use the symbols you learned in Lesson 1.2 and make up some

new ones.

You will need

- A large sheet of paper
- A ruler or a straight book edge
- Crayons or markers, including blue and green
- Optional: small round stickers for trees

Steps

1. With a grown-up, draw a big rectangle on the paper for the park. Leave room on one side for the key.
2. In the empty side, draw a smaller box. Write the word “Key” at the top.
3. Choose four or five things for your park: trees, a pond, a path, benches, a playground, a picnic table.
4. Make a symbol for each one. Draw each symbol in the key box and write its name beside it. A grown-up can help with the words.
5. Now draw the park. Use the very same symbols on the map that you drew in the key.
6. Color the water blue and the grass green.
7. Give your map a title, such as “Map of Maple Park.” Then ask someone to read your map using only the key.

Tips

- Draw the key first. Then you will remember which symbol goes with which thing.
- Make each symbol look different from the others, so no one mixes up a bench and a path.

Check your work

- My map has a key with at least four symbols.
- Every symbol on my map is in the key.
- Someone else can read my map using the key.

MAP NOTEBOOK

1. Draw a key box with three made-up symbols, such as a swing, a slide and a drinking fountain.
2. Color three little squares: yellow for wood, pink for brick and blue for stone, like Mr. Sanborn’s key.
3. Draw a tiny map of your yard or a playground and give it a key.

From history. The Sanborn Map Company kept making these maps for about a hundred years. When a town grew, the company sent out new pages to paste right over the old ones, so the maps stayed up to date. Today the Library of Congress keeps a huge

collection of Sanborn maps, and people use them to learn what their towns looked like long ago.

WORKED EXAMPLES

Example 1. Look at the map of the park. Use the key. How many trees are in the park?

(Use the map or drawing “Use the key to count the trees.” shown earlier in this lesson.)

1. Look at the key first. The tree symbol is a circle with a dot in the middle.
2. Now look at the map. Put your finger on each tree circle as you count.
3. Count the top row: there are three trees, two on the left and one on the right.
4. One more tree is on the right side just below the top row, and one more tree is in the bottom left corner.
5. Three and one and one make five.

Answer: There are 5 trees in the park.

PRACTICE

1. **EASY** Use the key. How many benches are in the park?
(Use the map or drawing “Count the benches.” shown earlier in this lesson.)
2. **EASY** What does the blue shape on the park map stand for?
3. **EASY** Put your finger on the path and walk it across the park. Which symbol in the key shows the path?
4. **MEDIUM** The park plants 3 more trees. How many trees will the park have then?
5. **MEDIUM** On a Sanborn map, a building is colored pink and has the letter D on it. What does that tell you?

COMMON MISTAKES

- Forgetting to put a key on the map, so no one knows what the symbols mean.
- Drawing a symbol one way in the key and a different way on the map.
- Trying to read the map before looking at the key. Always look at the key first.

Make it a game • Key Detective. A grown-up hides three small toys in a room and draws a quick map of the room with a key: a star for the first toy, a heart for the second and a triangle for the third. Use the map and the key to find all three toys. Then you hide the toys and draw the map for the grown-up.

Scripture. “Except the LORD build the house, they labour in vain that build it: except the LORD keep the city, the watchman waketh but in vain.” (Psalm 127:1, KJV)

Mr. Sanborn's maps helped people protect their houses and towns. But the Bible reminds us that it is God who truly keeps our homes and our cities.

Practice answers

1. 2 benches.
2. The pond.
3. The dashed line (a line made of short dashes).
4. $5 + 3 = 8$ trees.
5. It is a brick house where people live (D means dwelling, and pink means brick).

1.4 A MAP OF MY NEIGHBORHOOD

OBJECTIVES

- Walk around my block and notice the houses, trees, roads and special places.
- Draw a map of my neighborhood with symbols and a key.
- Tell how Thaddeus Mortimer Fowler walked the streets to draw whole towns from above.

Warm-up. Close your eyes and pretend you are walking out your front door. What do you see first? Which way do you turn to get to the street? Name three things you pass on your street. Open your eyes and tell a grown-up your little walk.

Video. Coming soon. Kid-friendly videos under 8 minutes: a read-aloud of *Me on the Map* by Joan Sweeney or another picture book about mapping a neighborhood, and a short look at old bird’s-eye town views. Search Homeschool Pop (Alternate), SciShow Kids and the Library of Congress (panoramic maps); candidates (need vetting): National Geographic Kids, Free School, Brightly Storytime-style read-alouds.

KEY TERMS

neighborhood

The houses, streets and places close to your home, and the people who live there.

block

A group of houses or buildings with streets all around it.

landmark

Something easy to see and remember that helps you find your way, like a big tree, a church or a school.

CORE IDEAS

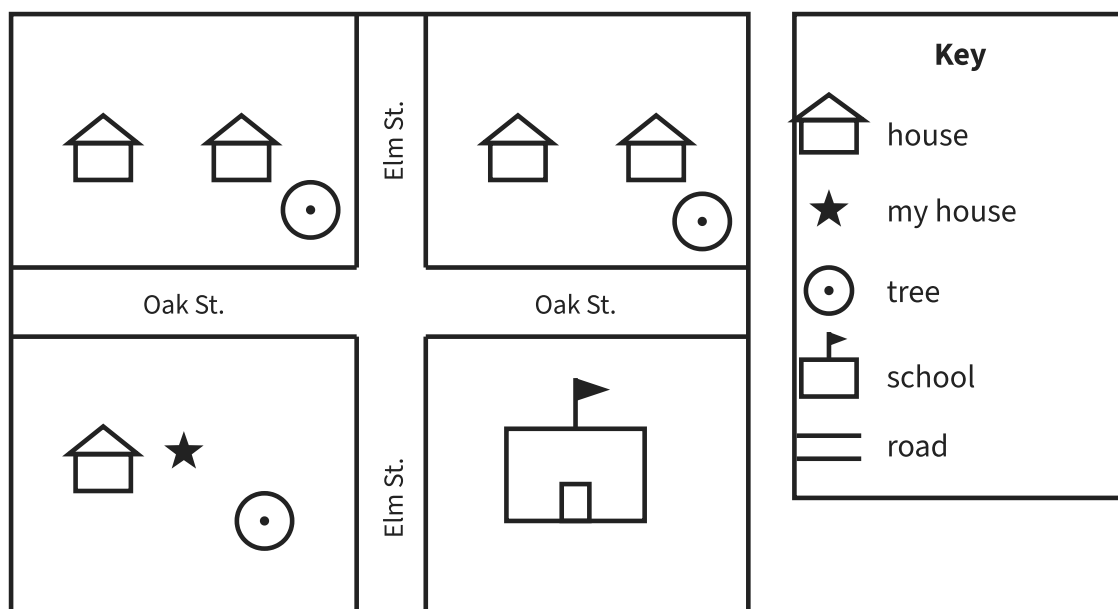
The story. More than a hundred years ago, a man named Thaddeus Mortimer Fowler traveled from town to town across America. He was an artist who drew whole towns. When he came to a new town, he did not stay in one place. He walked up and down the streets with his sketchbook. He drew the houses, the churches, the stores, the schools and the trees. He looked at the river and the railroad tracks. He walked and drew until he knew the whole town.

How it worked. Mr. Fowler could not fly. When he began drawing towns, there were no airplanes at all! So he used his notes and his imagination. Back at his table, he drew the whole town as if he were a bird high in the sky. Every house went in its right place. Every street went where it really was. People were glad to buy his pictures. They looked for their own houses and their churches. Many of his pictures had a list at the bottom: a number for

each important place, like the courthouse or the school. That list was a kind of key. Mr. Fowler drew hundreds of towns, many of them in Pennsylvania.

The big idea. You can do what Mr. Fowler did. Walk around your own **block** with a grown-up. Look carefully. Count the houses. Notice the trees, the roads and any **landmarks**, like a church, a school, a pond or a big rock. Then come home and draw your **neighborhood** from above, using symbols. Last of all, give your map a key.

On the map. Look at the neighborhood map below. Two streets cross in the middle: Oak Street and Elm Street. There are houses, trees and a school. A star marks my house. The key tells what each symbol means. Your neighborhood map will look different, because God put you in your very own place, with your very own neighbors.



A sample neighborhood map with a key. The star marks my house.

PICTURE STUDY



Bird's-Eye View of New Kensington, Pennsylvania, Thaddeus Mortimer Fowler (1842–1922), 1896 · Lithograph (a printed drawing) · Library of Congress, Geography and Map Division (Panoramic Maps collection); restored copy on Wikimedia Commons

Thaddeus Mortimer Fowler drew hundreds of American towns as a bird would see them. He walked the streets first and sketched what he saw. Then he drew the whole town from high above, with every street and almost every building in its place. His pictures were printed and sold to the people who lived there.

This is his view of New Kensington, Pennsylvania, beside the Allegheny River, drawn in 1896. Afterward, with a grown-up, you can open the Library of Congress panoramic maps and look for a Fowler view of a town near you.

Look closely

- Find a church. How can you tell it is a church?
- Find the longest street. Trace it with your finger.
- Is there a river, a bridge or a train? Point to it.
- Look at the bottom of the picture. Is there a list with numbers? Find number 1 on the picture.

Talk about it

1. How do you think Mr. Fowler knew where every house went?
2. How is this picture like a map? How is it different?
3. If Mr. Fowler drew your town, what would you look for first?

Safety first. Walk your block only with a grown-up. Stay on the sidewalk or the side of the road, stop at every corner, and look both ways before crossing. Do not go into anyone's yard without asking.

PROJECT: MY NEIGHBORHOOD MAP WITH A KEY

Like Mr. Fowler, you will walk first and draw second. You will take a walk around your block, make notes, and then draw a map of your neighborhood with symbols and a key. This is your unit project.

You will need

- A clipboard or a hard book, with a sheet of paper and a pencil for the walk
- A large sheet of paper for the finished map
- Crayons or markers, including blue and green
- A ruler or a straight book edge
- A grown-up walking partner

Steps

1. Before you go, draw a little house in the middle of your walk paper. That is your house.
2. Walk around your block with a grown-up. Each time you pass a house, make a tally mark. Make a circle for each big tree.
3. Draw quick little pictures of landmarks you see: a church, a school, a mailbox, a park, a pond or a stop sign.
4. Ask the grown-up the names of the streets and write them down (the grown-up can write).
5. At home, draw the streets on the big paper first, as two lines each. Write the street names along them.
6. Draw your house and put a star next to it. Then add the other houses, the trees and the landmarks with simple symbols.
7. Draw a key box. Put every symbol in the key with its name. Add a title, such as "My Neighborhood," and your name.

Tips

- Start with the streets. Once the streets are in place, the houses are easy to put beside them.
- You do not need every bush and car. Choose the things that help someone find the way.

Check your work

- My map shows my house with a star.
- My map shows streets, houses, trees and at least one landmark.
- My map has a key, a title and my name.

MAP NOTEBOOK

1. Draw your favorite landmark in your neighborhood and write its name.
2. Draw your front door from the side. Then draw your house from above.
3. Draw a picture of a neighbor and write one kind thing you could do for that neighbor.

From history. Mr. Fowler was born in Massachusetts in 1842 and served as a soldier in the Civil War as a young man. He kept drawing towns for the rest of his long life. Artists like him made bird's-eye views of thousands of American towns and cities, and the Library of Congress keeps more than a thousand of these pictures that anyone can look at for free.

WORKED EXAMPLES

Example 1. Look at the neighborhood map. How many houses are on it? Count my house too.

(Use the map or drawing "Count the houses." shown earlier in this lesson.)

1. Look at the key. A house is a tiny square with a pointed roof. The star marks my house.
2. Look above Oak Street. Count the houses: 1, 2, 3, 4.
3. Look below Oak Street. My house is in the bottom left, next to the star. That makes 5.
4. The school is not a house. It has its own symbol with a flag.

Answer: There are 5 houses on the map.

PRACTICE

1. **EASY** Look at the neighborhood map. How many trees are there?
(Use the map or drawing "Count the trees." shown earlier in this lesson.)
2. **EASY** Point to my house on the map. How do you know it is my house?
3. **MEDIUM** I walk from my house to the school. Which street do I cross?
4. **EASY** What is a landmark? Name one landmark near your home.
5. **MEDIUM** Draw a symbol for your mailbox. Add it to your key.

COMMON MISTAKES

- Drawing houses first and running out of room for the streets. Draw the streets first.
- Forgetting to mark your own house.
- Using a symbol on the map that is not in the key.

Make it a game · Where Am I? Lay your finished neighborhood map on the table. A grown-up secretly picks a spot on the map and gives you clues: “I am next to a big tree. I am across the street from the school.” Put your finger where you think the grown-up is. Then you pick a spot and give the clues.

Scripture. “And the second is like unto it, Thou shalt love thy neighbour as thyself.”
(Matthew 22:39, KJV)

A neighborhood is more than houses and streets. It is full of neighbors. Jesus tells us to love them. As you walk your block, pray for the families in each house you pass.

Practice answers

1. 3 trees.
2. The house in the bottom left. It has a star next to it, and the key says the star means my house.
3. Elm Street.
4. Something easy to see and remember that helps you find your way. Any real example is fine, such as a church, a big tree or a school.
5. Any small, simple symbol is fine, such as a little box on a post. It must be shown in the key with the word “mailbox.”

UNIT 1 REVIEW

A parent reads each question aloud. The child answers by speaking, pointing or drawing. The review is worth 20 points.

1. (3 pts) What is a map?
2. (3 pts) A bird flies over your house and a tree. What shape is the tree from above? What part of the house does the bird see?
3. (3 pts) What is a symbol? Tell me one symbol you might see on a map.
4. (3 pts) Draw the map symbols for a tree, a house, a road and water.
5. (3 pts) What is a map key, and why does a map need one?
6. (3 pts) Show the park map from Lesson 1.3. Use the key: How many benches are there? Point to the pond.
7. (2 pts) Show me your neighborhood map. Point to your house, and name one landmark on your map.

UNIT PROJECT: MY NEIGHBORHOOD MAP WITH A KEY

After a walk around the block with a grown-up, draw a large map of your neighborhood seen from above. Show the streets with their names, your house with a star, the other houses, trees and at least one landmark. Add a key that shows every symbol, a title and your name. Then give a family member a short tour of your map, pointing to each place as you tell about it.

- **From above:** Houses, trees and streets are drawn as they look from above, not from the side.
- **Symbols:** Simple symbols are used, and the same symbol is used for the same kind of thing every time.
- **Key:** The map has a key, and every symbol on the map is shown in the key with its name.
- **Care and telling:** The map is neat and colorful, and the child can point to and name the places on it.

Answer key

1. A picture of a place from above, drawn smaller than the real place.
2. The tree looks like a circle. The bird sees the roof.
3. A little picture that stands for a real thing. Example: a circle for a tree, or blue for water.
4. Tree: a circle. House: a tiny square with a pointed roof. Road: two lines side by side. Water: a blue shape. (Give 3 points for all four symbols, 2 points for three, and 1 point for one or two.)
5. A box that shows each symbol and tells what it means. Without it, people would not know what the symbols stand for.
6. 2 benches. The pond is the blue oval near the top middle of the map.

7. The child points to the house marked with a star and names a real landmark, such as a church, school, big tree or park.

NORTH, SOUTH, EAST AND WEST

God told Abram, “Lift up now thine eyes, and look from the place where thou art northward, and southward, and eastward, and westward” (Genesis 13:14). In this unit your child learns those four great directions and how to find them anywhere. We start with the beautiful compass roses painted on old sea charts and a silly saying that never fails: **Never Eat Soggy Waffles**. Then we watch the sun rise in the east and set in the west, just as Claude Monet watched it from his window over the harbor at Le Havre.

Next your child makes a real compass, the kind of tool that let sailors cross the sea even on cloudy nights: a needle rubbed with a magnet and floated on a leaf. We meet William Gilbert, who showed that the whole earth acts like a giant magnet. Last of all, your child uses north, south, east and west to give clear directions, the way the streets of Washington, D.C., were laid out, and guides you step by step to your own mailbox.

BEFORE YOU BEGIN

- Knows that a map is a picture of a place seen from above (Unit 1)
- Can find a map key and a few map symbols
- Can count to 20
- Knows left from right

MASTERY CHECKLIST

- I can say the four directions in order: Never Eat Soggy Waffles.
- I can find the compass rose on a map and point to north.
- I can tell that the sun rises in the east and sets in the west, and that the earth turns.
- I can make a needle compass and tell why it helped sailors.
- I can give directions using north, south, east, west and a number of steps.

OPTIONAL BOOKS AND RESOURCES

- **Library of Congress, Geography and Map Division** (<https://www.loc.gov/maps/>): Free. Search for “portolan chart” to see old sea charts with compass roses, or “Plan of the City of Washington” for the 1792 map in Lesson 2.4. Zoom in together and hunt for the compass roses.
- **The Huntington Library** (<https://www.huntington.org/>): Home of the Vallard Atlas (1547) shown in Lesson 2.1. A parent can search its website and digital collections for pictures of the atlas.

2.1 THE COMPASS ROSE ★

OBJECTIVES

- Name the four directions in order around a compass rose: north, east, south and west.
- Find east from where the sun rises, and then find north on your left hand.
- Find the compass rose on a map and point to north.

Warm-up. Go outside or to a sunny window early in the morning. Ask, “Where did the sun come up today?” Stand and face that way. Now hold out both arms. Which arm points the same way as your front door? Which arm points toward the street? Tell your parent what you see in front of you, behind you and on each side.

Video. Coming soon. A kid-friendly video under 8 minutes on the compass rose and the four directions (“Never Eat Soggy Waffles”), or a read-aloud of a picture book about maps and directions: search Learn Bright, Homeschool Pop (Alternate) and SciShow Kids; candidates needing vetting: Free School, National Geographic Kids.

KEY TERMS

direction

The way you go or the way you face, such as north or east.

north, south, east and west

The four main directions. We use them everywhere on the earth.

compass rose

A little star drawn on a map that shows which way is north, south, east and west.

CORE IDEAS

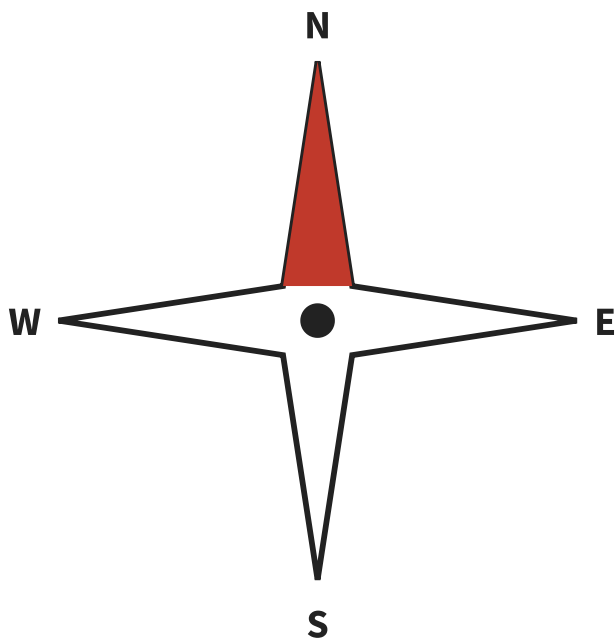
The story. Long ago, in the year 1547, in a busy French seaport called Dieppe, a mapmaker painted a book of sea charts by hand. Today we call it the Vallard Atlas, after the name Nicolas Vallard written in it. On its pages are coasts, islands, ships and tiny people. And on the sea there are bright, pointed stars that look like flowers. These stars are called **compass roses**. Long lines run out from them across the water, like spokes on a wheel. Sailors used those lines to know which way to steer.

How it works. A compass rose shows the four main **directions**: north, east, south and west. On most maps, north is at the top. Start at the top and go around the way a clock’s hands go. Say this silly saying: *Never Eat Soggy Waffles*. **N**ever is north. **E**at is east. **S**oggy is south. **W**affles is west. North and south are opposites. East and west are opposites too.

The big idea. You can find these directions outside, without any map at all. God made the sun to come up in the east every morning. (In summer it comes up a little to the north of east, and in winter a little to the south, but always on the east side of the sky.) So in the

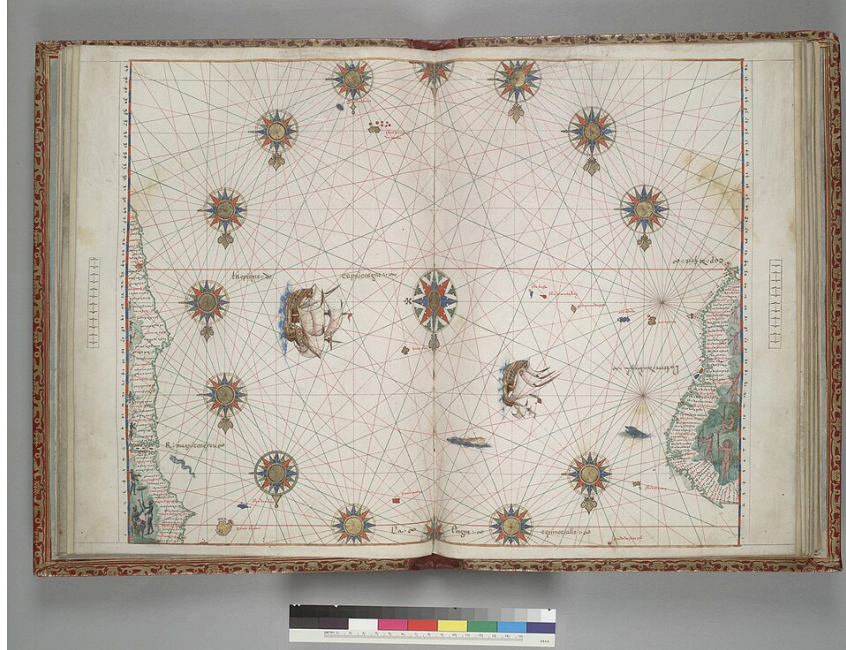
morning, stand and face the sunrise. Now you are facing east. Your left hand points north. Your right hand points south. Behind your back is west.

On the map. Every good map should have a compass rose, so you can turn the map the right way. Some old charts even put north in a different place, and only the compass rose tells you which way is which! Look for the letter N, or for an arrow or a lily-shaped point. That shows north. When you draw your own maps, you will add a compass rose too.



A simple compass rose. Go around like a clock: Never Eat Soggy Waffles.

PICTURE STUDY



A Chart from the Vallard Atlas, Unknown mapmaker of Dieppe, France (the atlas bears the name of Nicolas Vallard), 1547 · Hand-painted ink and color on vellum · The Huntington Library, San Marino, California

Before there were printed road maps, sailors used charts drawn and painted by hand. Charts like this one are called portolan charts. Mapmakers drew the coasts carefully and painted compass roses on the sea. Thin straight lines spread out from each compass rose so a sailor could lay a ruler from one port to another and see which way to sail.

The Vallard Atlas was made in Dieppe, France, in 1547. It is a book of fifteen colorful charts, full of ships, animals and people. It is kept today at the Huntington Library in California.

Look closely

- Find a compass rose. How many points can you count on it?
- Look for the point that shows north. Is it marked with a letter, a lily shape or something else?
- Follow one of the long, thin lines from the compass rose with your finger. Where does it go?
- Find a ship, an animal or a person painted on the chart.

Talk about it

1. Why would a sailor far out at sea need to know which way is north?
2. Why do you think the mapmaker made the compass roses so pretty, like flowers?

PROJECT: MY PAPER COMPASS ROSE

You will make a big compass rose from paper and lay it on the floor or the ground so that its N really points north. Then you can stand on it and know all four directions.

You will need

- A large piece of paper or a paper plate
- Crayons or markers (one red)
- A ruler or a straight book edge
- Tape or four small stones

Steps

1. With a ruler, draw a long line from top to bottom and a long line from side to side, so they cross in the middle like a plus sign.
2. Turn the lines into four pointed tips, like a star. A parent can help draw the points.
3. Write N at the top, E on the right, S at the bottom and W on the left. Say “Never Eat Soggy Waffles” as you write.
4. Color the north point red so it stands out.
5. In the morning, take it outside or to a sunny window. Face the sunrise and point the E toward it. Now the N points north.
6. Tape it down or hold it with stones. Stand on it and point north, south, east and west.

Tips

- If it is cloudy, ask a parent which side of the house the sun comes up on.
- Keep your compass rose. You will use it again with your yard map in Lesson 2.4.

Check your work

- I can say the four directions in order around the compass rose.
- I can face the sunrise and point to north with my left hand.

MAP NOTEBOOK

1. Draw a compass rose with four points. Write N, E, S and W in the right places.
2. Draw a soggy waffle next to your compass rose to help you remember the saying.
3. Draw the sun coming up on one side of your house. Write E for east under the sun.

From history. The thin lines that spread out from the compass roses on old sea charts are called rhumb lines. A sailor could lay a ruler from his port to the place he wanted to go, find the rhumb line that ran the same way, and follow it to the compass rose to learn which way to steer. Many old charts marked north with a lily shape called a fleur-de-lis, and mapmakers often made their compass roses beautiful, with gold and bright colors.

WORKED EXAMPLES

Example 1. Look at the compass rose. Which direction is at the top? Going around like a clock, which direction comes next?

(Use the map or drawing “Start at N and go around like a clock.” shown earlier in this lesson.)

1. Put your finger on the top point. It has the letter N. That is north.
2. Move your finger around the way a clock’s hands go, to the right side. That point has the letter E.
3. Say the saying: Never Eat Soggy Waffles. After Never comes Eat, and E is east.

Answer: North is at the top. East comes next, on the right.

PRACTICE

1. **EASY** Say the four directions in order, starting with north. Use the waffle saying to help.
2. **EASY** Point to the bottom of the compass rose. Which direction is it?
3. **EASY** Count the points on our simple compass rose. How many are there?
(Use the map or drawing “Count the points.” shown earlier in this lesson.)
4. **MEDIUM** In the morning you stand and face the sunrise. Which direction are you facing?
5. **MEDIUM** You are still facing the sunrise. Hold out your left arm. Which way does it point? Which way is behind you?

COMMON MISTAKES

- Mixing up east and west. Remember the saying goes around like a clock: after north (top) comes east (right).
- Thinking north is always straight ahead of you. North is one real direction on the earth; it does not change when you turn around.
- Forgetting to look for the compass rose before reading a map.

Make it a game • Never Eat Soggy Waffles. Lay your paper compass rose on the floor with N pointing north. A parent calls out a direction, and you jump onto that point as fast as you can. Then the parent calls out a word from the saying (“Soggy!”) and you jump to the matching direction (south). Take turns being the caller.

Scripture. “And the LORD said unto Abram, after that Lot was separated from him, Lift up now thine eyes, and look from the place where thou art northward, and southward, and eastward, and westward:” (Genesis 13:14, KJV)

God told Abram to look in all four directions at the land He would give him. The four directions are part of the world God made, and He knows every place in it.

1. North, east, south, west (Never Eat Soggy Waffles).
2. South.
3. 4.
4. East.
5. Your left arm points north. West is behind you.

2.2 SUNRISE AND SUNSET

OBJECTIVES

- Tell that the sun rises in the east and sets in the west.
- Mark east and west at a window in your home by watching sunrise and sunset.
- Explain in simple words that the sun seems to move because the earth turns.

Warm-up. Turn off the lights and shine a flashlight at the wall. That is the “sun.” Hold a ball or an orange in front of it and put a sticker on the ball for “our house.” Slowly turn the ball. Watch the sticker come into the light (morning) and go back into the dark (night). Which way did you have to turn the ball?

Video. Coming soon. A short kid-friendly animation (under 8 minutes) of why the sun rises in the east and sets in the west because the earth spins, plus a time-lapse of a real sunrise or sunset: search NASA, SciShow Kids and Homeschool Pop (Alternate); candidates needing vetting: Free School, National Geographic Kids.

KEY TERMS

sunrise

The time in the morning when the sun comes up over the edge of the land or sea. The sun rises in the east.

sunset

The time in the evening when the sun goes down out of sight. The sun sets in the west.

horizon

The line far away where the land or sea seems to meet the sky.

CORE IDEAS

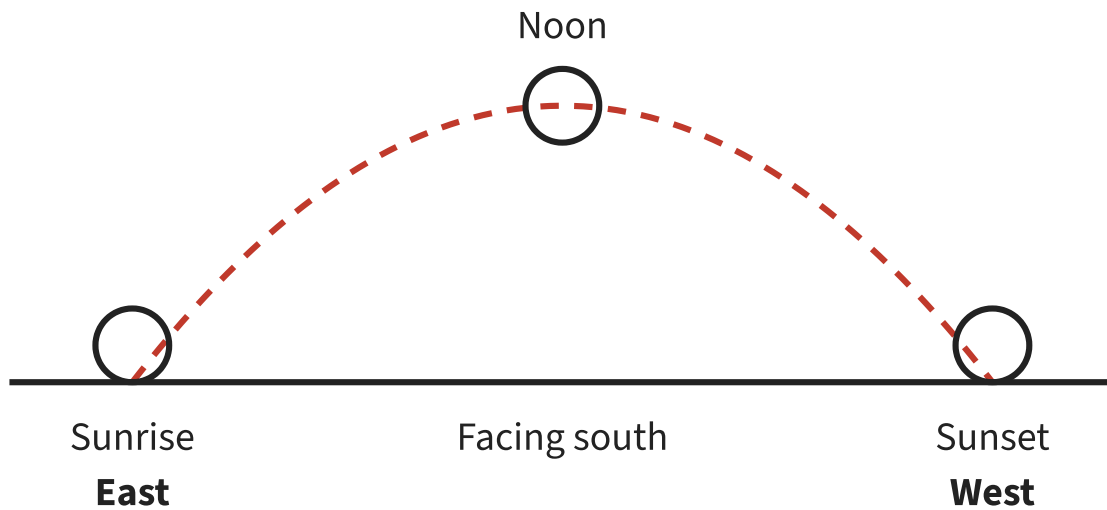
The story. One cold morning in the year 1872, a young painter named Claude Monet looked out of a window over the harbor at Le Havre, in France. He had grown up in that seaport town. Mist hung over the water. Boats rocked on the gray sea. Then a round, orange sun climbed up into the sky. Monet painted quickly, with fast, loose brushstrokes, to catch the moment before it changed. He named his painting *Impression, Sunrise*.

How it works. Every morning the sun comes up in the **east**. Every evening it goes down in the **west**. At midday, in almost all of the United States, it is high in the sky toward the **south**. But the sun is not really walking across the sky. The earth is spinning, like a ball turning on a string. Each morning our side of the earth turns toward the sun, and we see sunrise. Each evening our side turns away from the sun, and we see sunset. One whole turn takes one day.

The big idea. God set the sun to keep this faithful pattern every single day. Because it does, you can always find east and west. Near the middle of summer the sun rises a little north of

east, and near the middle of winter a little south of east. But it always rises on the east side of the sky and sets on the west side.

Try it at home. Find a window where you can see the sun come up, and a window where you can see it go down. They may be on different sides of your house! Put a sticky note marked E on the sunrise window and one marked W on the sunset window. Now your house has its own compass. North is on your left when you face the E window.



Facing south: the sun rises on your left in the east, is high in the south at noon, and sets on your right in the west.

PICTURE STUDY



Impression, Sunrise, Claude Monet, 1872 · Oil on canvas · Musée Marmottan Monet, Paris

Claude Monet painted this picture of the harbor at Le Havre, France, looking out from a window as the sun came up. He did not paint every rope and sail. He wanted to show how the morning *felt*: misty, cool and glowing. When people saw it, some made fun of the word “Impression” in its name and called Monet and his friends “Impressionists.” The name stuck, and today it is one of the most famous paintings in the world.

Look closely

- Find the sun. What color did Monet make it?
- Look at the water under the sun. What do you see there?
- Find the small dark boats. How many people can you see in them?
- Look far back in the mist. Can you see tall masts, smoke or other shapes?

Talk about it

1. The sun is rising in this picture. Which direction was Monet looking?
2. Is this painting bright and sunny or soft and misty? Why do you think Monet painted it that way?
3. Monet painted this from a window. What can you see out of your window at sunrise?

Safety first. Never look straight at the sun, even at sunrise or sunset. It can hurt your eyes. Look at the glowing sky around it.

PROJECT: MY SUNRISE AND SUNSET WINDOWS

You will be a sun-watcher, like Monet. You will find where the sun comes up and goes down at your house, and mark east and west on your windows.

You will need

- Two sticky notes or paper squares and tape
- A marker
- Paper and crayons
- A clock, so a parent can write down the times

Steps

1. Ask a parent to look up the time of sunrise and sunset for your town today.
2. In the morning, go from window to window and find where you can see the sun coming up, or the sky getting bright first.
3. Put a sticky note marked E (east) on that window.
4. In the evening, find where the sun goes down, or where the sky is pink and orange last.
5. Put a sticky note marked W (west) on that window.
6. Draw two pictures: the view out of your E window at sunrise and the view out of your W window at sunset. Write the time under each one.

Tips

- Never look straight at the sun. Look at the bright sky around it instead.
- If no window faces the sun, go outside with a parent and notice which side of the house the sun is on.

Check your work

- I can point to where the sun rises and where it sets at my house.
- I can tell why the sun seems to move across the sky.

MAP NOTEBOOK

1. Draw your house with a sun coming up on one side. Write E under that sun.
2. Draw the same house with a sun going down on the other side. Write W under that sun.
3. Draw a ball with a little house on it and an arrow showing which way the earth turns.

From history. Long before clocks, people told time by the sun. Farmers started work at sunrise and came home at sunset. Many old churches in Europe were built so that the altar end faces east, toward the rising sun, as a picture of Christ, who rose from the dead early in the morning. The word “orient,” which means to turn a map or yourself the right way, comes from an old word for the east, where the sun rises.

WORKED EXAMPLES

Example 1. In the picture, a child faces south. The sun comes up on the left side of the picture. If the left is east, which direction is on the right side, where the sun goes down?

(Use the map or drawing “Sunrise on the left, sunset on the right.” shown earlier in this lesson.)

1. East and west are opposites.
2. The left side is east.
3. So the right side, the opposite side, is west.

Answer: West. The sun sets in the west.

PRACTICE

1. **EASY** In which direction does the sun rise?
2. **EASY** In which direction does the sun set?
3. **MEDIUM** Point to the sun at noon in the picture. Which direction is it?
(Use the map or drawing “Find the noon sun.” shown earlier in this lesson.)
4. **MEDIUM** Your house has an E note and a W note on its windows. How many of the four directions still have no note?
5. **HARD** Does the sun really walk across the sky? Tell why we see sunrise and sunset.

COMMON MISTAKES

- Thinking the sun moves around the earth each day. The sun only seems to move, because the earth is turning.
- Thinking the sun rises in the same exact spot all year. It always rises in the east, but a little farther north in summer and a little farther south in winter.
- Looking straight at the sun to find it. Look at the bright sky near it instead.

Make it a game • Sunrise, Sunset. Stand in the middle of the room facing your E note. A parent calls “Sunrise!” and you stretch up tall toward the east. “Noon!” and you turn to face south and reach high. “Sunset!” and you turn and crouch low toward the west. “Night!” and you curl up and close your eyes. The parent calls faster and faster.

Scripture. “From the rising of the sun unto the going down of the same the LORD’s name is to be praised.” (Psalm 113:3, KJV)

From sunrise in the east to sunset in the west, all day long, we can praise God. Every sunrise reminds us that He keeps His promises.

Practice answers

1. East.

2. West.
3. South (high in the southern sky).
4. 2 (north and south).
5. No. The earth spins. In the morning our side turns toward the sun, and in the evening it turns away.

2.3 A MAGNET THAT POINTS NORTH ⚙

OBJECTIVES

- Make a needle compass by rubbing a needle with a magnet and floating it on a leaf in water.
- Tell that a magnet needle that can turn freely points north and south.
- Explain why a compass helped sailors cross the sea when they could not see the sun or stars.

Warm-up. Give your child a refrigerator magnet and a small basket of things: a paper clip, a spoon, a coin, a crayon, a nail, a cork. Guess first, then test: which things does the magnet pick up? Sort them into two piles, “sticks” and “does not stick.”

Video. Coming soon. A kid-friendly video under 8 minutes showing how to make a floating needle compass and how a compass points north, plus simple footage of sailors using a ship’s compass: search SciShow Kids, Science Max and Homeschool Pop (Alternate); candidates needing vetting: Free School, National Geographic Kids.

KEY TERMS

magnet

A piece of metal or stone that pulls iron things toward it.

lodestone

A dark rock God made that is a magnet all by itself. Its name means “leading stone.”

compass

A tool with a magnet needle that turns to point north, so you can find your way.

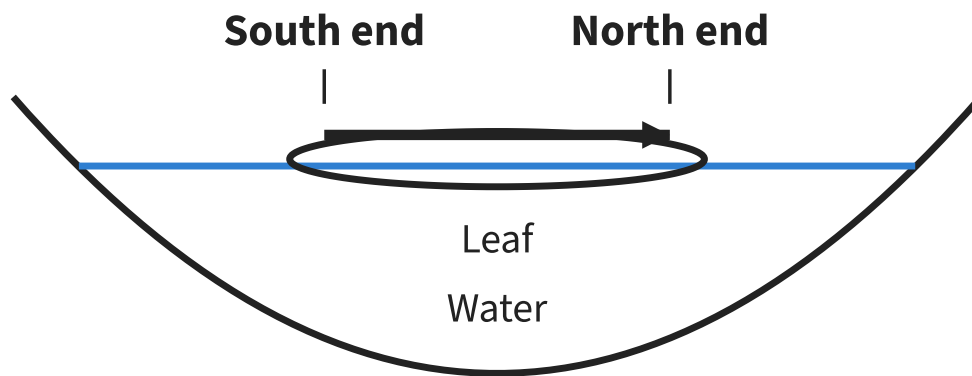
CORE IDEAS

The story. More than four hundred years ago, in the year 1600, a doctor in London named William Gilbert wrote a big book about magnets. He wanted to know why a magnet needle always turns to point north. So he shaped a round ball out of lodestone, a rock that is a magnet all by itself. He called it a *terrella*, which means “little earth.” When he moved a tiny needle around the ball, the needle turned just as compass needles turn on the real earth. Gilbert decided that the whole earth is like one giant magnet!

How it works. A needle is made of steel, which has iron in it. If you rub the needle with a **magnet**, always in the same direction, the needle becomes a little magnet too. Now float it on a leaf in a bowl of water, where it can turn easily. The earth’s magnet pulls on it. The needle swings around and stops, with one end pointing north and the other end pointing south. That is a **compass**!

Technology overcoming geography. Long ago, sailors were afraid to go far from land. They found their way by the sun in the day and the stars at night. But on cloudy days and stormy nights, they could be lost. Almost a thousand years ago, a Chinese scholar named Shen Kuo wrote about a needle rubbed on a lodestone that pointed the way. Soon sailors in China and in Europe carried magnet needles on their ships. Now, even under gray clouds, a sailor could tell which way was north. The compass helped people cross wide seas they could not cross before.

The big idea. God made the earth to work like a magnet, and He made the lodestone and iron. People did not invent north. They discovered a way to find it, any time, anywhere. When you float your needle and watch it turn, you are seeing the same thing that guided ships across the ocean.



A magnetized needle on a floating leaf turns until it points north and south.

PICTURE STUDY



A Blacksmith Making a Magnet, woodcut from *De Magnete*, William Gilbert (book author); unknown woodcut artist, 1600 · Woodcut illustration in a printed book · Printed in London; copies are kept in many libraries (this image is from the 1900 English edition, which reprinted Gilbert's woodcuts)

William Gilbert's book *De Magnete*, which means "On the Magnet," was printed in London in 1600. It has many small pictures cut into wood and printed in ink. In this one, a blacksmith is hammering a hot bar of iron. Gilbert found that if the iron lies pointing north and south while it is hammered, it becomes a weak magnet. The picture shows the directions so readers would lay the iron the right way.

Look closely

- Find the blacksmith. What is he holding?
- Find the anvil, the heavy iron block he works on.
- Look for the Latin words that show north and south: Septentrio means north and Auster means south. Which way does the iron bar point?
- Look at his workshop. What tools or things can you see?

Talk about it

1. The blacksmith made a magnet by hammering. How did you make your needle into a magnet?
2. Why did the iron need to point north and south?

Safety first. Needles are sharp. A parent should handle the needle, or tape a small piece of cork or tape over the point. Keep strong magnets away from phones, cards and computers, and never put magnets in your mouth.

PROJECT: MY NEEDLE COMPASS

You will make a real compass, the kind that helped sailors long ago. You need only a needle, a magnet, a leaf and a bowl of water.

You will need

- A steel sewing needle
- A strong magnet (a refrigerator magnet may be too weak; a bar or button magnet works best)
- A small flat leaf, a slice of cork or a plastic bottle cap
- A bowl or pie plate of water (not metal)
- Your paper compass rose from Lesson 2.1

Steps

1. A parent holds the needle by its eye end.
2. Rub one end of the magnet along the needle from the eye to the point. Lift the magnet away, go back to the eye and rub again. Always rub the same way. Count 10 rubs, then 10 more.
3. Set the bowl of water on a table, away from metal things like pots and spoons.
4. Float the leaf on the water. Gently lay the needle on the leaf.
5. Wait and watch. The leaf will turn slowly and stop.
6. Lay your paper compass rose beside the bowl with N pointing north (use your sunrise window to help). Does your needle line up with N and S?
7. Gently turn the leaf with your finger and let go. Does it swing back?

Tips

- If the needle does not turn, rub it 20 more times, always the same way.
- Keep the bowl away from the magnet and metal things, which will pull the needle off course.
- Your needle shows north and south, but it does not tell which end is which. Use the sun to check which end points north, and mark that end with a dot of nail polish or marker.

Check your work

- My needle floats and turns to point north and south.
- I can tell how I made my needle into a magnet.

MAP NOTEBOOK

1. Draw your bowl, your leaf and your needle. Draw an arrow on the north end of the needle.
2. Draw a ship on a stormy sea with a little compass on its deck.
3. Draw the things from the warm-up that stuck to the magnet.

From history. William Gilbert later became the doctor of Queen Elizabeth I of England. His book *De Magnete* was one of the first books in which a scientist tested his ideas again and again with careful experiments. Because of his work on magnets and on the pull of rubbed amber, he is sometimes called the father of the study of electricity and magnetism.

WORKED EXAMPLES

Example 1. Your needle compass is floating. The north end of the needle points toward a big oak tree. Which direction is the oak tree? What direction is on the other end of the needle?

(Use the map or drawing “One end points north, the other south.” shown earlier in this lesson.)

1. The north end of the needle points north.
2. It points at the oak tree, so the oak tree is to the north.
3. The other end of the needle points the opposite way. The opposite of north is south.

Answer: The oak tree is north. The other end of the needle points south.

PRACTICE

1. **EASY** What do we call a rock that is a magnet all by itself?
2. **EASY** Point to the end of the needle in the picture that points north.
(Use the map or drawing “Find the north end.” shown earlier in this lesson.)
3. **MEDIUM** Why do we float the needle on a leaf in water instead of laying it on the table?
4. **MEDIUM** You rub the needle 5 times, then 5 more times. How many rubs is that?
5. **HARD** A sailor is at sea on a cloudy night. He cannot see the stars. How can he tell which way is north?

COMMON MISTAKES

- Rubbing the needle back and forth. Rub in one direction only, lifting the magnet away each time.
- Setting the bowl near metal or the magnet, which pulls the needle the wrong way.
- Thinking the needle knows which end is north. Check with the sunrise and mark the north end.

Make it a game • Compass Needle. You are the compass needle! A parent points to which wall is north. Spin around slowly with your arms out, then stop and point both arms north and south like a needle. The parent says “Storm!” and gently turns you, and you must spin back and point north again. Then switch: the parent is the needle and you are the storm.

Scripture. “He stretcheth out the north over the empty place, and hangeth the earth upon nothing.” (Job 26:7, KJV)

God made the north and hung the earth in space. When a little needle turns to the north, it is following an order God built into His world.

Practice answers

1. A lodestone.
2. The end labeled “North end.”
3. So it can turn easily and point north.
4. 10.
5. He can look at his compass. The magnet needle points north even when it is cloudy.

2.4 GIVING DIRECTIONS

OBJECTIVES

- Give directions using only north, south, east and west and a number of steps.
- Follow directions on a simple grid map by counting squares.
- Draw a map of the yard with a compass rose.

Warm-up. Hide a small toy somewhere in one room. Your child may ask only questions that can be answered “yes” or “no,” such as “Is it near the window?” Then switch: your child hides it, and you must find it while your child gives directions like “Take three steps toward the door.” Talk about which directions were easy to follow.

Video. Coming soon. A kid-friendly video under 8 minutes on giving and following directions with north, south, east and west on a simple map or grid, or a read-aloud of a picture book about following a map: search Learn Bright, Homeschool Pop (Alternate) and Library of Congress; candidates needing vetting: Free School, Brightly Storytime-style read-alouds.

KEY TERMS

directions

Words that tell someone how to get from one place to another.

grid

Lines that cross to make rows of squares on a map, so you can count your way.

address

The street, number and town that tell exactly where a house or building is.

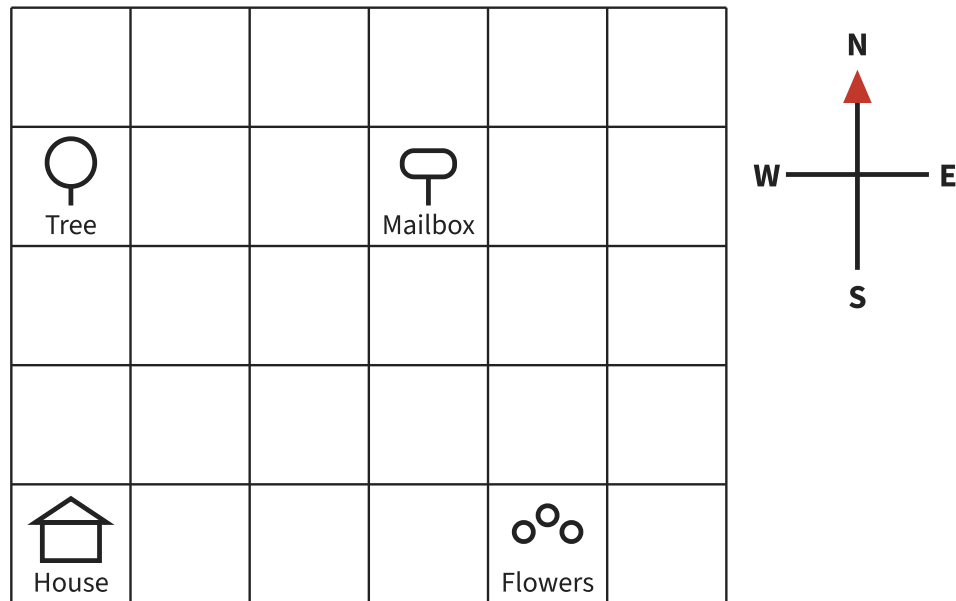
CORE IDEAS

The story. In 1791, President George Washington chose a place beside the Potomac River for a brand-new capital city. A French-born engineer named Pierre L’Enfant drew the plan, and a surveyor named Andrew Ellicott, with the help of Benjamin Banneker, measured out the land. They laid out the city with the Capitol building in the middle. Straight streets run north and south. Other straight streets cross them, running east and west. The city is split into four parts called NW, NE, SW and SE. Even today the White House address ends with the letters NW, for northwest!

How it works. When streets run north–south and east–west, it is easy to give **directions**. You only need two things: a direction and how far. “Walk two blocks north. Then walk one block east.” A map with a **grid** works the same way. Start on a square. Count squares north, south, east or west, and you will land in the right place.

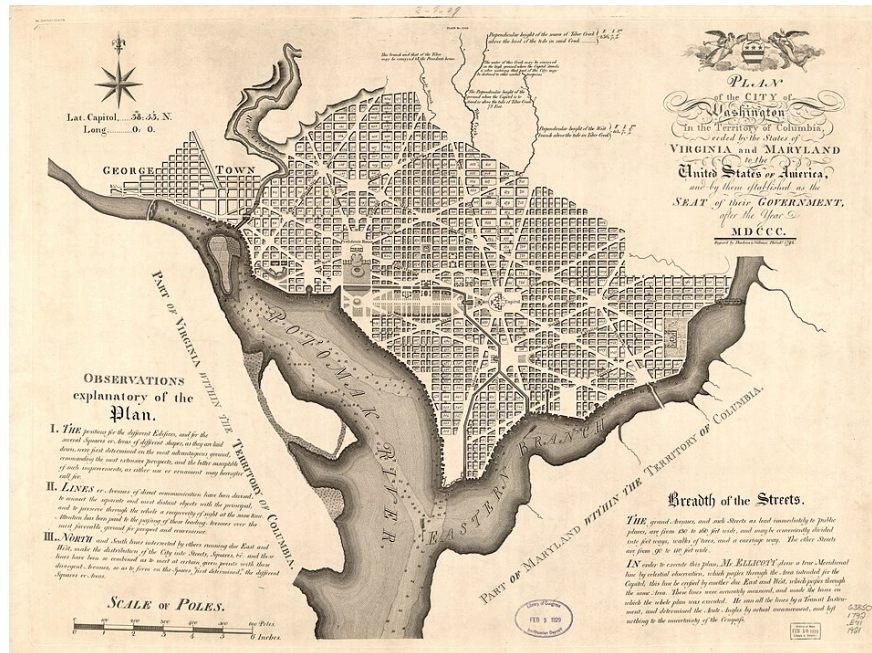
The big idea. Words like “over there” or “that way” can get people lost. Words like “north” and “three steps” are clear. They mean the same thing to everyone. Giving good directions is a way to love your neighbor, because it helps someone get where they need to go.

Try it at home. Draw a map of your yard on squared paper, with your house, a tree and the mailbox. Add a compass rose so north on the paper matches north outside. Then take a parent by the hand to the front door. Guide them to the mailbox using only north, south, east, west and a number of steps!



A yard map with a grid and a compass rose. Count squares to find your way.

PICTURE STUDY



Plan of the City of Washington, Andrew Ellicott, after the plan of Pierre Charles L'Enfant; engraved by Thackara and Vallance, Philadelphia, 1792 · Engraved map, ink on paper · Library of Congress, Washington, D.C.

This map was printed in 1792, before the city of Washington was built. It shows how the city was meant to look. Most of the land was still fields and woods, but the plan already showed every street. Andrew Ellicott drew it from Pierre L'Enfant's first plan, and copies were printed so that people far away could see what the new capital would be like.

Look closely

- Find the rivers. How many can you see?
- Find the straight streets that cross each other like a checkerboard.
- Find the long avenues that cut across the checkerboard on a slant.
- Look for a compass, an arrow or words that show directions on the map.

Talk about it

1. Why do you think the planners made the streets run straight north-south and east-west?
2. If you lived in this city, how would you tell a friend how to get to your house?

Safety first. Stay in the yard with a parent. If the mailbox is near the street, a grown-up must keep watch and the child must not step into the street.

PROJECT: MY YARD MAP AND THE MAILBOX WALK

You will draw a map of your yard with a compass rose, and then use it to guide a parent to the mailbox using only north, south, east and west.

You will need

- Squared (graph) paper, or plain paper with squares drawn by a parent
- Pencil and crayons
- Your paper compass rose from Lesson 2.1 and your needle compass from Lesson 2.3
- A scarf for a pretend blindfold (optional)

Steps

1. Go outside with a parent. Use your sunrise side or your needle compass to find north.
2. Stand at the front door and look around. Name what is north, south, east and west of you.
3. On the squared paper, draw your house. Then draw the mailbox, a tree and one more thing in the yard.
4. Draw a compass rose in a corner. Make the N point toward the side of the paper that faces north.
5. Count your steps from the front door to the mailbox. Write the directions on your map, for example: "6 steps north, 4 steps east."
6. Now lead your parent. They may close their eyes or wear the scarf, and you hold their hand. Say only things like "Walk 6 steps north. Stop. Walk 4 steps east."
7. Did your parent reach the mailbox? Switch and let your parent guide you.

Tips

- Big people take longer steps than children. Count with your parent's steps when you guide your parent.
- Use "north, south, east and west," not "left and right." Left and right change when you turn around. North does not!
- Stay in your own yard. If the mailbox is by the street, a parent must be with you, and you never cross the street.

Check your work

- My yard map has a compass rose with N pointing the right way.
- I guided my parent to the mailbox using only north, south, east, west and numbers.

MAP NOTEBOOK

1. Draw your yard map on squared paper with a compass rose.
2. Draw an arrow path from your front door to your mailbox and write the steps beside it.
3. Draw a checkerboard of streets. Color one street that runs north and south and one that runs east and west.

From history. In 1785, the young United States passed a law to measure its western lands in squares, with lines running north-south and east-west. Each township was a square six miles on each side, cut into 36 squares of one mile each. Many country roads were later built along those lines. That is why, if you fly over Ohio, Iowa or Kansas, the farms and roads below look like a giant checkerboard.

WORKED EXAMPLES

Example 1. On the yard map, start at the house. Go 3 squares north. Then go 3 squares east. What do you reach?

(Use the map or drawing “Count 3 squares north, then 3 squares east.” shown earlier in this lesson.)

1. Find the compass rose. North is up and east is to the right.
2. Put your finger on the house. Move up 3 squares, counting 1, 2, 3. You reach the tree.
3. Now move to the right 3 squares, counting 1, 2, 3. You reach the mailbox.

Answer: The mailbox.

PRACTICE

1. **EASY** Start at the house. How many squares east is it to the flowers?
(Use the map or drawing “Count the squares from the house to the flowers.” shown earlier in this lesson.)
2. **EASY** Start at the tree. Which way do you go to get back to the house? How many squares?
3. **MEDIUM** Start at the mailbox. Which way is the tree? How many squares?
4. **HARD** Say directions from the flowers to the mailbox using only directions and numbers.
5. **MEDIUM** Draw a compass rose on your own yard map. Point to north on it, then point to north outside. Do they match?

COMMON MISTAKES

- Using “left” and “right” instead of directions. Left and right change when you turn; north, south, east and west do not.
- Forgetting to say how far. “Go north” is not enough; say “Go 3 steps north.”
- Counting the square you start on. Count only the squares you move into.

Make it a game • Robot Walk. One player is the robot and stands on a starting spot. The other player picks a secret target, such as the couch or the back door, and gives robot commands: “3 steps north. 2 steps west.” The robot may only follow the words exactly. If the robot reaches the target, both players score a point. Switch roles and play to five points.

Scripture. “Let the redeemed of the LORD say so, whom he hath redeemed from the hand of the enemy; And gathered them out of the lands, from the east, and from the west, from the north, and from the south.” (Psalm 107:2–3, KJV)

God knows the way to every place on earth. He gathers His people from all four directions and brings them home.

Practice answers

1. 4 squares.
2. South, 3 squares.
3. West, 3 squares.
4. Go 3 squares north and 1 square west (or 1 square west and then 3 squares north).
5. The N on the map should point the same way as north outside.

UNIT 2 REVIEW

Read each question aloud. Your child may answer by speaking, pointing or drawing. For map questions, use the yard map from Lesson 2.4. The review is worth 20 points.

1. (3 pts) Say the four directions in order around the compass rose, starting with north.
What saying helps you remember?
2. (2 pts) Draw a compass rose and put N, E, S and W in the right places.
3. (2 pts) In which direction does the sun rise? In which direction does it set?
4. (3 pts) Does the sun really move across the sky? Why do we have sunrise and sunset?
5. (2 pts) Which way does a compass needle point?
6. (3 pts) Tell how to make a needle compass.
7. (3 pts) On the yard map from Lesson 2.4, start at the house. Which way and how many squares to the tree?
8. (2 pts) Stand and face north. Which direction is behind you?

UNIT PROJECT: MY YARD MAP WITH A COMPASS ROSE

Draw a map of your yard on squared paper with your house, the mailbox and at least three other things, such as a tree, a garden or a swing. Add a key and a compass rose, with N pointing the way north really is. Mark the sunrise side with a little sun and the letter E, and the sunset side with a sun and the letter W. Write the steps from the front door to the mailbox along an arrow. Beside the map, show your needle compass (or a drawing of it) and tell a parent how you made it.

- **Directions:** The compass rose shows N, E, S and W in the right places, and N matches north outside.
- **Map:** The house, the mailbox and at least three other things are drawn in about the right places, with a key.
- **Path:** The steps to the mailbox use only north, south, east, west and numbers, and they really work.
- **Compass:** The child made a needle compass and can tell how it works and why sailors needed one.

Answer key

1. North, east, south, west. Never Eat Soggy Waffles.
2. N at the top, E on the right, S at the bottom, W on the left.
3. It rises in the east and sets in the west.
4. No. The earth turns. Our side turns toward the sun in the morning and away from it in the evening.
5. North (and its other end points south).
6. Rub a needle with a magnet many times in one direction. Float it on a leaf in a bowl of water. It turns to point north and south.
7. North, 3 squares.

8. South.

THE SHAPE OF THE LAND

“The earth is the LORD’s, and the fulness thereof; the world, and they that dwell therein” (Psalm 24:1). God did not make the earth flat like a tabletop. He made tall mountains and gentle hills, wide plains and dry deserts, and coasts where the land meets the sea. These shapes are called **landforms**. In this unit your child will learn to name them, find them on a map and build them with their own hands.

We will ride west with the painter Albert Bierstadt to see the Rocky Mountains, peek over a mesa at a village built under a cliff, and plant wheat like the homestead families of the Great Plains. We will cross the Sahara with Ibn Battuta’s camel caravan, meet the saguaro cactus, and sail Chesapeake Bay with Captain John Smith. At the end, your child will make a salt-dough map with six landforms and a picture map to match.

BEFORE YOU BEGIN

- Can find north, south, east and west on a map with a compass rose (Unit 2)
- Knows that a map is a picture of a place from above (Unit 1)
- Can read a simple map key (Unit 1)
- Can count to 20

MASTERY CHECKLIST

- I can tell a mountain, a hill and a mesa apart by their shape.
- I can tell what a plain and a prairie are and point to the Great Plains on a map.
- I can tell what a desert is and one reason why it is dry.
- I can tell what a coast, a beach, a bay and a peninsula are.
- I can draw a picture map with six landforms and label them.

OPTIONAL BOOKS AND RESOURCES

- **Mesa Verde National Park (National Park Service)** (<https://www.nps.gov/meve/>): Free. Photographs of the mesa and its cliff dwellings, such as Cliff Palace, to look at together during Lesson 3.1.
- **Homestead National Historical Park (National Park Service)** (<https://www.nps.gov/home/>): Free. The park at Daniel Freeman’s homestead near Beatrice, Nebraska, with pictures of the restored tallgrass prairie (Lesson 3.2).
- **Saguaro National Park (National Park Service)** (<https://www.nps.gov/sagu/>): Free. Photographs of saguaro forests and desert animals near Tucson, Arizona (Lesson 3.3).

3.1 MOUNTAINS, HILLS AND PLATEAUS ★

OBJECTIVES

- Tell a mountain, a hill and a plateau (or mesa) apart by their shape.
- Find the Rocky Mountains on a map of North America and tell the story of Albert Bierstadt's trip west.
- Build a mountain, a hill and a mesa from dough and say which is tallest.

Warm-up. Lay a bath towel flat on the floor. Put your hands on the two ends and slowly push them toward each other. Watch the towel rise into folds. Which folds are tall and pointy, like mountains? Which are low and round, like hills? Now set a big flat book on top of a stack of blocks. You made a high, flat-topped place, like a mesa!

Video. Coming soon. Short kid-friendly videos (under about 8 minutes) on mountains, hills and plateaus, plus Rocky Mountain and Mesa Verde cliff-house footage: search SciShow Kids, NASA, Smithsonian and National Park Service (Rocky Mountain and Mesa Verde parks); Homeschool Pop (Alternate); National Geographic Kids and Free School (candidates, need vetting).

KEY TERMS

mountain

Land that rises very high, with steep sides and often a pointed top.

hill

Land that rises up, but not as high as a mountain, with gentle, rounded sides.

plateau

High land that is flat on top, like a tabletop.

mesa

A small plateau with steep cliff sides. Mesa is the Spanish word for “table.”

CORE IDEAS

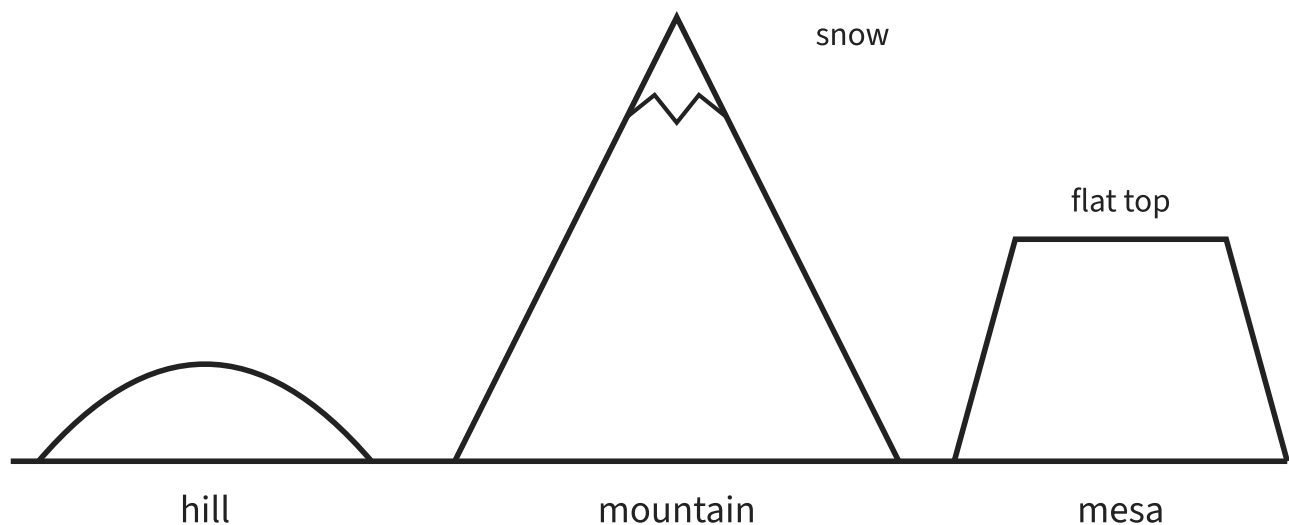
The story. In the summer of 1859, a young painter named Albert Bierstadt rode west with a team that was building a wagon road. Their leader was Colonel Frederick Lander. For weeks they crossed wide, flat grassland. Then, far ahead, they saw a wall of mountains so tall that snow sat on their tops in summer. These were the **Rocky Mountains**. Bierstadt filled his notebooks with drawings. Back home in New York, he painted a giant picture of them, about 6 feet tall and 10 feet wide. He named the tallest peak after his leader: Lander's Peak.

The big idea. The land is not flat everywhere. God made it with high places and low places. A **mountain** rises very high, with steep sides and often a pointed top. A **hill** is like a little mountain. It is lower, with soft, round sides you could run up. A **plateau** is high land that is

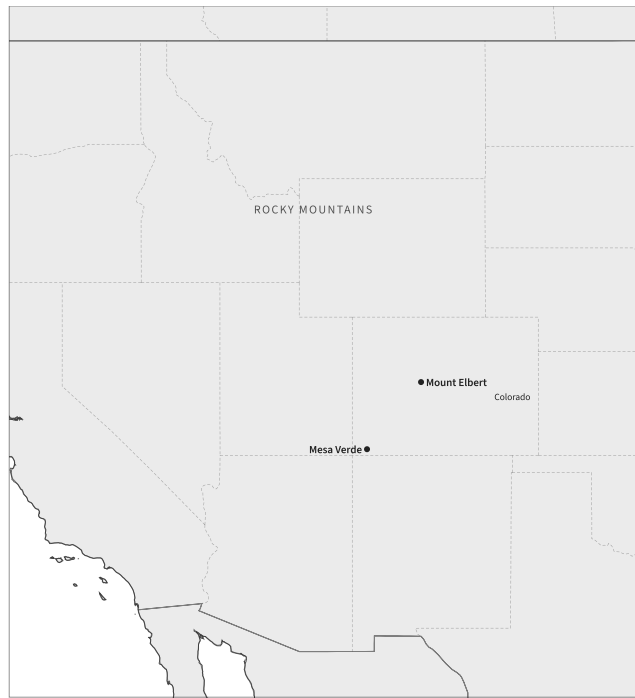
flat on top, like a table. A small plateau with steep cliff sides is called a **mesa**. Mesa is the Spanish word for “table.”

On the map. The Rocky Mountains run down the western part of North America for more than 3,000 miles, from Canada all the way to New Mexico. The tallest one is Mount Elbert in Colorado. It is more than 14,000 feet high, almost three miles straight up! In the southwest corner of Colorado is a mesa called **Mesa Verde**, which means “green table.” In December 1888, two ranchers named Richard Wetherill and Charlie Mason were looking for lost cattle. They peeked over the edge of a canyon and saw a whole village of stone houses tucked under the cliff. Ancestral Pueblo people had built it more than 600 years before.

How maps show it. On a picture map, mapmakers often draw mountains as little pointed peaks, hills as low bumps, and a mesa as a box with a flat top. When you see a row of little peaks on a map, you know the land there goes up, up, up.



A hill, a mountain and a mesa, seen from the side.



The Rocky Mountains, with Mount Elbert and Mesa Verde.

PICTURE STUDY



The Rocky Mountains, Lander's Peak, Albert Bierstadt, 1863 · Oil on canvas · Metropolitan Museum of Art, New York

Albert Bierstadt was born in Germany and grew up in Massachusetts. In 1859 he traveled west with Colonel Lander's road builders and drew the mountains of what is now Wyoming. Four years later he finished this enormous painting in his New York studio. He put together his drawings to make the grandest view he could, so it is not an exact copy of one spot. People lined up to see it, because most Americans had never seen the Rocky Mountains.

Look closely

- Find the tallest, snowiest peak. That is Lander's Peak. Trace its pointed top with your finger in the air.
- Find the waterfall. Where does its water go?
- Look at the bottom of the painting. Find the tents and horses of a Shoshone camp. How small do the people look next to the mountains?
- Find a place in the painting that looks low and gentle, more like a hill than a mountain.

Talk about it

1. How can you tell the mountains in this painting are very, very tall?
2. If you could walk into this painting, where would you go first?
3. Why do you think so many people wanted to see this painting when it was new?

PROJECT: THREE LANDFORMS IN DOUGH

You will build a mountain, a hill and a mesa from dough, then measure which one is tallest with building blocks.

You will need

- Play dough or salt dough (2 cups flour, 1 cup salt, about 3/4 cup water, mixed and kneaded)
- A paper plate
- A butter knife (for the parent or with help)
- Small building blocks or Lego bricks
- Toothpicks and three small paper flags

Steps

1. Make a big ball of dough. Pinch and pull it up into a tall, pointed mountain. Put it on the plate.
2. Make a smaller ball. Press it into a low, round hill next to the mountain.
3. Make a fat, round tower of dough. Ask your parent to slice the top flat with the butter knife. Now you have a mesa with steep sides and a flat top.
4. Write "mountain," "hill" and "mesa" on the flags (a parent can help) and stick one in each landform.
5. Stack blocks next to each landform until the stack is as tall as it. Count the blocks. Which landform is tallest? Which is shortest?
6. Gently set a tiny toy or bead on top of each one. On which top does it sit still best? (The flat mesa!)

Tips

- Save your salt dough in a bag in the refrigerator. You can use more of it for the unit's landform map.

- If your mountain droops, make the bottom wider. Real mountains are wide at the bottom too.

Check your work

- I can point to my mountain, hill and mesa and say how they are different.
- I can tell which of my landforms is tallest by counting blocks.

MAP NOTEBOOK

1. Draw a hill, a mountain and a mesa in a row, the way they look from the side. Label each one.
2. Draw the snowy top of Lander's Peak and color the sky behind it.
3. Draw a mesa with little stone houses tucked under its cliff, like Mesa Verde.

From history. In 1893 a teacher named Katharine Lee Bates rode a wagon to the top of Pikes Peak, a Rocky Mountain in Colorado more than 14,000 feet high. She looked out over the mountains and the flat plains below, and afterward wrote a poem that became the song "America the Beautiful." It sings of "purple mountain majesties above the fruited plain." You will learn about that fruited plain in the next lesson.

WORKED EXAMPLES

Example 1. Look at the picture of three landforms. Which one is the tallest? Which one has a flat top?

(Use the map or drawing "Which is tallest? Which is flat on top?" shown earlier in this lesson.)

1. Put your finger on the top of each landform.
2. The middle one reaches highest, and its top is pointed. That is the mountain.
3. The one on the right has a top as flat as a table. That is the mesa.
4. The one on the left is low and round. That is the hill.

Answer: The mountain is the tallest. The mesa has a flat top.

PRACTICE

1. **EASY** Point to the hill in the picture. Is its top pointed or rounded?
(Use the map or drawing "Find the hill." shown earlier in this lesson.)
2. **EASY** Which is taller, a hill or a mountain?
3. **EASY** What does the Spanish word *mesa* mean?
4. **MEDIUM** Draw three mountains and two hills. How many landforms did you draw in all?
5. **MEDIUM** Point to the Rocky Mountains on the map. What did two ranchers find at Mesa Verde in 1888?
(Use the map or drawing "The Rocky Mountains." shown earlier in this lesson.)

COMMON MISTAKES

- Calling every high place a mountain. A hill is lower and rounder; a mountain is much taller and steeper.
- Thinking a plateau must be low because it is flat. A plateau is flat on top but high up.
- Thinking Bierstadt painted exactly what one spot looked like. He put together many drawings to make one grand view.

Make it a game • Mountain, Hill, Mesa!. A parent calls out a landform. For “Mountain!” stand on tiptoe and point your hands together high over your head. For “Hill!” crouch down and make a round back. For “Mesa!” stand tall and lay your flat hands on top of your head like a tabletop. The parent calls faster and faster. Then switch, and you call while the parent does the moves.

Scripture. “I will lift up mine eyes unto the hills, from whence cometh my help. My help cometh from the LORD, which made heaven and earth.” (Psalm 121:1-2, KJV)

The mountains are big and strong, but the God who made them is bigger and stronger. When we look up at the hills, we remember who made them.

Practice answers

1. Rounded.
2. A mountain.
3. Table.
4. 5 landforms (3 + 2).
5. They found a village of old stone houses built under a cliff by Ancestral Pueblo people.

3.2 PLAINS AND PRAIRIES

OBJECTIVES

- Tell what a plain and a prairie are and find the Great Plains on a map.
- Tell how homestead families came to farm the prairie and built houses of sod.
- Count the wheat and corn fields on a simple farm map.

Warm-up. Get a slice of bread, a cracker or a bowl of cereal. Look at the label together or ask a parent: what grain is it made from? Wheat? Corn? Oats? Most of that grain grew on big, flat farms. Now lay your hand flat on the table and slide it along. Flat land like this is just right for farming.

Video. Coming soon. Short kid-friendly videos (under about 8 minutes) on prairies and the Great Plains, wheat harvest and combines, and how bread goes from field to table: search SciShow Kids, Smithsonian, The Henry Ford and National Park Service (Homestead National Historical Park); Homeschool Pop (Alternate); National Geographic Kids and Free School (candidates, need vetting).

KEY TERMS

plain

Wide land that is flat or gently rolling, with no mountains.

prairie

A plain covered with tall grasses and wildflowers and very few trees.

sod

The top layer of the ground, thick with grass and its tangled roots.

farm

Land where people grow crops like wheat and corn or raise animals for food.

CORE IDEAS

The story. On January 1, 1863, the very first day a new law allowed it, a man named Daniel Freeman claimed a piece of prairie near Beatrice, Nebraska. The law was the **Homestead Act**, signed by President Abraham Lincoln in 1862. It said a family could have 160 acres of land, almost for free, if they lived on it and farmed it for five years. Many thousands of families came. Out on the prairie there were hardly any trees for wood. So many families built houses out of the ground itself. They cut the grassy **sod** into long blocks and stacked them like bricks.

The big idea. A **plain** is wide land that is flat or gently rolling, with no mountains. You can see a very long way. A **prairie** is a plain covered with tall grass and wildflowers and very few trees. Prairie grass has long roots that twist and tangle deep under the ground. That is why the sod was strong enough to build a house!

On the map. The biggest plain in our country is the **Great Plains**. It lies just east of the Rocky Mountains and stretches from Canada all the way down to Texas. Flat land is easy to plow, and the prairie soil is rich and dark. So today the Great Plains are covered with farms. Farmers grow wheat for bread and pasta, and corn for food and for feeding cattle. Kansas is even called “the Wheat State.” The bread on your table may have grown on the Great Plains.

God gives the growth. A farmer plows, plants and pulls weeds. But he cannot make the rain fall or the sun shine. Farmers wait and trust God for each harvest, just as God promised Noah after the flood.



The Great Plains lie east of the Rocky Mountains.

PICTURE STUDY



The Sylvester Rawding Family in Front of Their Sod House, north of Sargent, Custer County, Nebraska, Solomon D. Butcher, 1886 · Photograph (albumen print) · Library of Congress, Prints and Photographs Division; Butcher's glass plate negatives are kept by History Nebraska

Solomon Butcher was a photographer who lived on the Nebraska prairie. He drove his wagon from farm to farm with a big camera and took pictures of homestead families in front of their sod houses. He took thousands of them. This photograph shows the Rawding family. Their house is built right into the side of a hill, so the grassy roof joins the hillside, and their cow has wandered up onto the roof! His pictures show us how families really lived when they first came to farm the Great Plains.

Look closely

- Look at the walls of the house. Can you see the blocks of sod stacked like bricks?
- Find the cow. Where is it standing?
- Count the people in the photograph. Then find the mules and the dog.
- Find the doors and the windows. What is on the table?

Talk about it

1. Why did families on the prairie build houses out of sod instead of wood?
2. What do you think it was like inside a sod house on a hot day? On a cold day?
3. What chores do you think the children in this family did?

PROJECT: GROW A PRAIRIE IN A CUP

Prairie grass has long, tangled roots. You will plant wheat seeds in a clear cup so you can watch the roots grow and see how sod is made.

You will need

- A clear plastic cup
- Potting soil
- A spoonful of wheat berries (from the grocery store or a feed store) or grass seed
- A spray bottle or small cup of water
- A sunny windowsill

Steps

1. Fill the cup with soil almost to the top.
2. Push some seeds into the soil right next to the clear side of the cup, so you can see them. Sprinkle the rest on top and cover them with a little soil.
3. Water the soil until it is damp, not soggy. Set the cup in a sunny window.
4. Check every day. Draw what you see. In a few days, look for roots through the side of the cup and green shoots on top.
5. After two weeks, ask a parent to help you tip out the whole clump. See how the roots hold the soil together? That is sod!

Tips

- Keep the soil damp but not swimming in water.
- Count how many days until the first green shoot pops up.

Check your work

- I can show where the roots are and tell why sod holds together.
- I can tell what grain I planted and one food made from it.

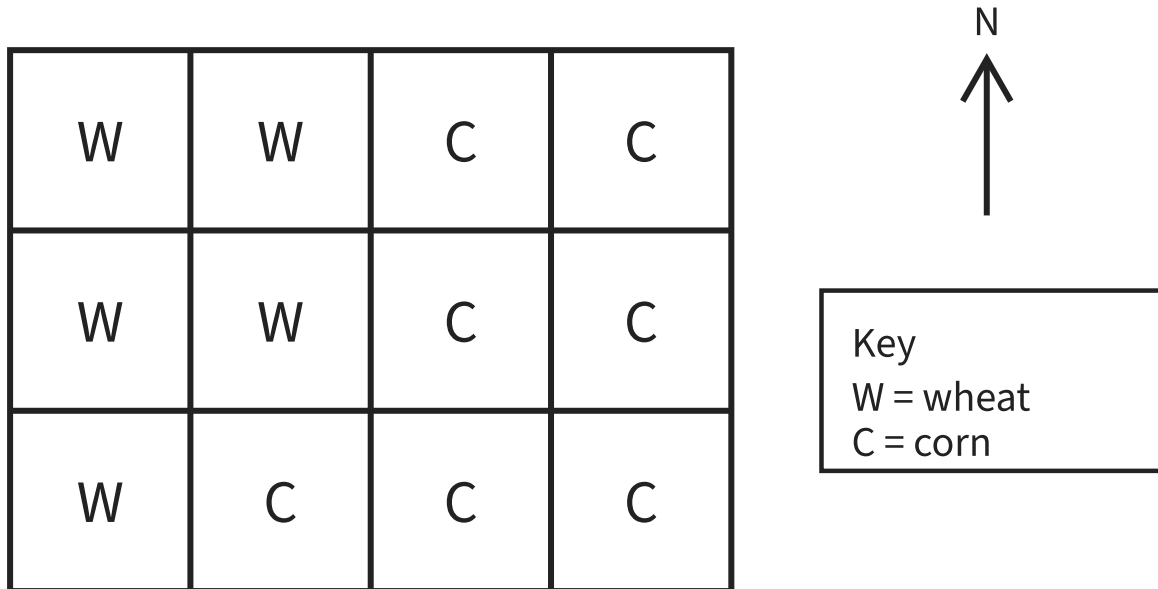
MAP NOTEBOOK

1. Draw a prairie: tall grass, wildflowers, a big sky and a sod house.
2. Draw a farm map with squares for fields. Color the wheat fields yellow and the corn fields green.
3. Draw a loaf of bread and, next to it, the wheat it came from.

From history. In 1874, Mennonite families moved from Russia to Kansas. They brought along a hardy kind of wheat called Turkey Red that could live through the cold prairie winters. Farmers all over the Great Plains began planting it, and it helped Kansas become one of the greatest wheat-growing places in the world.

WORKED EXAMPLES

Example 1. Here is a map of a farm on the Great Plains. Each square is one field. W means wheat and C means corn. How many wheat fields are there? Are there more wheat fields or corn fields?



A farm map: count the fields.

1. Find the key. It tells us W is wheat and C is corn.
2. Touch each square with a W and count: 1, 2, 3, 4, 5. There are 5 wheat fields.
3. Now touch each square with a C and count: 1, 2, 3, 4, 5, 6, 7. There are 7 corn fields.
4. 7 is more than 5.

Answer: 5 wheat fields. There are more corn fields (7) than wheat fields.

PRACTICE

1. **EASY** What is a plain covered with tall grass and wildflowers called?
2. **EASY** Point to the Great Plains on the map. Are they east or west of the Rocky Mountains?
(Use the map or drawing "Find the Great Plains." shown earlier in this lesson.)
3. **EASY** What did many homestead families on the prairie use to build their houses?
4. **MEDIUM** Look at the farm map. How many fields are there in all?
(Use the map or drawing "Count all the fields." shown earlier in this lesson.)
5. **MEDIUM** Name two foods made from wheat.

COMMON MISTAKES

- Thinking a plain has to be perfectly flat. Plains can roll up and down gently, like soft waves.
- Mixing up a prairie and a desert. A prairie gets enough rain for tall grass to grow; a desert gets very little rain.
- Thinking food comes from the store. The store only sells it; it grew first on a farm.

Make it a game • Plant and Harvest. Lay out 10 paper squares on the floor as fields. The child is the farmer. The parent calls “Plow!” (walk in a straight line), “Plant!” (put a button or bean on each square), “Rain!” (wiggle fingers down), “Grow!” (stretch up tall) and “Harvest!” (pick up all the beans as fast as you can and count them). Take turns being the farmer.

Scripture. “While the earth remaineth, seedtime and harvest, and cold and heat, and summer and winter, and day and night shall not cease.” (Genesis 8:22, KJV)

After the flood, God promised Noah that planting time and harvest time would keep coming. Every year, farmers on the plains plant and harvest because God keeps His promise.

Practice answers

1. A prairie.
2. East.
3. Blocks of sod (grassy earth).
4. 12 fields (5 wheat + 7 corn).
5. Any two, such as bread, crackers, pasta, cereal or pancakes.

3.3 DESERTS

OBJECTIVES

- Tell what a desert is and give one reason why deserts are dry.
- Find the Sahara on a map of Africa and tell about Ibn Battuta’s camel caravan.
- Show with a sponge test how a saguaro cactus saves water.

Warm-up. Set two small plates on a sunny windowsill. Put a spoonful of water on each. Cover one with a plastic cup turned upside down. Leave the other open. Check them at the end of the lesson or tomorrow. Which plate dried up first? In a desert the sun and the dry air drink up water fast.

Video. Coming soon. Short kid-friendly videos (under about 8 minutes) on deserts, camels in the Sahara and the saguaro cactus of the Sonoran Desert: search SciShow Kids, NASA (Sahara from space), Smithsonian and National Park Service (Saguaro National Park); Homeschool Pop (Alternate); National Geographic Kids and Free School (candidates, need vetting).

KEY TERMS

desert

A place that gets very little rain.

Sahara

The biggest hot desert in the world, across the top of Africa.

cactus

A desert plant with a thick, waxy skin and spines that stores water inside.

caravan

A long line of travelers and animals, such as camels, crossing a desert together.

CORE IDEAS

The story. In the year 1352, a great traveler named Ibn Battuta joined a camel caravan to cross the **Sahara**. He was going to the kingdom of Mali in West Africa. For about two months the camels plodded over sand and stone. Water was so hard to find that the travelers carried it in bags made of animal skin. On the way they stopped at a place called Taghaza. There Ibn Battuta saw something strange: houses built from blocks of salt, with roofs made of camel skins!

The big idea. A **desert** is a place that gets very little rain. Rain comes from clouds, and over some places clouds hardly ever form or come. Over the Sahara, the air is mostly dry, so clouds seldom grow and drop rain. Other deserts lie behind tall mountains. The clouds drop their rain on the mountains first, and the land on the other side stays dry. Many deserts are

hot in the daytime, but some deserts are cold. What makes a desert is not heat but very little rain.

On the map. The Sahara covers most of the top part of Africa. It is almost as big as the whole United States! Far away, in Arizona and Mexico, is the Sonoran Desert. There grows the **saguaro** cactus (say suh-WAH-roh). It can grow taller than a house. When rain comes, its roots, spread wide just under the ground like a net, slurp up water fast. Its pleated trunk swells like an accordion to hold it. Its waxy skin keeps the water in, and its spines help shade it and keep thirsty animals away. Woodpeckers peck holes in it for their homes.

Made for the desert. God gave desert plants and animals just what they need. The camel can walk for days without a drink. The cactus saves every drop. Even the driest place on earth is full of His care.



The Sahara covers most of northern Africa.

PICTURE STUDY



The Sahara (also called The Desert), Gustave Guillaumet, 1867 · Oil on canvas · Musée d'Orsay, Paris

Gustave Guillaumet was a French painter who traveled many times to Algeria, at the northern edge of the Sahara. He painted the desert as it really looked: wide, flat, quiet and very dry. In this painting there are no trees, no rivers and no clouds. Guillaumet wanted people far away in Paris to feel how big and empty the Sahara is.

Look closely

- Look at the sky. Do you see any rain clouds?
- Find the line of camels far away. That is a caravan. How small does it look?
- Look at the front of the painting. What has been left in the sand?
- Name the colors the painter used. Are there any greens?

Talk about it

1. Why do you think there are no trees or grass in this painting?
2. What would you need to bring if you were in that caravan?
3. How is this painting different from Bierstadt's Rocky Mountains?

PROJECT: THE CACTUS SPONGE TEST

A cactus has thick, waxy skin that keeps its water from drying up in the sun. You will test this with two sponges and some wax paper.

You will need

- Two kitchen sponges the same size
- A sheet of wax paper

- Tape
- A bowl of water
- A sunny windowsill

Steps

1. Soak both sponges in the water. Squeeze them just a little so they are wet but not dripping.
2. Wrap one sponge all the way around in wax paper and tape it closed. This is your “cactus.” Leave the other sponge bare.
3. Set both sponges side by side on a sunny windowsill.
4. Wait until the next day. Unwrap the cactus sponge and squeeze both sponges over the bowl.
5. Which one is still wet? Which one dried out?

Tips

- Try folding a strip of paper back and forth like an accordion. Pull the ends. It stretches, just as a saguaro’s pleated trunk swells when it fills with water.

Check your work

- I can tell which sponge stayed wet and why.
- I can name two ways a saguaro cactus saves water.

MAP NOTEBOOK

1. Draw a saguaro cactus with arms. Add a woodpecker hole and a flower on top.
2. Draw a camel caravan crossing the sand dunes under a hot sun.
3. Draw Ibn Battuta’s house of salt blocks with a camel-skin roof.

From history. Near Tucson, Arizona, whole forests of saguaro cactuses are protected in Saguaro National Park. It became a national monument in 1933 and a national park in 1994. A saguaro grows very slowly. It may be many years old before it grows its very first arm, and some saguaros live for more than 150 years.

WORKED EXAMPLES

Example 1. Look at the map of Africa. North is at the top. Is the Sahara in the north part of Africa or the south part?

(Use the map or drawing “Where is the Sahara?” shown earlier in this lesson.)

1. Remember: on this map, north is up at the top and south is down at the bottom.
2. Put your finger on the word Sahara.
3. Your finger is near the top of Africa, not the bottom.

Answer: The Sahara is in the north part of Africa.

PRACTICE

1. **EASY** What is a desert?
2. **EASY** Point to Timbuktu on the map. Is it at the north edge or the south edge of the Sahara?
(Use the map or drawing “Find Timbuktu.” shown earlier in this lesson.)
3. **EASY** What animal carried Ibn Battuta’s caravan across the Sahara?
4. **MEDIUM** A saguaro has 2 arms on one side and 3 arms on the other side. How many arms does it have in all?
5. **MEDIUM** Tell one reason why a desert stays so dry.

COMMON MISTAKES

- Thinking every desert is hot and sandy. A desert is any place with very little rain; some are rocky and some are cold.
- Thinking a cactus never needs water. It needs water too; it just stores it up when rain comes.
- Thinking nothing lives in a desert. Many plants and animals are made to live there.

Make it a game • Camel Caravan. Fill a plastic cup half full of water and set it on a tray or plate. You are a camel carrying precious water across the Sahara. Walk the tray from one end of the yard or house to the other without spilling. A parent can lay pillows as sand dunes to step around. At the end, pour the water into a measuring cup to see how much you saved. Try again and see if you can save more.

Scripture. “The wilderness and the solitary place shall be glad for them; and the desert shall rejoice, and blossom as the rose.” (Isaiah 35:1, KJV)

When rain finally falls in the desert, flowers burst out everywhere, even on the cactus. The prophet Isaiah used that picture to show the joy God brings to dry and lonely places.

1. A place that gets very little rain.
2. The south edge.
3. Camels.
4. 5 arms.
5. Any one: clouds seldom form there because the air is dry; or tall mountains catch the rain before the clouds reach it.

3.4 COASTS, BAYS AND BEACHES

OBJECTIVES

- Tell what a coast, a beach, a bay and a peninsula are and point to each on a map.
- Tell how Captain John Smith explored and mapped Chesapeake Bay.
- Build a coastline in a tray and watch waves move the sand.

Warm-up. Take a cookie and take one big bite out of the side. Look at the bite: the empty space with cookie around three sides is shaped like a **bay**. Now find a corner of the cookie that sticks out. Pretend the plate is the sea. That piece of cookie with “sea” on three sides is like a **peninsula**. Then you may eat the map!

Video. Coming soon. Short kid-friendly videos (under about 8 minutes) on coasts, beaches, waves and how sand is made, and Chesapeake Bay from the air: search SciShow Kids, NASA (coastlines from space), Smithsonian and National Park Service (Captain John Smith Chesapeake trail); Homeschool Pop (Alternate); NOAA, National Geographic Kids and Free School (candidates, need vetting).

KEY TERMS

coast

The land along the edge of the sea, where land meets sea.

beach

The low edge of the coast covered with sand or small stones.

bay

A part of the sea that reaches into the land, with land around it on three sides.

peninsula

A piece of land with water on three sides.

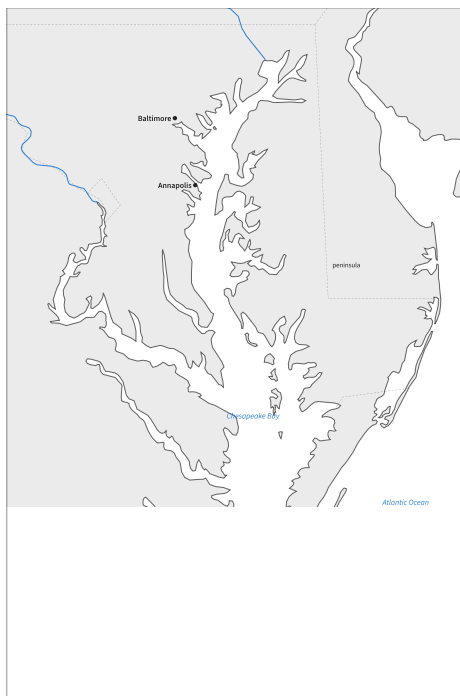
CORE IDEAS

The story. In the summer of 1608, Captain John Smith set out from the little English town of Jamestown, in Virginia. He and his men climbed into a small open boat to explore a great bay called the **Chesapeake**. They sailed and rowed along the shore. They poked into river after river and met the Native peoples who lived along the water. Smith drew everything he saw. His map was printed in 1612, and it was so good that people used it for many years.

The big idea. The **coast** is where the land meets the sea. Some coasts are tall, rocky cliffs. Others are low and sandy. A **beach** is the low edge of the coast covered with sand or pebbles. Sand is made of tiny bits of rock and shell that the waves have rubbed and tumbled for a very long time. A **bay** is a part of the sea that reaches into the land, with land on three sides, like a big bite out of a cookie. Bays have calm water, so ships love them. A **peninsula** is the opposite: land with water on three sides.

On the map. Chesapeake Bay is on the east coast of the United States. It is about 200 miles long, and many rivers flow into it. The land on its east side is a long peninsula, with the bay on one side and the Atlantic Ocean on the other. Find the bay on the map. Can you see how the land wraps around it?

God set the edge. On the third day of creation, God gathered the waters into seas and let the dry land appear. Every coast in the world is a place where those two meet. The waves roll in and out, and they move the sand, but they stop where God has set them.



Chesapeake Bay, which John Smith explored in 1608.

PICTURE STUDY



Eagle Head, Manchester, Massachusetts (High Tide), Winslow Homer, 1870 · Oil on canvas · Metropolitan Museum of Art, New York

Winslow Homer started out drawing pictures for magazines. Later he became one of America's great painters of the sea. In the summer of 1870 he painted this beach at Manchester, Massachusetts, north of Boston. The rocky point of land behind the beach is called Eagle Head. Homer liked to show real people at the edge of the sea, with the wind and the water all around them.

Look closely

- Find the wave sliding up onto the sand. How far up the beach has the water come?
- Find the rocky land that sticks out into the water. That is Eagle Head.
- Find the dog. What do you think it is doing?
- Look at the people's wet clothes and the sky. Is it windy or calm?

Talk about it

1. Is this coast sandy, rocky or both? How can you tell?
2. The title says "High Tide." What do you think happens to the beach when the tide goes back out?
3. Have you ever been to a beach? What did the sand feel like?

Safety first. Stay with your child whenever there is water in a tray, and wipe up spills so no one slips.

PROJECT: A COASTLINE IN A TRAY

You will build a coast with a beach, a bay and a peninsula in a pan, then make waves and watch how they move the sand.

You will need

- A large baking pan or plastic storage bin
- Sand (play sand) or damp soil, about 4 to 6 cups
- A few small pebbles
- A pitcher of water
- A ruler or a flat piece of cardboard for making waves
- Toothpicks and small paper flags

Steps

1. Pile the sand into one end of the pan. Pat it down firm. This is your land.
2. Slope the front edge of the sand gently down toward the empty end. This low edge is your beach.
3. Scoop out a curved bite from the edge of the land. That is your bay.
4. Push some sand out into the empty end to make a long arm of land. That is your peninsula.
5. Slowly pour water into the empty end until it is about an inch deep. Now you have a sea!
6. Make flags that say “beach,” “bay” and “peninsula” and stick them in the right places.
7. Hold the ruler in the water and gently push it back and forth to make small waves. Watch what happens to the beach. Where does the sand go? Is the water in the bay calmer?

Tips

- Small, gentle waves work best. Big splashes wash everything away at once.
- Put a few pebbles at the tip of the peninsula. Do the waves move pebbles as easily as sand?

Check your work

- I can point to my beach, bay and peninsula.
- I can tell what the waves did to the sand.

MAP NOTEBOOK

1. Draw a coast from above: blue sea, a beach, a bay and a peninsula. Label each one.
2. Draw John Smith’s little boat sailing into Chesapeake Bay.
3. Unit map: draw a picture map of a make-believe land with six landforms: a mountain, a hill, a mesa, a plain, a desert and a bay. Add a compass rose and label all six.

From history. On his 1608 voyage, John Smith was spearing fish with his sword near the mouth of a river when a stingray stung him in the arm. His arm swelled so badly that his men thought he would die, but by evening he was well enough to eat the stingray for supper! The tip of land where it happened is still called Stingray Point.

WORKED EXAMPLES

Example 1. Look at the map of Chesapeake Bay. North is at the top. Which way do you go from the bay to reach the Atlantic Ocean: east or west?

(Use the map or drawing “Which way is the ocean?” shown earlier in this lesson.)

1. Find the compass directions: north is up, so east is to the right and west is to the left.
2. Put your finger on Chesapeake Bay.
3. Find the words Atlantic Ocean. They are to the right of the bay.
4. Right on this map is east.

Answer: East. The Atlantic Ocean is east of Chesapeake Bay.

PRACTICE

1. **EASY** Point to Chesapeake Bay on the map. Then point to the Atlantic Ocean.
(Use the map or drawing “Find the bay and the ocean.” shown earlier in this lesson.)
2. **EASY** What do we call land with water on three sides?
3. **EASY** What is sand made of?
4. **MEDIUM** Count the cities marked with dots on the Chesapeake Bay map. How many are there?
(Use the map or drawing “Count the dots.” shown earlier in this lesson.)
5. **MEDIUM** John Smith sailed from Jamestown up the bay to where Baltimore is today. Look at the map. Did he sail north or south?
(Use the map or drawing “Jamestown to Baltimore.” shown earlier in this lesson.)

COMMON MISTAKES

- Mixing up a bay and a peninsula. A bay is water with land around it; a peninsula is land with water around it.
- Thinking every coast has a beach. Some coasts are steep, rocky cliffs.
- Thinking a beach always stays the same. Waves and storms move the sand all the time.

Make it a game • Land or Sea?. Lay a blue towel (the sea) next to a brown or green towel (the land). A parent calls out a word: beach, bay, mountain, ocean, peninsula, desert, plain, hill. If it is a kind of land, jump onto the land towel. If it is a kind of water,

jump onto the sea towel. A beach is land, but it touches the sea, so you may jump with one foot on each! Then let the child call the words.

Scripture. “And God called the dry land Earth; and the gathering together of the waters called he Seas: and God saw that it was good.” (Genesis 1:10, KJV)

God made both the land and the sea, and He made the place where they meet. Every beach and bay is part of the good world He made.

Practice answers

1. The bay is the long water reaching up into the land; the ocean is the open water on the right (east).
2. A peninsula.
3. Tiny bits of rock and shell broken and rubbed smooth by the waves.
4. 3 (Jamestown, Annapolis and Baltimore).
5. North.

UNIT 3 REVIEW

Ask each question aloud. Your child may answer by telling, pointing or drawing. The review is worth 20 points.

1. (3 pts) How is a mountain different from a hill?
2. (3 pts) What is a mesa? What does the word mesa mean?
3. (3 pts) What is a prairie? Name one food that grows on the Great Plains.
4. (2 pts) A farm map has 4 wheat fields and 5 corn fields. How many fields are there in all?
5. (3 pts) What is a desert? Tell one reason a desert is dry.
6. (2 pts) Tell two ways a saguaro cactus saves water.
7. (2 pts) What is a bay? What is a peninsula?
8. (2 pts) On a map with north at the top, the ocean is on the right side of the land. Which direction is the ocean from the land?

UNIT PROJECT: MY SALT-DOUGH LANDFORM MAP

With a parent's help, mix salt dough (2 cups flour, 1 cup salt, about 3/4 cup water) and press it onto a piece of sturdy cardboard. Shape six landforms: a pointed mountain, a round hill, a flat-topped mesa, a flat plain, a dry desert and a coast with a bay. Let it air-dry for a few days (never put the cardboard in the oven), then paint it: white snow on the mountain, green on the hill and plain, tan on the desert, blue in the bay. Stick in toothpick flags to label all six. Beside it, draw a matching picture map from above with a compass rose and a key. Salt dough is not for eating.

- **Six landforms:** All six landforms are built and each has the right shape (pointed mountain, round hill, flat-topped mesa, flat plain, desert, bay).
- **Labels:** Each landform has a flag with the correct name.
- **Picture map:** The drawn map shows the same six landforms from above, with a compass rose and a simple key.
- **Telling about it:** The child can point to each landform and tell one thing about it, such as where a real one is.

Answer key

1. A mountain is much taller, with steep sides and often a pointed top. A hill is lower, with gentle, rounded sides.
2. A small, high, flat-topped landform with steep cliff sides. Mesa means "table."
3. A wide, flat plain covered with tall grass and wildflowers and few trees. Wheat or corn.
4. 9 fields.
5. A place that gets very little rain. Clouds seldom form there because the air is dry, or tall mountains catch the rain first.
6. Any two: waxy skin keeps water in; its pleated trunk swells to store water; wide roots soak up rain fast; spines shade it; it has spines instead of leaves, so little water escapes.

7. A bay is part of the sea with land around it on three sides. A peninsula is land with water on three sides.
8. East.

THE WATER CYCLE

Where does a puddle go when it dries? What is a cloud made of? Why doesn't the sea fill up when every river in the world keeps pouring into it? In this unit your child follows one drop of water on its long trip: up into the air, into a cloud, down as rain, along a river to the sea, and deep into the ground where wells and springs find it. The Bible noticed this trip long ago: "All the rivers run into the sea; yet the sea is not full; unto the place from whence the rivers come, thither they return again" (Ecclesiastes 1:7).

Along the way you will watch a chalk-traced puddle shrink in the sun, make a cloud in a jar, build a river in a sand tray, and dig a tiny well in a cup. You will meet Dutch workers drying linen in the sun, Luke Howard who named the clouds, Henry Schoolcraft and his Ojibwe guide Ozawindib at the source of the Mississippi, and Jesus resting at Jacob's well. On the map, your child will trace a real river from its source to its mouth.

BEFORE YOU BEGIN

- Can point to north, south, east and west on a map with a compass rose (Unit 2)
- Knows that mountains and hills are high land and that water runs downhill (Unit 3)
- Can count to 20

MASTERY CHECKLIST

- I can tell where a puddle goes when it dries: the water evaporates and goes up into the air.
- I can tell that clouds are made of tiny drops of water, and that big drops fall as rain.
- I can tell the steps of the water cycle in order: up, cloud, rain, river, sea.
- I can trace a river on a map from its source to its mouth.
- I can tell the difference between a spring and a well, and tell the story of Jesus at Jacob's well.

OPTIONAL BOOKS AND RESOURCES

- **NOAA SciJinks: The Water Cycle** (<https://scijinks.gov/water-cycle/>): Free. A short, simple page with a clear water cycle picture from the National Oceanic and Atmospheric Administration. Good for a parent to read and show the picture.
- **USGS Water Science School** (<https://www.usgs.gov/special-topics/water-science-school>): Free. Pictures and plain explanations of the water cycle, groundwater, springs and wells from the U.S. Geological Survey. Written for older students; a parent can pick out the diagrams.
- **Mississippi National River and Recreation Area (National Park Service)** (<https://www.nps.gov/miss/>): Free. Photos and facts about the Mississippi River, including its start at Lake Itasca, for Lesson 4.3.

4.1 WATER GOES UP ★

OBJECTIVES

- Tell what happens to a puddle on a sunny day: the water goes up into the air.
- Use the word evaporate and show that sun and warmth make water dry up faster.
- Count squares on a picture grid to see that a puddle got smaller.

Warm-up. Dip your finger in a cup of water and paint a wet stripe on a paper towel or on the kitchen counter. Paint a second stripe right under a sunny window or a warm lamp. Watch both stripes for five minutes. Which one is drying first? Where is the water going?

Video. Coming soon. A short kid-friendly animation (under 8 minutes) on evaporation or “where does a puddle go?”: search SciShow Kids and NASA first, then Homeschool Pop (Alternate), and NOAA SciJinks or Free School (candidates, need vetting).

KEY TERMS

evaporate

To dry up and go into the air. The water is still there, but it is too tiny to see.

water vapor

Water that has gone up into the air as tiny bits we cannot see.

puddle

A small pool of water on the ground, often left after rain.

CORE IDEAS

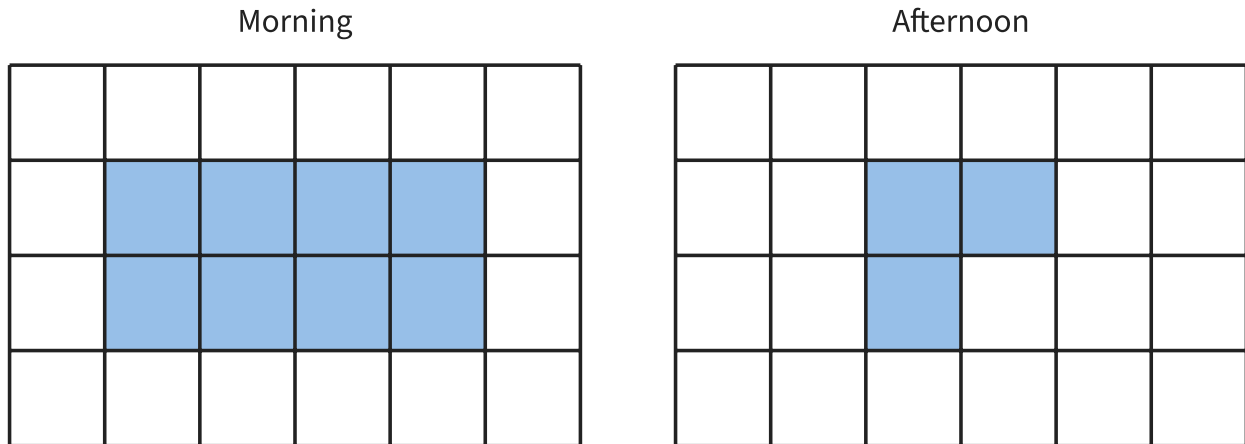
The story. About 350 years ago, in the Dutch city of Haarlem, workers had a big job. They washed long strips of white linen cloth. Then they carried the wet cloth out to the green fields and spread it flat on the grass in the sun. A painter named Jacob van Ruisdael painted those fields. You can see the white strips lying in the sun. The workers wet the cloth again and again, and each time the sun dried it. The sun made the cloth whiter, too.

How it works. Where did the water in the wet cloth go? It did not soak into the ground and it did not vanish. It went **up**. The sun warmed the water, and the water broke into bits so tiny that no one can see them. Those tiny bits floated up into the air. We say the water **evaporated**. Water in the air is called **water vapor**. The same thing happens to a **puddle** after the rain. In the morning the puddle is big. By afternoon it is small. Soon it is gone, and the sidewalk is dry.

The big idea. Warm water goes up faster than cold water. Sun, warmth and wind all help water evaporate. That is why wet clothes dry quickly on a sunny, windy day and slowly on a cold, gray one. Every day, water goes up from puddles, ponds, rivers, wet grass and the

great big sea. It goes up from your wet hair, too! This is the first step of the **water cycle**, the way God sends water up, around and back down again.

On the map. Look at the picture grid of a puddle in the morning and in the afternoon. Count the wet squares. The afternoon puddle covers fewer squares. Where did the missing water go? Up into the air!



The same puddle seen from above in the morning and in the afternoon. Count the blue squares.

PICTURE STUDY



View of Haarlem with Bleaching Fields, Jacob van Ruisdael, about 1670–1675 · Oil on canvas · Mauritshuis, The Hague, Netherlands

Jacob van Ruisdael was a Dutch painter who loved big skies. In this painting he stood on high ground near the city of Haarlem and looked far across the flat land. Most of the picture is

sky! Down below, in the fields, workers have spread out long pieces of linen to dry and whiten in the sun.

Look closely

- Find the long white strips on the grass. That is the wet linen drying in the sun.
- Find the big church on the edge of the town. Its tower points up into the sky.
- Look at the sky. How much of the picture is sky, and how much is land?
- Find the bright patches of sunlight and the dark patches of shadow. Where would the cloth dry fastest?

Talk about it

1. Where did the water in the wet linen go when it dried?
2. Why did the workers lay the cloth out in the sun and not in a dark barn?
3. The clouds are made of water too. Where do you think that water came from?

PROJECT: THE DISAPPEARING PUDDLE

You will make a puddle and watch it evaporate. You will also test whether sun or shade dries water faster.

You will need

- A bucket or pitcher of water
- Sidewalk chalk
- Two small plates or jar lids
- A spoon
- A sunny day (or a warm lamp indoors)

Steps

1. On a sunny morning, pour water on a flat sidewalk or driveway to make a puddle.
2. Trace around the edge of the puddle with chalk.
3. Come back every half hour. Trace the new, smaller edge with a different color.
4. At the same time, put 2 spoonfuls of water on each plate. Set one plate in the sun and one in the shade.
5. Check the plates when you check the puddle. Which plate dries first?
6. When the puddle is gone, count your chalk lines. Tell a parent where the water went.

Tips

- A dark sidewalk in full sun works best. On a cloudy day it will take much longer.
- Indoors, use two plates: one under a warm lamp and one on a shady shelf.

Check your work

- I saw the puddle get smaller and smaller.

- I can tell which plate dried first and why.
- I can say: the water evaporated and went up into the air.

MAP NOTEBOOK

1. Draw your chalk puddle with all its colored rings, biggest on the outside.
2. Draw a sun over a puddle with little arrows going up. Write the word “up.”
3. Draw two plates, one in the sun and one in the shade. Color the one that dried first.

From history. People have used evaporation for thousands of years to make salt. They let seawater into wide, shallow ponds near the shore. The sun and wind made the water go up into the air, and the salt was left behind in white crusts that workers raked into piles. Salt is still made this way in many sunny places by the sea.

WORKED EXAMPLES

Example 1. Look at the two puddle grids. How many squares are wet in the morning? How many in the afternoon? Which puddle is bigger?

(Use the map or drawing “Morning puddle and afternoon puddle, seen from above.” shown earlier in this lesson.)

1. Point to the morning grid. Count the blue squares one at a time: 1, 2, 3, 4, 5, 6, 7, 8.
2. Point to the afternoon grid. Count the blue squares: 1, 2, 3.
3. 8 is more than 3, so the morning puddle is bigger.
4. The puddle got smaller because the sun made its water evaporate.

Answer: Morning: 8 squares. Afternoon: 3 squares. The morning puddle is bigger.

PRACTICE

1. **EASY** Where does the water in a puddle go on a sunny day?
2. **EASY** Which will dry first: a wet towel in the sun or a wet towel in a dark closet?
3. **EASY** Point to things in your home or yard that are drying right now (a dish rack, wet hair, a wet sidewalk, laundry).
4. **MEDIUM** A puddle covers 6 squares in the morning and 2 squares at noon. How many squares of water went up into the air?
5. **MEDIUM** Draw a picture that shows water going up from a pond. Add the sun.

COMMON MISTAKES

- Thinking the puddle water is gone forever. It is still there, up in the air as water vapor.
- Thinking all the water soaked into the ground. Some may soak in, but on a sidewalk most of it goes up.

- Thinking water only evaporates when it is very hot. It evaporates on cool days too, just more slowly.

Make it a game · Dry or Wet? A parent names a place: “a wet swimsuit on a sunny fence,” “a puddle in a cold, shady alley,” “a glass of water in the freezer.” The child stands up tall and says “Goes up fast!” if the water will evaporate quickly, or crouches low and says “Slow!” if it will take a long time. Take turns making up places.

Scripture. “He causeth the vapours to ascend from the ends of the earth; he maketh lightnings for the rain; he bringeth the wind out of his treasures.” (Psalm 135:7, KJV)

Long before anyone drew a picture of the water cycle, the Bible said that God makes the vapors go up. When a puddle dries in the sun, you are watching His work.

Practice answers

1. Up into the air. It evaporates.
2. The towel in the sun.
3. Any wet thing that is drying, such as dishes, laundry, a wet towel or a damp sidewalk.
4. 4 squares.
5. A pond with arrows or dots going up toward the sky, and a sun shining on it.

4.2 CLOUDS AND RAIN

OBJECTIVES

- Tell that clouds are made of tiny drops of water that came up from the earth.
- Show condensation on a cold glass and make a little “cloud” in a jar.
- Follow the arrows on a water cycle picture: up, cloud, rain, river, sea.

Warm-up. Hold a cold spoon or a small mirror close to your mouth and breathe on it: “Haaa.” What do you see? Wait and watch it fade. The fog came from the water in your warm breath. Today you will see how the sky does the same thing to make clouds.

Video. Coming soon. A short kid-friendly video (under 8 minutes) on how clouds and rain form, or a jar-cloud demonstration: search SciShow Kids and NASA, then Homeschool Pop (Alternate), and NOAA SciJinks (candidate, needs vetting); a read-aloud of a picture book about clouds or rain also fits.

KEY TERMS

cloud

Millions of tiny drops of water (or bits of ice) floating together high in the sky.

condensation

When water in the air cools and turns back into drops, like the drops on a cold glass.

rain

Drops of water that grow big and heavy in a cloud and fall to the ground.

water cycle

Water going up, making clouds, falling as rain and running back to the sea, over and over.

CORE IDEAS

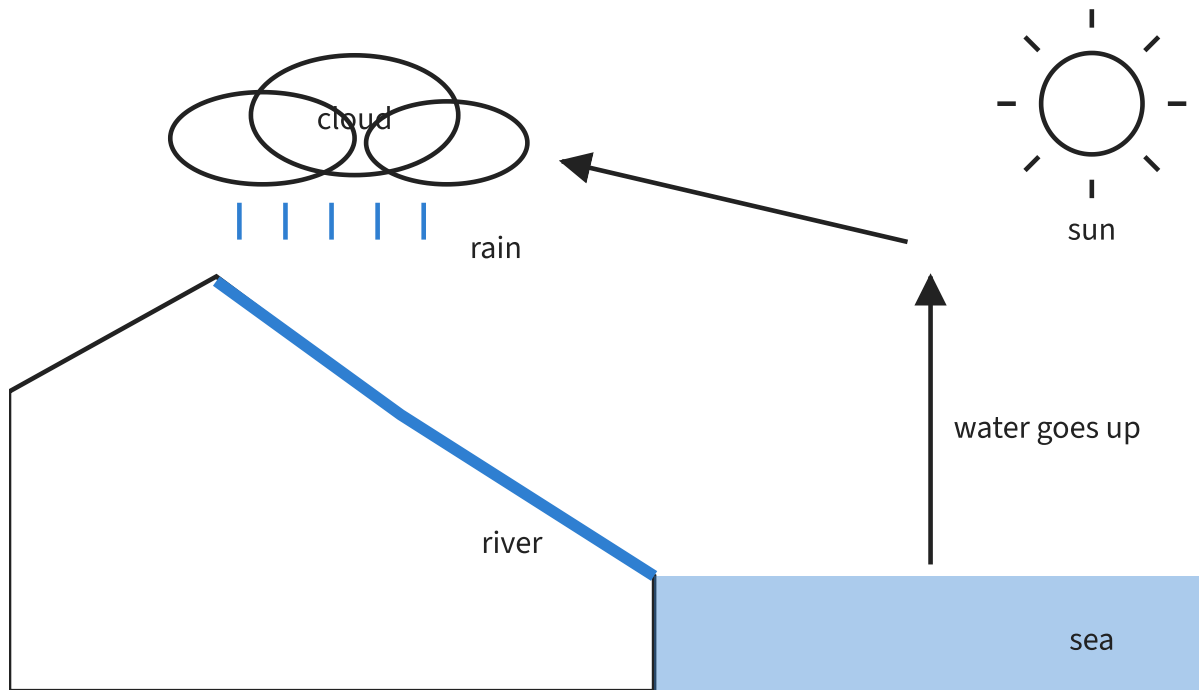
The story. More than 200 years ago, in London, England, there lived a man named Luke Howard. He made medicines for his work, but he loved to look up. He watched the clouds every day. In 1802 he gave a talk and gave the clouds names. Fluffy heaps he called *cumulus*, which means “heap.” Flat gray sheets he called *stratus*, which means “spread out.” Thin wisps high up he called *cirrus*, which means “a curl of hair.” We still use his names today.

How it works. What is a cloud made of? Water! In the last lesson, water went up into the air from puddles and the sea. High in the sky the air is cold. When the invisible water vapor gets cold, it turns back into tiny drops. This is called **condensation**. You can see it on a glass of ice water on a summer day. Drops appear on the outside of the glass. They did not leak out. They came from the air! Millions and millions of tiny drops together make a **cloud**.

The big idea. Inside a cloud, the tiny drops bump together and join. They grow bigger and heavier. When they are too heavy to float, down they come as **rain**. If it is very cold, they fall

as snow. The rain fills the rivers, and the rivers run to the sea. Then the sun warms the sea, and the water goes up again. Up, cloud, rain, river, sea, and up again. That is the **water cycle**. God waters the whole earth this way, and He never runs out.

On the map. Look at the water cycle picture. Put your finger on the sea. Follow the arrow up. Then follow the cloud to the rain, the rain to the river, and the river back to the sea.



The water cycle: water goes up from the sea, makes a cloud, falls as rain, and runs back down to the sea in a river.

PICTURE STUDY



Wivenhoe Park, Essex, John Constable, 1816 · Oil on canvas · National Gallery of Art, Washington, D.C.

John Constable was an English painter who loved the countryside where he grew up. In 1816 he painted this park, which belonged to a general named Francis Rebow. Constable loved clouds so much that a few years later he painted dozens of small pictures of nothing but sky, and wrote the time and the wind on the back of them.

In this one painting you can see almost the whole water cycle: water in the lake, clouds in the sky that will bring rain, and green grass that drinks the rain.

Look closely

- Find the cows. Find the swans on the water. Find the small boat.
- Find the house far away. Is it big or small in the picture? Why?
- Look at the clouds. Are they fluffy heaps or flat sheets? Which of Luke Howard's names fits them?
- Find the reflection of the sky in the lake.

Talk about it

1. The water in the lake can go up into the air. Where will it go after that?
2. Do you think it will rain soon in this picture? What makes you think so?
3. Why is the grass so green in this park?

Safety first. A parent should pour the hot water for the jar cloud. Use hot tap water, not boiling water, and a sturdy glass jar.

PROJECT: A CLOUD IN A JAR AND A SWEATY GLASS

You will make tiny drops come out of the air, just as clouds do. First on a cold glass, then inside a jar.

You will need

- A drinking glass and ice cubes
- A clean glass jar (a pint or quart canning jar works well)
- Hot tap water (a parent pours)
- A small plate or the jar lid turned upside down
- A handful of ice
- A dark sheet of paper

Steps

1. Fill the drinking glass with ice and a little water. Dry the outside with a towel.
2. Wait five minutes. Touch the outside. Drops of water! They came out of the air. That is condensation.
3. Now the jar. A parent pours about two inches of hot tap water into the jar.
4. Set the plate or upside-down lid on top of the jar and pile ice on it.
5. Hold the dark paper behind the jar. Watch for a misty cloud inside, and watch for drops on the bottom of the plate.
6. Wait a few minutes. Do any drops get big and fall back down like rain?

Tips

- A humid summer day makes the cold glass drip best.
- If the cloud is hard to see, darken the room and shine a flashlight through the side of the jar.

Check your work

- I saw drops form on the cold glass.
- I saw a mist or drops in the jar under the ice.
- I can say: warm water goes up, cold makes it turn into drops, and big drops fall as rain.

MAP NOTEBOOK

1. Go outside and look at the sky. Draw the clouds you see. Are they heaps (cumulus), sheets (stratus) or curls (cirrus)?
2. Draw the cold glass with drops on the outside. Draw little arrows from the air to the drops.
3. Draw the water cycle in a circle: sea, arrow up, cloud, rain, river, back to the sea.

From history. A few years after he painted *Wivenhoe Park*, John Constable spent the summers of 1821 and 1822 at Hampstead, on a hill above London, painting the sky again

and again. He called it “skying.” On the back of many of these small cloud studies he wrote the date, the time of day and which way the wind was blowing, almost like a weatherman’s notebook.

WORKED EXAMPLES

Example 1. On the water cycle picture, start at the sea. Where does the water go next? Name the places in order until you are back at the sea.

(Use the map or drawing “Follow the arrows around the water cycle.” shown earlier in this lesson.)

1. Put your finger on the sea at the bottom right.
2. Follow the arrow that points up. The water goes up into the air.
3. Follow the next arrow to the cloud.
4. Look under the cloud. The water falls as rain on the mountain.
5. Follow the blue river down the mountain. It runs into the sea.

Answer: Sea, up into the air, cloud, rain, river, and back to the sea.

PRACTICE

1. **EASY** What is a cloud made of?
2. **EASY** Where did the drops on the outside of the cold glass come from?
3. **EASY** Match each cloud name to what it means: heap, flat sheet, curl of hair. (cumulus, stratus, cirrus)
4. **MEDIUM** Point to the water cycle picture. Point to the rain. Point to the river. Which one comes first?
5. **MEDIUM** You counted 4 raindrops on the window, then 7 more. How many drops in all?

COMMON MISTAKES

- Thinking the drops on a cold glass leaked through the glass. They came from the air outside it.
- Thinking clouds are made of smoke or cotton. They are made of water.
- Thinking rain is new water. It is the same water that went up before, coming back down.

Make it a game · Water Drop Journey. Make four signs: SEA, CLOUD, RAIN, RIVER, and set them in a circle around the room. The child is a water drop. A parent calls “Sun!” and the drop floats up on tiptoe to CLOUD. “Heavy!” and the drop falls down to RAIN. “Downhill!” and the drop runs to RIVER, then to SEA. Go around three times, faster each time.

Scripture. “And it came to pass at the seventh time, that he said, Behold, there ariseth a little cloud out of the sea, like a man's hand. And he said, Go up, say unto Ahab, Prepare thy chariot, and get thee down, that the rain stop thee not.” (1 Kings 18:44, KJV)

The prophet Elijah prayed for rain after a long dry time. His servant looked toward the sea seven times, and at last he saw a little cloud coming up out of the sea. Soon the sky was dark with clouds and a great rain fell. The Bible saw it too: clouds come up from the sea.

Practice answers

1. Tiny drops of water (or tiny bits of ice).
2. From the air. Water in the air turned into drops when it touched the cold glass.
3. Cumulus = heap. Stratus = flat sheet. Cirrus = curl of hair.
4. The rain comes first. It falls on the land and then runs down in the river.
5. 11 drops.

4.3 RIVERS RUN TO THE SEA ★

OBJECTIVES

- Tell that a river begins at its source, flows downhill and ends at its mouth.
- Trace the Mississippi River on a map from Lake Itasca to the sea and tell which way it flows.
- Explain with a sand tray why the sea does not fill up and overflow.

Warm-up. Tip a cookie sheet a little by setting one end on a book. Pour a spoonful of water at the high end. Which way does it run? Try pouring at the low end. Water always runs downhill, from high to low.

Video. Coming soon. Kid-friendly footage (under 8 minutes) of the Mississippi headwaters at Itasca, a river from mountain stream to the sea, or a simple “source to mouth” animation: search NASA, Smithsonian and SciShow Kids, then Homeschool Pop (Alternate), and USGS or National Geographic Kids (candidates, need vetting).

KEY TERMS

river

A long stream of water that flows downhill across the land.

source

The place where a river begins, often a lake, a spring or a mountain stream.

mouth

The place where a river ends and pours into the sea, a lake or a bigger river.

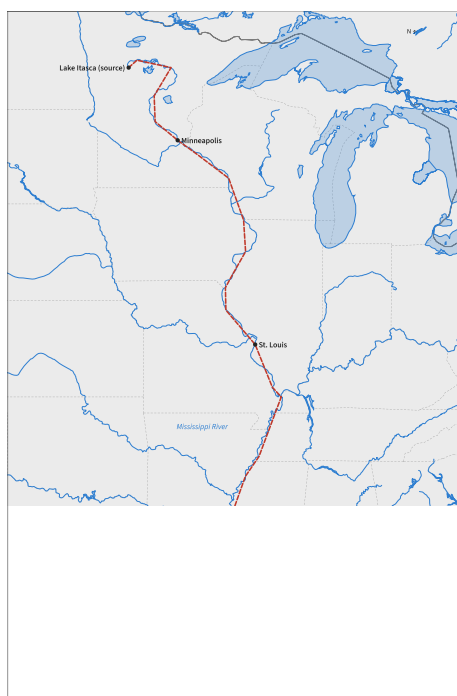
CORE IDEAS

The story. In the summer of 1832, a man named Henry Schoolcraft paddled north in a canoe. He wanted to find where the great Mississippi River begins. An Ojibwe guide named Ozawindib knew the way. He led the group through woods and lakes to a clear blue lake in Minnesota. There, a little stream ran out of the lake. It was so small that a child can walk across it on stepping stones! That little stream grows into the Mississippi. Schoolcraft named the lake **Lake Itasca**.

How it works. Every **river** starts at a **source**. The source is high up. Water runs downhill, so the river runs down too. Other streams flow in along the way, and the river grows wider and deeper. The Mississippi runs past farms and big cities like St. Louis. At last, past New Orleans, it pours into the sea at the Gulf of Mexico. (The U.S. government now calls it the Gulf of America.) The end of a river is called its **mouth**. A drop of water that starts at Lake Itasca takes about three months to reach the sea!

The big idea. Long ago, a wise king wrote in the Bible: “All the rivers run into the sea; yet the sea is not full.” Rivers pour into the sea every day, all over the world. Why doesn’t the sea fill up and spill over? Because the sun lifts water out of the sea, just as it dries a puddle. The water makes clouds, the clouds rain on the land, and the rain runs back to the rivers. The king said the rivers go back to the place they came from. That is the water cycle again!

On the map. Find Lake Itasca at the top of the map. That is the source. Put a finger on it and trace the blue river all the way down to the sea. That is the mouth. North is at the top, so the Mississippi flows mostly south.



The Mississippi River from its source at Lake Itasca to its mouth at the sea.

PICTURE STUDY



View from Mount Holyoke, Northampton, Massachusetts, after a Thunderstorm (The Oxbow), Thomas Cole, 1836 · Oil on canvas · The Metropolitan Museum of Art, New York

Thomas Cole climbed a mountain in Massachusetts and looked down on the Connecticut River. The river makes a giant loop there, shaped like the U-shaped wooden collar an ox wears, so people call it the Oxbow. A thunderstorm has just passed. The Connecticut River keeps flowing south until it reaches the sea at Long Island Sound.

Cole put himself in the painting, very small, at his easel. Can you find him?

Look closely

- Find the river. Trace its big loop with your finger.
- Find the dark storm clouds. Which side of the picture is stormy, and which side is sunny?
- Find the tiny painter at his easel near the bottom.
- Find the fields and farms along the river.

Talk about it

1. Where will the rain from the storm go?
2. Why do you think farmers like to live near a river?
3. Is the river going uphill or downhill? How do you know?

PROJECT: A RIVER IN A TRAY

You will build a hill of sand and make your own river run from its source to the “sea.”

You will need

- A baking pan or plastic storage bin
- Sand or garden soil, damp
- A book or block to tip the pan
- A cup or watering can of water
- A blue crayon and a printed copy of the Mississippi map

Steps

1. Pile damp sand at one end of the pan to make a hill. Leave the other end empty. That empty end is your sea.
2. Set the hill end on a book so the pan tips down toward the sea.
3. Slowly pour water at the top of the hill. That is your river's source.
4. Watch the water find a path downhill. Watch it carve a river and carry sand along.
5. See the water pool up in the sea at the bottom. Point to the source and the mouth.
6. Now take the map. Find Lake Itasca. With the blue crayon, trace the Mississippi all the way to the sea.

Tips

- Pour slowly, a little at a time, or the water will wash the whole hill away.
- Do this outside or put a towel under the pan.

Check your work

- I made water run downhill from a source to a sea.
- I traced the Mississippi from its source to its mouth.
- I can tell why the sea does not fill up.

MAP NOTEBOOK

1. Draw a river from a mountain to the sea. Write "source" at the top and "mouth" at the bottom.
2. Draw Lake Itasca with stepping stones across the little stream and a child walking on them.
3. Is there a creek or river near your home? Draw it and ask a parent where it goes.

From history. Lake Itasca is now inside Itasca State Park in Minnesota. Where the little Mississippi runs out of the lake, there is a row of stepping stones and a wooden post that tells visitors they are at the start of the great river. Every summer, families take off their shoes and walk across the Mississippi in just a few steps.

WORKED EXAMPLES

Example 1. Look at the Mississippi map. North is at the top. Is the source in the north or the south? Which way does the river flow?

(Use the map or drawing “Trace the Mississippi from north to south.” shown earlier in this lesson.)

1. Find Lake Itasca. It is near the top of the map.
2. The top of the map is north. So the source is in the north.
3. Trace the river down to the sea. The sea is at the bottom, in the south.
4. The river goes from the source to the mouth, so it flows from north to south.

Answer: The source is in the north. The Mississippi flows mostly south, to the sea.

PRACTICE

1. **EASY** Where does a river begin? Where does it end?
2. **EASY** Does water run uphill or downhill?
3. **EASY** Point to Lake Itasca on the map. Then point to the sea at the mouth of the Mississippi.

(Use the map or drawing “Find the source and the mouth.” shown earlier in this lesson.)

4. **MEDIUM** Look at the Mississippi map. Count the cities marked on the river between Lake Itasca and the sea.
5. **MEDIUM** Rivers pour into the sea every day. Why doesn’t the sea fill up?

COMMON MISTAKES

- Thinking the mouth of a river is where it starts. The mouth is where it ends.
- Thinking rivers flow south because south is “down.” Rivers flow downhill, and some rivers flow north. The Mississippi happens to flow mostly south.
- Thinking the sea is getting fuller and fuller. Water leaves the sea all the time by going up into the air.

Make it a game • Source to Mouth. Lay a long blue ribbon or a line of string across the floor as a river. Put a pillow at one end for the mountain (the source) and a blue towel at the other end for the sea (the mouth). The child walks the river from source to mouth while a parent calls out places to stop: “a farm,” “a big city,” “a little creek joins you!” At the sea, the child jumps up like water going into the air and runs back to the mountain to start again.

Scripture. “All the rivers run into the sea; yet the sea is not full; unto the place from whence the rivers come, thither they return again.” (Ecclesiastes 1:7, KJV)

The Preacher saw that the rivers keep running into the sea, and the sea never overflows. The water goes back to where the rivers came from. God made the water cycle so that the earth

is watered again and again.

Practice answers

1. It begins at its source. It ends at its mouth, often at the sea.
2. Downhill.
3. Lake Itasca is at the top, in Minnesota. The mouth is at the bottom, past New Orleans, at the Gulf of Mexico.
4. 3 cities: Minneapolis, St. Louis and New Orleans.
5. The sun makes water go up out of the sea. It makes clouds and rain, and the rain runs back into the rivers.

4.4 SPRINGS AND WELLS

OBJECTIVES

- Tell that some rain soaks into the ground and is stored there as groundwater.
- Tell the difference between a spring and a well, and retell the story of Jesus at Jacob's well.
- Count squares on a picture map to find the way from a house to a well.

Warm-up. Fill a clear cup with small pebbles or gravel. Slowly pour in water. Watch it trickle down between the stones and fill up the bottom. The water is hiding in the spaces! The ground under your feet holds water the same way.

Video. Coming soon. A short kid-friendly video (under 8 minutes) on groundwater, springs and wells, or a gentle children's retelling of Jesus and the woman at the well: search SciShow Kids and Smithsonian, then Homeschool Pop (Alternate), and USGS or Free School (candidates, need vetting).

KEY TERMS

groundwater

Rain that soaks deep into the ground and fills the spaces between sand, gravel and rocks.

spring

A place where groundwater comes up out of the ground all by itself.

well

A deep hole dug or drilled into the ground to reach groundwater.

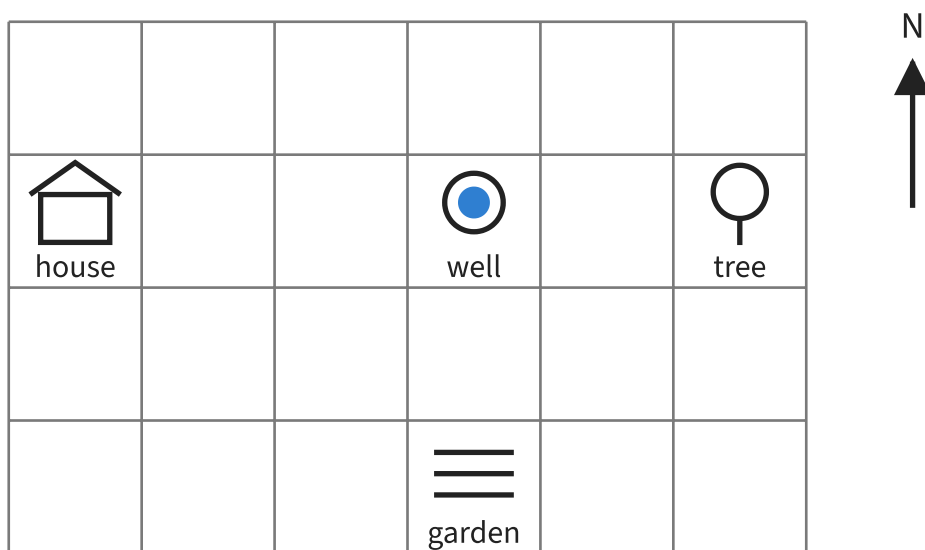
CORE IDEAS

The story. One hot day, about two thousand years ago, Jesus was walking through the land of Samaria. He was tired. At noon He sat down beside an old well. People called it Jacob's well, because long, long before, their father Jacob had given it to them. A woman came with her jar to draw water. Jesus asked her for a drink. She said, "Sir, thou hast nothing to draw with, and the well is deep." Then Jesus told her about a different kind of water, living water that He alone can give (John 4).

How it works. Why was there water at the bottom of that deep well? When rain falls, some runs into rivers, and some goes back up into the air. But some soaks down into the ground. It trickles between grains of sand, bits of gravel and cracks in the rock, like the water in your cup of pebbles. This hidden water is called **groundwater**. In some places groundwater comes out of a hillside all by itself and bubbles up clear and cold. That is a **spring**. Where there is no spring, people dig or drill a **well** down to the water and lift it up.

The big idea. For thousands of years, families have lived near springs and wells. A farm family on the prairie dug a well before they built their house. They lowered a bucket on a rope, or they pumped the handle of a pump. Many country homes today still get their water from a well, with an electric pump to bring it up. Ask a grown-up: does your water come from a well, or from a town water system? The water in your cup has been on a long trip through the water cycle!

On the map. Look at the picture map of a farm. Find the house and the well. Count the squares from the house to the well.



A picture map of a farm. North is at the top.

PICTURE STUDY



Christ and the Samaritan Woman, Duccio di Buoninsegna, 1310–1311 · Tempera and gold on wood panel · Thyssen-Bornemisza National Museum, Madrid, Spain

Duccio was a painter from the Italian city of Siena. More than 700 years ago he painted a huge altarpiece for the cathedral there, with many small pictures of the life of Jesus. This is one of those small pictures. It shows Jesus at Jacob's well talking with the woman of Samaria.

Look closely

- Find Jesus. Where is He sitting?
- Find the well. What shape is it? What is it made of?
- Find the woman's water jar.
- Find the city and the men coming out of its gate. They are Jesus' disciples coming back with food.

Talk about it

1. Why did the woman come to the well in the middle of the day?
2. How do you think the woman got the water up out of a deep well?
3. Jesus talked about "living water." What do you think He meant?

Safety first. Never lean over or play near an open well, a cistern or deep water. If your family has a well, a grown-up should always be with you near it.

PROJECT: A WELL IN A CUP

You will make the ground in a cup, fill it with groundwater, and dig a well to reach it.

You will need

- A clear plastic cup or jar
- Small pebbles or aquarium gravel
- Sand
- A drinking straw
- A small cup of water with a drop of blue food coloring

Steps

1. Put a layer of pebbles in the bottom of the cup. Cover it with a layer of sand. This is your ground.
2. Push the straw straight down through the sand until it touches the bottom. This is your well.
3. Make it rain! Slowly pour the blue water over the sand.
4. Look through the side of the cup. Watch the water soak down and fill the spaces between the pebbles. That is groundwater.
5. Look down the straw. Can you see water inside it? Your well has reached the groundwater.
6. Put your finger over the top of the straw and lift it out. You have drawn water from your well!

Tips

- Pour slowly so the water soaks in instead of running over the top.
- If the straw fills with sand, push it in first, then add the sand around it.

Check your work

- I saw rain soak down and fill the spaces in the ground.
- I can tell the difference between a spring and a well.
- I can tell the story of Jesus at Jacob's well.

MAP NOTEBOOK

1. Draw the ground cut open like a cake: grass on top, then dirt, then rocks with blue water in the spaces. Draw a well going down to the water.
2. Draw Jacob's well with Jesus sitting beside it and the woman with her jar.
3. Draw a spring coming out of a hillside and running into a little stream.

From history. Jacob's well can still be visited today. It is near the city of Nablus, in the hills where the town of Sychar stood in Bible times. A church has been built over it, and visitors can still go down to the old stone well and look into it, where the woman of Samaria once let down her jar.

WORKED EXAMPLES

Example 1. On the farm map, how many squares is it from the house to the well? Which way do you walk?

(Use the map or drawing “Count the squares from the house to the well.” shown earlier in this lesson.)

1. Put your finger on the house.
2. Move your finger one square at a time toward the well, counting: 1, 2, 3.
3. You are on the well. It took 3 squares.
4. Look at the N arrow. North is up, so east is to the right. You walked to the right, which is east.

Answer: 3 squares, walking east.

PRACTICE

1. **EASY** What do we call water that comes up out of the ground all by itself?
2. **EASY** Where did the water at the bottom of a well come from?
3. **EASY** Who sat by Jacob’s well and asked a woman for a drink?
4. **MEDIUM** On the farm map, how many squares is it from the well to the tree?
(Use the map or drawing “Count from the well to the tree.” shown earlier in this lesson.)
5. **MEDIUM** On the farm map, how many squares is it from the well down to the garden? Is that north or south?

(Use the map or drawing “Count from the well to the garden.” shown earlier in this lesson.)

COMMON MISTAKES

- Thinking there is a big underground lake or river under every house. Most groundwater sits in tiny spaces between sand, gravel and rock.
- Thinking a well makes water. A well only reaches water that is already there.
- Thinking the water in a well is different from rain. It is rain that soaked into the ground.

Make it a game • Bucket Down the Well. Tie a string to a small plastic cup. A parent sets a bowl of water on the floor as the well. The child stands on a step stool or chair, lowers the bucket on its string, and tries to fill it and pull it up without spilling. Count how many buckets it takes to fill a pitcher. Then talk about how much work it was to get water before faucets.

Scripture. “But whosoever drinketh of the water that I shall give him shall never thirst; but the water that I shall give him shall be in him a well of water springing up into everlasting life.” (John 4:14, KJV)

Water from a well helps us for a day, and then we are thirsty again. Jesus told the woman at Jacob's well that He gives a better water: life with God that never runs dry.

Practice answers

1. A spring.
2. From rain that soaked down into the ground (groundwater).
3. Jesus.
4. 2 squares (east).
5. 2 squares, south.

UNIT 4 REVIEW

A parent reads each question aloud. The child answers out loud, points or draws. Give full points for a clear answer in the child's own words. The review is worth 20 points.

1. (3 pts) A puddle was on the sidewalk this morning. Now it is gone. Where did the water go? What is the word for this?
2. (2 pts) Which dries faster: a wet shirt in the sun or a wet shirt in the shade?
3. (3 pts) What is a cloud made of? Why does rain fall out of it?
4. (2 pts) Drops of water appear on the outside of a glass of ice water. Where did they come from?
5. (3 pts) Put the water cycle in order, starting at the sea: rain, sea, cloud, river, water goes up.
6. (2 pts) What do we call the place where a river begins? What do we call the place where it ends?
7. (3 pts) On the Mississippi map, point to the source and trace the river to its mouth. Which way does the river flow, north or south? Why doesn't the sea fill up?
8. (2 pts) What is the difference between a spring and a well? Who sat at Jacob's well?

UNIT PROJECT: MY WATER CYCLE WINDOW AND RIVER MAP

Draw the water cycle on a quart zip-top bag with permanent marker: a sun, a cloud near the top, rain under the cloud, and blue waves along the bottom. Pour in about a quarter cup of water (a drop of blue food coloring helps), seal it tight, and tape it to a sunny window. Over the next few days, watch drops form near the top (condensation), run down the sides (rain), and gather at the bottom again (the sea). Beside the window, hang your traced map of the Mississippi with its source and mouth labeled, and tell a parent the whole trip of one water drop, from the sea to the sky to the river and back.

- **The bag:** The bag is sealed, drawn with a sun, cloud, rain and sea, and taped where the sun can reach it.
- **Watching:** The child checked the bag on at least three days and drew or told what changed.
- **The river map:** The Mississippi is traced from Lake Itasca to the sea, with the source and the mouth marked.
- **Telling:** The child tells the water cycle in order (up, cloud, rain, river, sea) using at least two of the new words.

Answer key

1. It went up into the air. It evaporated.
2. The shirt in the sun.
3. Tiny drops of water. The drops join and get too big and heavy to float, so they fall.
4. From the air. The cold glass turned water in the air into drops (condensation).
5. Sea, water goes up, cloud, rain, river (and back to the sea).

6. The source. The mouth.

7. From Lake Itasca to the Gulf; it flows south. The sun lifts water out of the sea and it comes back as rain.

8. A spring comes out of the ground by itself; a well is a hole people dig to reach groundwater. Jesus sat at Jacob's well.

HOT, COLD AND IN-BETWEEN

Why is it hot in some places and cold in others? In this unit your child will hold a flashlight and become the sun. Light that shines straight down makes a small, bright, hot spot. Light that comes in slanted spreads out thin and cool. That one simple test explains why the middle of the earth, along the **equator**, is hot all year, why the **polar lands** stay icy, and why the **in-between lands**, where most Americans live, have four seasons.

Along the way we meet real people in real places: French scientists measuring the earth in Ecuador in 1735, the missionary Hans Egede and his family among the Inuit of Greenland in 1721, the Pilgrims living through their first winter, spring, summer and fall at Plymouth in 1620–21, and the missionary Johannes Rebmann, who saw snow on Kilimanjaro in 1848 when the experts said it could not be there. We end high on snowy mountains near the equator, with Frederic Church’s great painting *Cotopaxi*.

“The earth is the LORD’s, and the fulness thereof” (Psalm 24:1). God made the hot lands, the icy lands and the in-between lands, and He gave people the wisdom to make homes in every one of them.

BEFORE YOU BEGIN

- Can point to the top, middle and bottom of a ball or globe
- Knows that north is at the top of most maps (Unit 2)
- Knows the words mountain and ocean (Units 3 and 4)

MASTERY CHECKLIST

- I can point to the equator and tell that the lands near it are hot.
- I can show with a flashlight why straight-down light is hotter than slanted light.
- I can point to the North Pole and the South Pole and tell how the Inuit built snow houses.
- I can name the four seasons in order and point to an in-between band on a world map.
- I can tell why a tall mountain has snow on top, even near the equator.

OPTIONAL BOOKS AND RESOURCES

- **NASA Space Place** (<https://spaceplace.nasa.gov/>): Free. NASA’s site for children has simple pictures and short articles on the sun, the earth and why we have seasons. A parent can find a page to read aloud for Lessons 5.1 and 5.3.
- **Detroit Institute of Arts** (<https://dia.org/>): Free to browse. Search the museum’s online collection for Frederic Edwin Church’s *Cotopaxi* (1862) to see a large image for the picture study in Lesson 5.4.

5.1 THE EQUATOR ★

OBJECTIVES

- Find the equator on a globe and tell that it runs around the hot middle of the earth.
- Show with a flashlight why sunlight that shines straight down is hotter than sunlight that comes in slanted.
- Name one country that sits on the equator.

Warm-up. Give your child an orange and a rubber band. Ask them to stretch the band around the fattest part of the orange, halfway between the top and the bottom. Say: “Mapmakers draw a line just like this around the middle of the globe. Today we will find out why the lands along that line are so hot.”

Video. Coming soon. Search SciShow Kids, NASA and Homeschool Pop (Alternate) for a short animation (under 8 minutes) on the equator and why it is hot near the middle of the earth; also look for rain forest animal footage from Smithsonian. Candidates needing vetting: National Geographic Kids, Free School.

KEY TERMS

globe

A round model of the earth. It shows the land and the water in their true shapes.

equator

A pretend line around the middle of the earth, halfway between the North Pole and the South Pole.

tropics

The hot lands on both sides of the equator, where it is never winter.

CORE IDEAS

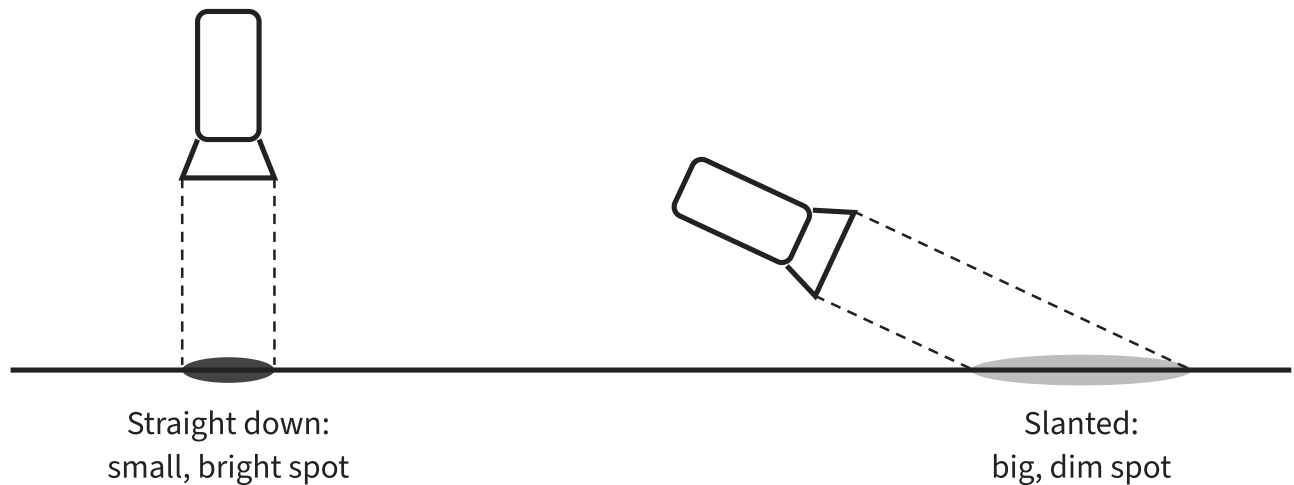
The story. In 1735 a group of French scientists sailed across the ocean to South America. One of them was named Charles Marie de La Condamine. They climbed up into the high mountains of a land we now call Ecuador. Why did they go so far? They wanted to measure the round earth near its middle line, the **equator**. They worked there for years. Today the whole country is named after that line. In Spanish, *ecuador* means “equator.” Near the city of Quito stands a monument called “The Middle of the World.”

How it works. The equator is not a real line you could trip over. It is a pretend line that mapmakers draw around the fat middle of the **globe**, halfway between the North Pole and the South Pole. Near the equator, the sun at noon shines almost straight down. You can see why that matters with a flashlight. Shine it straight down at the floor, and you get a small, bright, round spot. Tilt it, and the very same light spreads out into a big, dim oval. Straight-

down light packs all its warmth into a small place. That is why the lands near the equator are hot.

The big idea. The hot lands on both sides of the equator are called the **tropics**. There is no snowy winter there. In some places it rains almost every day, and great green rain forests grow. Other places have a wet time and a dry time. All year long, day and night are about twelve hours each. Bananas, coconuts, pineapples and cocoa beans (for chocolate!) grow in hot lands like these.

On the map. Find the equator on a globe. Run your finger along it all the way around. It crosses South America, Africa and the islands of Asia, and lots and lots of ocean. Ecuador, Brazil, Kenya and Indonesia all sit on the equator. The trip all the way around the earth on the equator is about 25,000 miles. God made the sun to warm the whole earth, but He gave the middle the strongest share.



The same light makes a small, bright spot when it shines straight down and a big, dim spot when it comes in slanted.

PICTURE STUDY



Tiger in a Tropical Storm (Surprised!), Henri Rousseau, 1891 · Oil on canvas · National Gallery, London

Henri Rousseau was a French painter who worked for many years as a clerk collecting taxes at the gates of Paris. He taught himself to paint. In 1891 he painted this tiger in a hot, wet jungle during a storm. It was the first of many jungle pictures he made.

Rousseau never traveled to the tropics. He studied the plants growing in the big glass greenhouses and gardens of Paris, and he looked at pictures of animals in books. Then he imagined the rest.

Look closely

- Find the tiger. What is it doing? How does its face look?
- Look for the thin silver lines of rain falling across the picture.
- Which way is the wind pushing the leaves and grass?
- Count how many different kinds of leaves you can find.

Talk about it

1. Does this place look hot or cold? What clues tell you?
2. Why do so many plants grow in places that are hot and rainy?
3. If you stood in this jungle, what sounds would you hear?

PROJECT: THE FLASHLIGHT-AND-GLOBE SUNLIGHT TEST

You will be the sun! With a flashlight you will see why the middle of the earth is hot and the top and bottom are cold.

You will need

- A flashlight
- A sheet of graph paper, or plain paper with a grid of 1-inch squares drawn on it
- A pencil and crayons (red, orange and blue)
- A globe, or a large ball with a line drawn around its middle in marker
- A room you can make dark

Steps

1. Make the room dark. Lay the grid paper flat on the table.
2. Hold the flashlight straight up and down, about one ruler length above the paper. A helper traces around the bright spot with a pencil.
3. Keep the flashlight the same distance away, but tilt it far to one side. Trace the new spot.
4. Count the squares inside each spot. Which spot covers more squares? Which spot looks brighter?
5. Now hold the flashlight level and shine it right at the equator on the globe. Look at the round, bright spot.
6. Keep the flashlight level and raise it so the light hits the globe near the North Pole. Watch the light slide across the curved globe and stretch out long and dim.
7. Color the small spot on your paper red and orange and write “hot.” Color the big spot blue and write “cool.”

Tips

- The small, bright spot has more light on each square. More light on each square means more warmth.
- Hold the flashlight still. A parent can rest it on a stack of books for the globe part.

Check your work

- I can make a straight-down spot and a slanted spot with a flashlight.
- I can tell which spot is hotter and why.
- I can point to the equator on a globe.

MAP NOTEBOOK

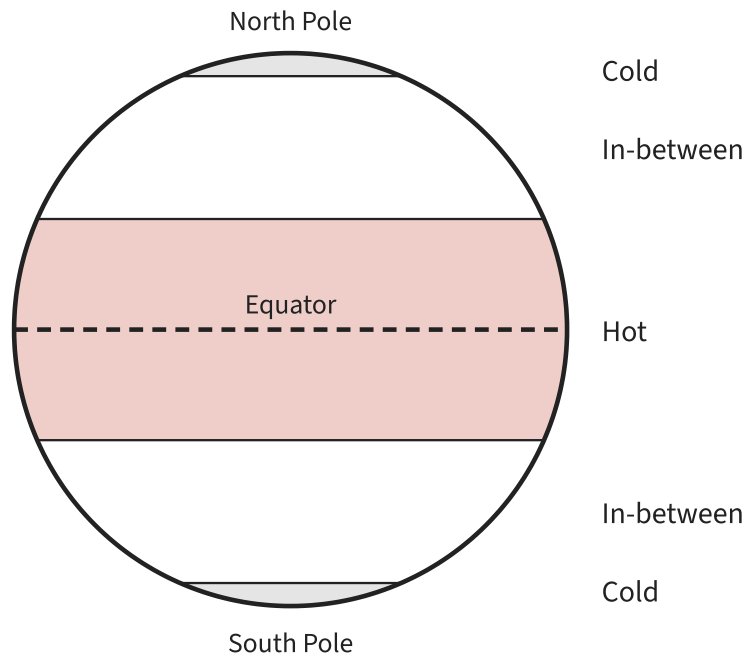
1. Draw a globe with a red line around its middle. Label it “equator.”
2. Draw the two spots from your flashlight test. Write “hot” by the small one and “cool” by the big one.
3. Draw one fruit that grows in the hot lands near the equator.

From history. The French scientists worked in the mountains near Quito for about eight years. When the work was done, La Condamine did not go straight home. He floated down the mighty Amazon River on a raft and in canoes, all the way across South America to the Atlantic Ocean, drawing a map as he went. Today the “Middle of the World”

monument near Quito marks the equator, but modern GPS shows that the true line is a short walk away from it.

WORKED EXAMPLES

Example 1. Look at the globe picture. How many bands are there? In which band is the equator?



The earth's bands: cold at the poles, hot in the middle and in-between in two bands between them.

1. Put your finger on the North Pole at the top.
2. Count the bands as you go down: one cold band, two in-between band, three hot band, four in-between band, five cold band.
3. Find the dashed line labeled "Equator." It runs right through the middle band, the hot one.

Answer: There are 5 bands. The equator is in the hot band in the middle.

PRACTICE

1. **EASY** Point to the equator on a globe. Is it at the top, the middle or the bottom?
2. **EASY** Which flashlight spot is hotter: the small, bright one or the big, dim one?
3. **EASY** Look at the globe picture. Count the cold bands.
(Use the map or drawing "Count the cold bands." shown earlier in this lesson.)
4. **MEDIUM** Name one country that sits on the equator.
5. **MEDIUM** Draw something that grows in the hot lands near the equator.

COMMON MISTAKES

- Thinking the equator is a real line painted on the ground. It is a pretend line on maps and globes.
- Thinking the equator is hot because it is closer to the sun. It is hot because the sunlight shines straight down there.
- Thinking every hot place is a dry desert. Many lands near the equator are rainy and very green.

Make it a game • Equator Hop. Lay a long strip of tape across the floor. That is the equator. One end of the room is the North Pole and the other end is the South Pole. A parent calls out “Hot!” and the child jumps onto the tape. The parent calls “Cold!” and the child runs to a pole and shivers. The parent calls “In-between!” and the child stands halfway between. Speed up as you go.

Scripture. “His going forth is from the end of the heaven, and his circuit unto the ends of it: and there is nothing hid from the heat thereof.” (Psalm 19:6, KJV)

The psalm says the sun runs its path across the whole sky, and nothing is hidden from its heat. God made the sun to warm every land, and He made the middle of the earth the warmest of all.

Practice answers

1. The middle.
2. The small, bright one, made by light shining straight down.
3. 2 (one at the top and one at the bottom).
4. Any one of these: Ecuador, Brazil, Kenya or Indonesia.
5. For example a banana, a coconut palm, a pineapple or a cocoa pod.

5.2 THE POLAR LANDS

OBJECTIVES

- Find the North Pole and the South Pole on a globe and tell why the lands around them are cold all year.
- Tell how the Inuit used snow, skins and seal oil to make warm homes in the far north.
- Match the polar bear to the north and the penguin to the south.

Warm-up. Hand your child two ice cubes. They hold one in a bare hand and one inside a wool sock or mitten while you count slowly to ten. Which hand felt colder? Say: “Today we visit the coldest places on earth. The people and animals who live there know how to wrap up warm.”

Video. Coming soon. Search SciShow Kids, NASA and Smithsonian for short footage (under 8 minutes) of the Arctic and Antarctic, polar bears and sea ice, and a simple video showing how an igloo is built; Homeschool Pop (Alternate) for the North and South Poles. Candidates needing vetting: National Geographic Kids, Free School.

KEY TERMS

North Pole

The very top of the earth. It sits in the middle of a frozen ocean.

South Pole

The very bottom of the earth. It sits on Antarctica, a land covered with thick ice.

Arctic

The cold lands and sea all around the North Pole.

igloo

A dome-shaped house made of blocks of snow. In the Inuit language, *iglu* means “house.”

CORE IDEAS

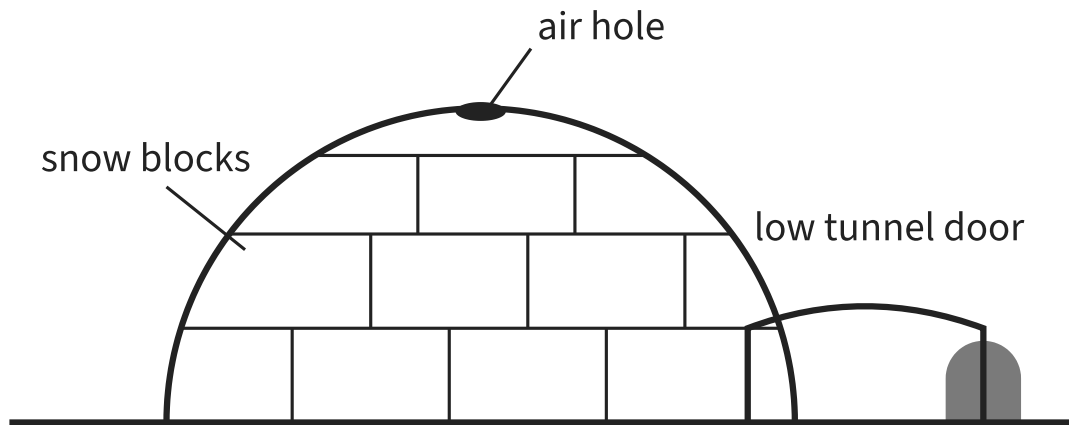
The story. In 1721 a Norwegian pastor named Hans Egede sailed north to Greenland with his wife, Gertrud, and their four children. Greenland is a huge, icy island near the top of the world. Hans wanted to tell the people there about Jesus. The people of the far north are called the **Inuit**. The Egede family lived near them through long, dark winters. Hans worked hard to learn their language. His son Poul, who grew up among the Inuit children, learned it even faster.

Why it is cold. Remember the flashlight test? Near the poles, sunlight comes in low and slanted, so it spreads out thin and weak. In winter the sun does not come up at all for many weeks. In summer it does not set, but it stays low in the sky and gives little warmth. So the ice and snow stay all year. The **North Pole** sits in the middle of an ocean covered with

floating ice. The **South Pole** sits on Antarctica, a land buried under ice more than a mile thick.

How the Inuit lived. Hardly any trees grow in the far north, so there was very little wood. The Inuit used what God had put around them: snow, stone, bones and the skins of seals and caribou. In Greenland, many families had winter houses of stone and sod. Farther west, in Arctic Canada, hunters cut blocks of hard-packed snow with a long knife. They stacked the blocks round and round, each ring a little smaller, until they made a dome. This snow house is an **igloo**. A low tunnel kept the wind out. A small lamp that burned seal oil gave light and warmth. Snow is full of tiny pockets of air, so it holds warmth in like a blanket. In summer, families lived in tents made of skins.

On the map. Put your finger on the very top of the globe. That is the North Pole. Now find the very bottom. That is the South Pole. Polar bears, walruses and Arctic foxes live in the north. Penguins live in the south. A polar bear and a penguin never meet in the wild!



An Inuit snow house: snow blocks, a small air hole and a low tunnel door that keeps the wind out.

PICTURE STUDY



The Sea of Ice, Caspar David Friedrich, about 1823–24 · Oil on canvas · Hamburger Kunsthalle, Hamburg, Germany

Caspar David Friedrich was a German painter who loved quiet, lonely places. In about 1823–24 he painted this sea of ice. Broken slabs of ice have been pushed up into a great pile, like a mountain of giant plates.

Friedrich never went to the Arctic. He made careful drawings of ice on the Elbe River near his home in Dresden, and then he imagined the frozen north. In those years explorers were sailing into the Arctic, and their ships sometimes got stuck in the ice for months. Look closely and you will find one.

Look closely

- Find the biggest slab of ice. Which way is it pointing?
- Find the ship on the right side. What has happened to it?
- What colors did Friedrich use for the ice and the sky?
- Can you find any trees, animals or people?

Talk about it

1. Would you like to visit this place? Why or why not?
2. Why is it hard to sail a ship in the polar seas?
3. How is this picture different from the hot jungle in Lesson 5.1?

PROJECT: A SUGAR-CUBE IGLOO

Build a little snow house the way Inuit hunters built a real one: ring on ring, each ring a little smaller, with a low tunnel for the door.

You will need

- A box of sugar cubes (about 100)
- A tub of thick white frosting, or royal icing
- A sturdy paper plate
- A plastic knife or craft stick
- A cup or small bowl to trace a circle about 5 inches across
- Cotton balls for snow

Steps

1. Trace a circle about 5 inches across in the middle of the plate.
2. Spread a little frosting along the circle and set the first ring of sugar cubes on it. Leave a gap two cubes wide for the door.
3. Build the next ring on top. Set each cube a tiny bit toward the inside so the ring is smaller.
4. Keep building rings, each one smaller, until only a small hole is left at the top. Leave it open. That is the air hole.
5. In front of the door gap, build a short tunnel: two low walls of cubes with a roof of cubes on top.
6. Spread cotton snow all around your igloo.
7. Tell someone how a real snow house was built and why the tunnel door is low.

Tips

- Wait a few minutes after each ring so the frosting can set.
- A parent can cut some cubes in half for the top rings. Mini marshmallows work too.

Check your work

- I can tell what a real snow house was made of.
- I can show the tunnel door and the air hole on my igloo.
- I can point to the North Pole and the South Pole on a globe.

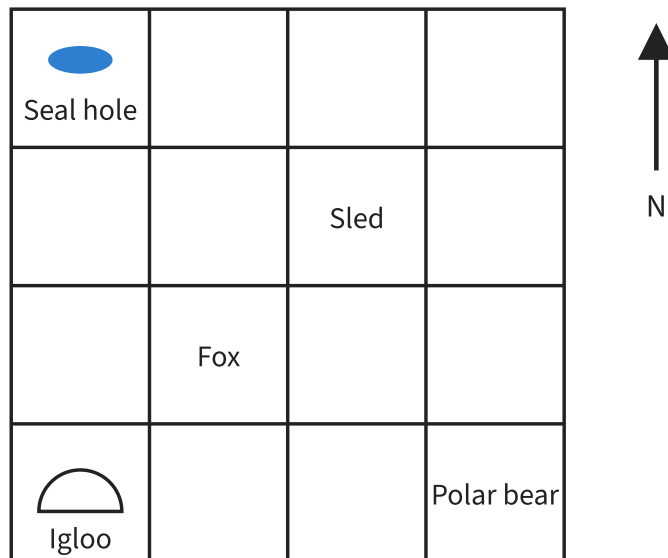
MAP NOTEBOOK

1. Draw a snow house. Label the snow blocks, the air hole and the tunnel door.
2. Draw a globe. Put a polar bear at the top and a penguin at the bottom.
3. Draw the sun low in the sky over the ice, with long slanted rays.

From history. In 1728 Hans Egede helped start a small town in Greenland called Godthåb. Today it is called Nuuk, and it is the capital of Greenland. Hans is remembered as the “Apostle of Greenland.” His son Poul, who had learned the language as a boy, later put the New Testament into the Greenlandic language.

WORKED EXAMPLES

Example 1. Look at the Arctic picture map. Start at the igloo. Go 3 squares north. What do you find?



An Arctic picture map. North is up.

1. Find the igloo. It is in the bottom left square.
2. Find the arrow marked N. North is up on this map.
3. Count 3 squares up: one, two, three.
4. Read the square where you stop.

Answer: The seal hole. Inuit hunters waited beside holes like this, where seals come up through the ice to breathe.

PRACTICE

1. **EASY** Point to the North Pole and the South Pole on a globe.
2. **EASY** Match each animal to its home: polar bear, penguin. North or south?
3. **MEDIUM** Look at the Arctic picture map. How many squares east is it from the igloo to the polar bear?

(Use the map or drawing “Count the squares from the igloo to the polar bear.” shown earlier in this lesson.)

4. **EASY** What was a snow house made of?
5. **MEDIUM** Why did a snow house have a low tunnel for a door?

COMMON MISTAKES

- Putting penguins at the North Pole. Nearly all wild penguins live in the southern half of the world.
- Thinking the Inuit lived in snow houses all year. Many lived in sod and stone houses in winter and in skin tents in summer; snow houses were used most in Arctic Canada.
- Thinking the poles are cold because they are far from the sun. They are cold because the sunlight comes in low and slanted.

Make it a game · North or South?. Tape a sign marked N on one wall and a sign marked S on the opposite wall. A parent calls out polar bear, penguin, walrus, Arctic fox, emperor penguin, igloo, Greenland or Antarctica. The child runs to the right wall. A wrong run means flapping like a penguin or growling like a polar bear before the next turn.

Scripture. “For he saith to the snow, Be thou on the earth; likewise to the small rain, and to the great rain of his strength.” (Job 37:6, KJV)

God tells the snow where to fall. He made the icy lands too, and He gave the people who live there the skill to make warm homes out of snow.

Practice answers

1. The North Pole is at the very top. The South Pole is at the very bottom.
2. Polar bear: north (the Arctic). Penguin: south (Antarctica and the southern seas).
3. 3 squares.
4. Blocks of hard-packed snow.
5. To keep the cold wind out and the warm air in.

5.3 PLACES WITH FOUR SEASONS

OBJECTIVES

- Name the four seasons in order and tell what each one is like.
- Find the two in-between bands on a world map and tell that most of the United States lies in one.
- Tell how the Pilgrims lived through their first year of seasons in New England.

Warm-up. Look out a window together. Ask: “What season is it right now?” Have your child find three clues, such as the color of the leaves, the clothes people are wearing, or how high the sun is at lunchtime.

Video. Coming soon. Search SciShow Kids, NASA and Homeschool Pop (Alternate) for a short animation (under 8 minutes) on why we have seasons and the four seasons; also look for a read-aloud of a picture book about the seasons or the Pilgrims’ first year. Candidates needing vetting: National Geographic Kids, Free School, Brightly Storytime-style read-alouds.

KEY TERMS

season

One of the four parts of the year: winter, spring, summer and fall.

in-between lands

Lands that are not hot all year and not icy all year. They have four seasons. Mapmakers call them *temperate*.

harvest

Gathering in the ripe crops, most of all in the fall.

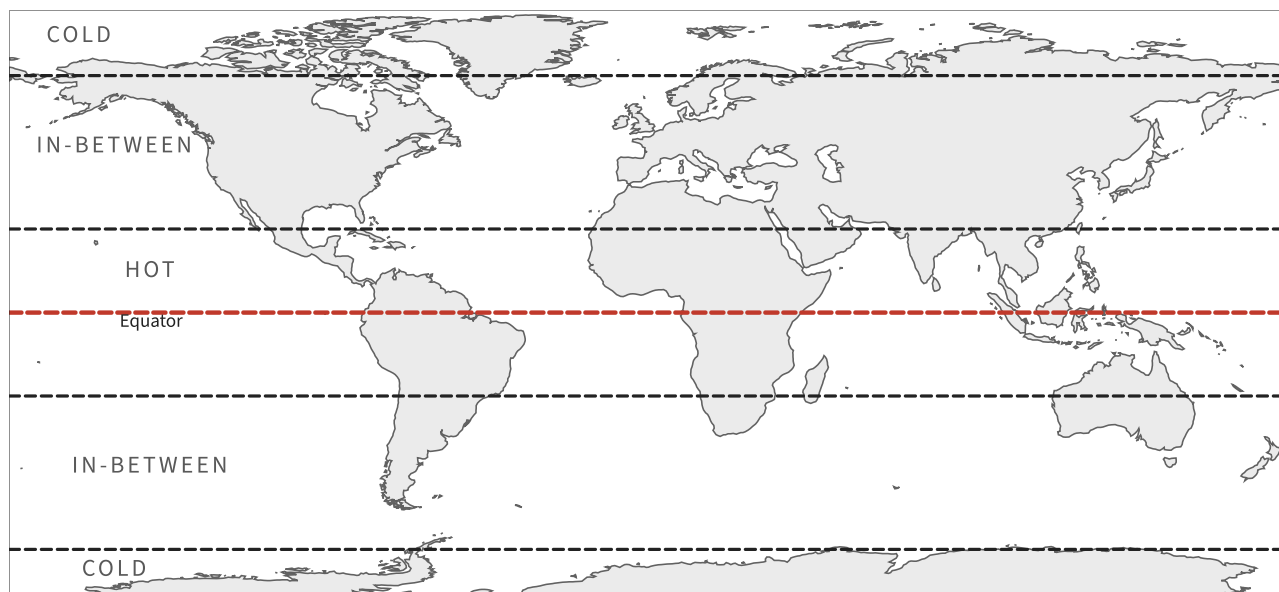
CORE IDEAS

The story. In December 1620 a little ship called the *Mayflower* brought the Pilgrims to Plymouth, in a land they called New England. It was winter. Snow fell, and the wind was icy. Many grew sick, and about half of them died before spring. Then spring came. The ground thawed and the birds came back. A man named Squanto, who had learned English, showed the Pilgrims how to plant corn and put a fish in each hill to feed the soil. All summer the corn grew tall in the sun. In the fall of 1621 they gathered their **harvest**. They gave thanks to God with a great feast, and Chief Massasoit and many of his Wampanoag men joined them.

Four seasons. The Pilgrims had come to an **in-between land**. It is not hot all year like the lands near the equator. It is not icy all year like the poles. It has four **seasons**: cold winter, fresh spring, warm summer and cool fall. Most of the United States is in-between land. So is most of Europe, and much of China and Japan.

Why the seasons change. The earth leans a little to one side as it travels around the sun. The trip takes one whole year. For part of the year, our half of the earth leans toward the sun. The sunlight comes down more straight, the days are long, and it is summer. Half a year later, our half leans away. The light comes in slanted, the days are short, and it is winter. Spring and fall come in between. Here is a surprise: when it is winter for us, it is summer in Australia! Children there may go to the beach on Christmas Day.

On the map. Look at the world map. The hot band is in the middle. The cold bands are at the top and the bottom. Two in-between bands lie between them, one north of the equator and one south. Put your finger on the place where you live. Is it in an in-between band? God promised Noah that the seasons would keep coming, year after year, as long as the earth remains.



The world's bands: hot in the middle, in-between on both sides and cold near the poles.

PICTURE STUDY



The Harvesters, Pieter Bruegel the Elder, 1565 · Oil on wood · The Metropolitan Museum of Art, New York

Pieter Bruegel the Elder was a painter in the Low Countries, the lands we now call Belgium and the Netherlands. In 1565 he painted a set of pictures about the times of the year for a rich man in the city of Antwerp. This one shows late summer, when the wheat is ripe and ready to cut.

Its sister painting, *The Hunters in the Snow*, shows the same kind of country in the deep cold of winter. Bruegel lived in an in-between land with four seasons, just like many of us.

Look closely

- Find the workers cutting the wheat with long, curved blades called scythes.
- Find the people eating lunch under the tree. Can you find the man taking a nap?
- Look far into the distance. What can you see?
- What color is the wheat? What season is it?

Talk about it

1. How would this same field look in winter? In spring?
2. Why did the farmers have to work so hard at harvest time?
3. Which season is your favorite, and why?

PROJECT: MY FOUR-SEASONS TREE

Draw the same tree four times, once for each season, and watch how an in-between land changes all year long.

You will need

- A large paper plate
- A ruler and a pencil
- Brown crayon or marker
- Bits of pink and green tissue paper
- Bits of red, orange and yellow paper
- Cotton balls
- A glue stick

Steps

1. Use the ruler to draw two lines across the plate, like a plus sign, to make four parts.
2. In each part, draw the same brown tree trunk and bare branches.
3. Spring: glue pink blossoms and small, light green leaves on the branches.
4. Summer: glue on lots of big green leaves. Draw a bright sun.
5. Fall: glue red, orange and yellow leaves on the branches and on the ground below.
6. Winter: leave the branches bare and glue cotton snow on them and on the ground.
7. Write the name of each season in its part. Go around the plate and tell the seasons in order.

Tips

- Pick a real tree in your yard or on your street. Take a photo of it each season this year and compare it with your plate.
- Some trees, like pines, stay green all winter. You can draw one of those too.

Check your work

- I can name the four seasons in order.
- I can tell how a tree changes in each season.
- I can point to an in-between band on a world map.

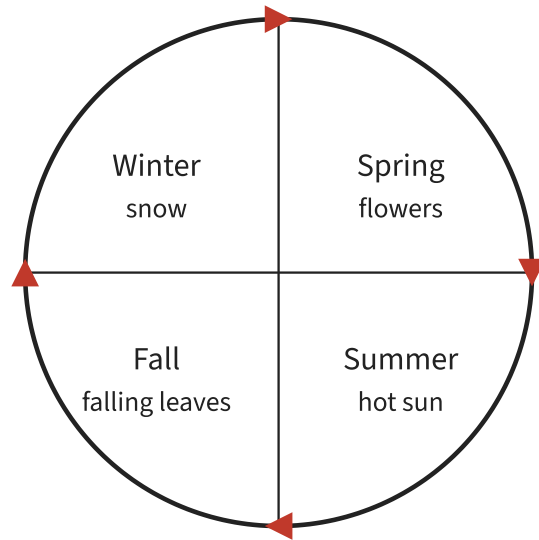
MAP NOTEBOOK

1. Draw yourself four times, dressed for winter, spring, summer and fall.
2. On a simple world map, color the two in-between bands green.
3. Draw a harvest basket with three foods the Pilgrims might have gathered in the fall.

From history. We know about the Pilgrims' harvest feast because one of them, Edward Winslow, wrote about it in a letter in December 1621. He said about ninety Wampanoag men came with Massasoit and stayed for three days, and they brought five deer to share. Many years later, in 1863, President Abraham Lincoln asked the whole nation to keep a day of thanksgiving each fall.

WORKED EXAMPLES

Example 1. Look at the season wheel. Start at winter and follow the arrows. Which season comes next? Which season comes after summer?



The seasons go around and around, year after year.

1. Find winter on the wheel.
2. Follow the arrow around to the next part. It says spring.
3. Keep going: spring, then summer.
4. Follow the arrow after summer. It says fall.

Answer: Spring comes after winter. Fall comes after summer.

PRACTICE

1. **EASY** Name the four seasons in order, starting with spring.
2. **EASY** Look at the season wheel. Which season comes right before winter?
(Use the map or drawing "Follow the arrows." shown earlier in this lesson.)
3. **MEDIUM** Look at the world map. Point to the in-between bands. How many are there?
(Use the map or drawing "Find the in-between bands." shown earlier in this lesson.)
4. **MEDIUM** What did Squanto show the Pilgrims?
5. **MEDIUM** When it is winter in the United States, what season is it in Australia?

COMMON MISTAKES

- Thinking summer comes because the earth is closer to the sun. The seasons come from the earth's lean. In fact, the earth is closest to the sun in early January, during our winter.
- Thinking every place has four seasons. Lands near the equator have no winter, and the polar lands have no warm summer.
- Thinking the seasons are the same all over the world on the same day. When it is winter in the north, it is summer in the south.

Make it a game • Season Charades. Take turns acting out something people do in one season without talking: shoveling snow, planting seeds, splashing in a pool, raking leaves, picking apples, building a snowman. The others guess the season. Score a point for each right guess, and an extra point if you can say which season comes next.

Scripture. "While the earth remaineth, seedtime and harvest, and cold and heat, and summer and winter, and day and night shall not cease." (Genesis 8:22, KJV)

God made this promise to Noah after the flood. Every spring planting and every fall harvest reminds us that God keeps His word.

Practice answers

1. Spring, summer, fall, winter.
2. Fall.
3. 2: one north of the hot band and one south of it.
4. How to plant corn, with a fish in each hill to feed the soil.
5. Summer.

5.4 HIGH AND COLD

OBJECTIVES

- Tell that the air gets colder as you climb higher, so a tall mountain can have snow on top even near the equator.
- Find Kilimanjaro in Africa and Cotopaxi in South America, both near the equator.
- Name the layers of a tall mountain, from the warm bottom to the snowy top.

Warm-up. Build a “mountain” out of pillows or blocks and set a cotton ball on the very top for snow. Ask: “If you climbed a giant mountain on a hot summer day, would you pack a swimsuit or a warm coat for the top?” Let your child guess, and keep the guess until the end of the lesson.

Video. Coming soon. Search NASA, Smithsonian and SciShow Kids for short footage (under 8 minutes) of Mount Kilimanjaro and its snowy top, and a simple animation on why mountaintops are cold; Homeschool Pop (Alternate) for mountains. Candidates needing vetting: National Geographic Kids, Free School.

KEY TERMS

mountain

Land that rises very high above the land around it.

volcano

A mountain made by hot melted rock and ash pushing up from deep inside the earth.

snowcap

The snow and ice that cover the top of a high mountain.

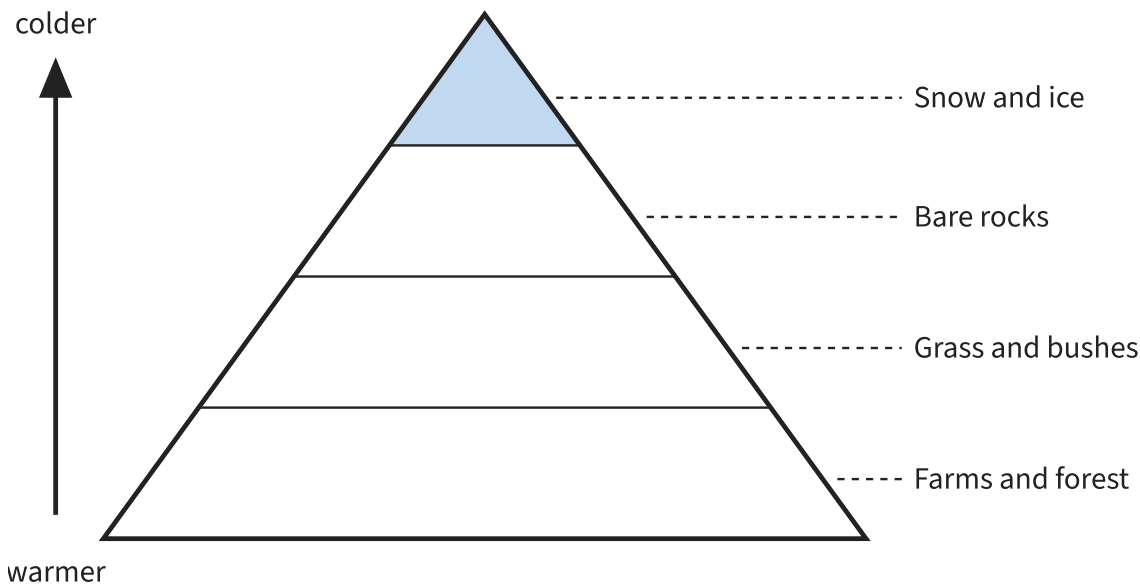
CORE IDEAS

The story. In May 1848 a German missionary named Johannes Rebmann was walking through the hot grasslands of East Africa, not far south of the equator. Far away he saw a giant mountain with something white on top. At first he thought it was a bright cloud. His guide called the white stuff simply “cold.” Then Rebmann knew what it was: snow! It was the great mountain **Kilimanjaro**. When the news reached England, some map experts did not believe him. Snow in hot Africa, so close to the equator? Impossible! But Rebmann was right. Kilimanjaro is the tallest mountain in Africa, more than 19,000 feet high, and its top is white with snow and ice.

Why it is cold up high. The sun warms the ground, and the warm ground warms the air near it. As you climb up a mountain, you leave the warm low land far below. The air up high is thin, and it cannot hold much warmth. So the higher you go, the colder it gets. Climbers on Kilimanjaro start in warm green fields and finish in freezing wind at the top!

Layers on a mountain. A tall mountain is like a stack of different lands, one on top of another. At the bottom of Kilimanjaro, farmers grow bananas and coffee, and a thick, damp forest grows. Higher up there are grass and bushes. Higher still there are bare rocks and hardly any plants. At the very top is the **snowcap**. Even near the equator, a tall enough mountain has a cold top all year.

On the map. Find the equator on a globe. Now find Kilimanjaro in East Africa, a little south of the line. Then cross the ocean to Ecuador in South America. There stands Cotopaxi, a snowcapped **volcano** very close to the equator and about as tall as Kilimanjaro. The painter Frederic Church traveled all the way there to see it. Today you will look at his painting.



The higher you climb, the colder it gets.



Two snowy mountains near the hot equator: Cotopaxi and Kilimanjaro.

PICTURE STUDY



Cotopaxi, Frederic Edwin Church, 1862 · Oil on canvas · Detroit Institute of Arts, Detroit, Michigan

Frederic Edwin Church was an American painter who loved to travel to see the wonders of God's creation. In 1853, and again in 1857, he journeyed to Ecuador in South America to sketch its mountains and volcanoes. Back in his studio in New York, he painted this great picture of Cotopaxi in 1862.

In the painting, the volcano is puffing out a long cloud of smoke and ash, and the sun glows red through it. The real Cotopaxi is one of the tallest active volcanoes in the world. Even though it stands very close to the equator, its top is covered with snow and ice all year.

Look closely

- Find the volcano far away. Which way is its smoke blowing?
- Find the sun. What color is it?
- Find the lake and the waterfall near the front of the picture.
- Look at the rocks and land in front. Are they bright or dark?

Talk about it

1. Would it be hot or cold at the very top of Cotopaxi? How do you know?
2. How do you think Church felt when he saw a real volcano?
3. Cotopaxi is near the equator. Why does it still have snow on top?

PROJECT: A SNOWCAPPED MOUNTAIN MODEL

Make a tall mountain and paint its layers, from warm farms and forest at the bottom to cold snow on top.

You will need

- A sheet of heavy paper or poster board
- Tape or a stapler
- A paper plate
- Crayons or paint: green, light green or yellow, gray
- Cotton balls and glue
- A small paper person, cut out and colored

Steps

1. A parent rolls the paper into a tall cone and tapes it. Trim the bottom so it stands up on the plate.
2. Color the bottom part of the cone dark green for farms and forest.
3. Color the next part light green or yellow for grass and bushes.
4. Color the next part gray for bare rocks.
5. Glue cotton balls on the very top for the snowcap.
6. Draw a line across the plate and label it “Equator” to show the mountain stands in a hot land.
7. Walk your paper person up the mountain. At each layer, tell what it would wear: shorts at the bottom, a sweater higher up, and a heavy coat, hat and mittens at the top.

Tips

- Clay or play dough over an upside-down cup makes a sturdy mountain too.
- Look at your warm-up guess. Was it right?

Check your work

- I can tell why the top of a tall mountain is cold.
- I can name the layers of my mountain from bottom to top.
- I can point to Kilimanjaro and Cotopaxi on a globe.

MAP NOTEBOOK

1. Draw Kilimanjaro with four layers. Label the snow and ice at the top.
2. Draw a climber twice: dressed for the warm bottom and dressed for the cold top.
3. Draw Cotopaxi with a snowcap and a puff of smoke.

From history. Rebmann worked with another missionary named Johann Ludwig Krapf. In 1849 Krapf saw a second snowy mountain, Mount Kenya, which stands almost exactly on the equator. In 1889, about forty years after Rebmann first saw the snow, Hans Meyer and Ludwig Purtscheller became the first people known to climb to the top of Kilimanjaro.

WORKED EXAMPLES

Example 1. Look at the mountain picture. How many layers does it have? Which layer has snow?

(Use the map or drawing “Count the layers from the bottom to the top.” shown earlier in this lesson.)

1. Start at the bottom and count up: one farms and forest, two grass and bushes, three bare rocks, four snow and ice.
2. Find the arrow at the side. It points up toward “colder.”
3. The coldest layer is the one at the very top.

Answer: The mountain has 4 layers. The top layer has the snow and ice.

PRACTICE

1. **EASY** Is it warmer at the bottom or at the top of a tall mountain?
2. **EASY** Look at the mountain picture. Which layer is just below the snow and ice?
(Use the map or drawing “Find the layer just below the top.” shown earlier in this lesson.)
3. **EASY** What did Johannes Rebmann see on top of Kilimanjaro?
4. **MEDIUM** Look at the map. Point to Kilimanjaro and Cotopaxi. Which continent is each one on?
(Use the map or drawing “Find the two snowy mountains.” shown earlier in this lesson.)
5. **MEDIUM** Draw what a climber should wear at the top of Kilimanjaro.

COMMON MISTAKES

- Thinking a mountaintop should be warmer because it is closer to the sun. A mountain is very tiny next to the distance to the sun; the top is cold because the air up high is thin and far from the warm ground.
- Thinking every place near the equator is hot. High mountains near the equator have cold tops.
- Thinking a volcano is too hot inside to have snow on top. Cotopaxi has snow and ice on top all year.

Make it a game · Climb the Cold Mountain. Use a staircase as your mountain, with a basket of hats, scarves, mittens and sweaters at the bottom. The child climbs one step at a time. At every few steps a parent calls “Colder!” and the child walks carefully down, holding the rail, to grab one more warm thing to put on, then climbs back up. At the top the parent calls “Snowcap!” and the child shivers and waves. Then climb down and take off one thing at each layer as it gets warmer.

Scripture. “In his hand are the deep places of the earth: the strength of the hills is his also.” (Psalm 95:4, KJV)

The deepest valleys and the highest snowy mountains all belong to God. He made the hot lowlands and the cold peaks, sometimes right next to each other.

Practice answers

1. At the bottom.
2. Bare rocks.
3. Snow.
4. Kilimanjaro is in Africa. Cotopaxi is in South America.
5. Warm clothes: a heavy coat, a hat, mittens and boots.

UNIT 5 REVIEW

A parent asks each question aloud. The child may answer by speaking, pointing to a globe or map, or drawing. The review is worth 20 points.

1. (3 pts) Point to the equator on a globe. Is it hot or cold there?
2. (3 pts) In the flashlight test, which spot was hotter: the straight-down spot or the slanted spot? Why?
3. (2 pts) Does the polar bear live in the north or the south? What about the penguin?
4. (3 pts) Who built snow houses, and what were they made of?
5. (2 pts) Name the four seasons.
6. (3 pts) On a world map, point to an in-between band. Do we live in one?
7. (2 pts) Start at the North Pole and name the bands in order all the way to the South Pole.
8. (2 pts) Kilimanjaro is near the equator. Why does it have snow on top?

UNIT PROJECT: MY HOT, COLD AND IN-BETWEEN WORLD

On a simple outline map of the world (or a large drawing of a globe), color the bands: red or orange for the hot band in the middle, green for the two in-between bands, and blue for the two cold bands. Draw a dashed line for the equator. Then add small drawings or cut-out pictures in the right places: a banana tree and a tiger in the hot band, a four-seasons tree and your own house in an in-between band, an igloo and a polar bear in the north, a penguin in the south, and a snowcapped Kilimanjaro near the equator in Africa. Keep your flashlight test drawing beside the map and tell a parent why each band is hot, cold or in-between.

- **Bands:** The five bands are colored in the right order, with the equator in the middle of the hot band.
- **Pictures in place:** Each drawing or picture sits in the right band, and the snowy mountain is near the equator.
- **Telling:** The child explains, in their own words, why straight-down sunlight makes the middle hot and why the poles are cold.
- **Care:** The map is neat, colorful and easy to read.

Answer key

1. The child points to the line around the middle of the globe. It is hot there.
2. The straight-down spot. All the light was packed into a small place.
3. The polar bear lives in the north. The penguin lives in the south.
4. The Inuit built them out of blocks of hard-packed snow.
5. Winter, spring, summer and fall (in any order).
6. The child points to a band between the hot middle and a cold pole. For most families in the United States, yes.
7. Cold, in-between, hot, in-between, cold.

8. It is very high, and the air gets colder the higher you go.

MY STATE AND MY COUNTRY

Your child has learned to read a map, find north and name the shapes of the land. Now it is time to find home on the big map. In this unit your child finds their own state, traces its shape and puts a star on its capital. Then they zoom out to see all fifty states, the nation's capital in Washington, D.C., and the two neighbor countries, Canada and Mexico. Last of all, they meet the flag, the bald eagle and the Liberty Bell, and find where each one is.

Each lesson begins with a real moment: Delaware saying yes as the first state in 1787, George Washington crossing the icy Delaware River on Christmas night in 1776, Charles Blondin walking a rope from the United States to Canada above the Niagara River in 1859, and the bell in Philadelphia that carries words from the Bible. Along the way your child will make a salt-dough state, color a map of the United States, build a thirteen-stripe flag and thank God for “a goodly heritage” (Psalm 16:6).

BEFORE YOU BEGIN

- Can point to north, south, east and west on a map (Unit 2)
- Knows that a star or other symbol on a map stands for something real (Unit 1)
- Can count objects to 20
- Knows the name of their own town

MASTERY CHECKLIST

- I can find my state on a map of the United States and say its capital.
- I can name one special place in my state.
- I can say that our country has fifty states and find Washington, D.C.
- I can show Canada to the north and Mexico to the south.
- I can count the 13 stripes on the flag and tell what the stars stand for.
- I can name the bald eagle and the Liberty Bell and tell where the Liberty Bell is.

OPTIONAL BOOKS AND RESOURCES

- **Independence National Historical Park (National Park Service)** (<https://www.nps.gov/inde/>): Free. Photos and visitor information for the Liberty Bell and Independence Hall in Philadelphia (Lesson 6.4). A parent can show the pictures of the bell and its crack.
- ***Washington Crossing the Delaware* at the Metropolitan Museum of Art** (<https://www.metmuseum.org/art/collection/search/11417>): Free. A large, zoomable image of Emanuel Leutze's painting (Lesson 6.2). Zoom in to look for the ice, the oars and the flag.
- **Yellowstone National Park (National Park Service)** (<https://www.nps.gov/yell/>): Free. Photos of the geysers, hot springs and the Grand Canyon of the Yellowstone to compare with Thomas Moran's painting (Lesson 6.1).

6.1 MY STATE ★

OBJECTIVES

- Find my own state on a map of the United States and trace its shape with a finger.
- Say the name of my state's capital and tell what a capital is.
- Name one special place in my state and show where it is.

Warm-up. Lay a jump rope or a long piece of yarn on the floor in a big loop. Step inside it. Everything inside the loop is “your land.” Now walk to the edge. What happens when you step over the line? Tell your parent: a state has a line all the way around it too, and that line is called a border.

Video. Coming soon. A short read-aloud of a picture book about where I live (for example, Joan Sweeney's *Me on the Map* or Laurie Keller's *The Scrambled States of America*), plus a short Homeschool Pop (Alternate) or Smithsonian clip showing the states on a map; search the name of your own state with “for kids” for a short tour of its capital and a famous place; keep each under about 8 minutes.

KEY TERMS

state

One of the big parts that our country is made of. Each state has its own name, its own shape and its own leaders.

border

The line where one place stops and the next place starts.

capital

The city where the leaders of a state meet to make its laws. On a map it is often marked with a star.

landmark

A special place that is easy to know and that people like to visit, such as a big waterfall, a mountain or an old building.

CORE IDEAS

The story. On December 7, 1787, some men met in the little town of Dover, in Delaware. They read a new plan for how the whole country should be run. It was called the Constitution. They all said yes to it. Delaware was the very first state to say yes. That is why Delaware is still called “The First State.” Soon more states said yes, one after another, and the United States grew.

The big idea. Our country is made of fifty **states**, the way a quilt is made of many squares sewn together. Each state has a **border**, a line all the way around it. Sometimes the border is a river. Sometimes it is a straight line that a man with measuring chains marked long ago.

Each state has a **capital**. The capital is the city where the state's leaders meet. It is not always the biggest city. The capital of Illinois is Springfield, not big Chicago. The capital of New York is Albany, not New York City.

On the map. Every state has its own shape. Colorado and Wyoming look like boxes. Michigan looks like a mitten. Florida reaches down into the sea like a long thumb. Oklahoma has a thin part on top that looks like the handle of a pan. On a map, look for the little star. That star shows the capital. Now find your own state. Trace its border with your finger. What does its shape look like to you?

A special place. Every state has a **landmark**, a special place people love to see. Wyoming has Yellowstone, with hot springs and geysers that shoot water into the sky. In 1872 it became our country's first national park. Arizona has the Grand Canyon. South Dakota has Mount Rushmore. Your state has special places too. God made the hills, rivers and lakes of your state, and He gave them to the people who live there to enjoy and care for.



The states fit together like a quilt. Find a box, a mitten and a pan handle. Then find your own state.

PICTURE STUDY



The Grand Canyon of the Yellowstone, Thomas Moran, 1872 · Oil on canvas · Smithsonian American Art Museum, Washington, D.C. (lent by the U.S. Department of the Interior Museum)

In 1871 a painter named Thomas Moran rode into the wild land of Yellowstone with a team of explorers. He made quick drawings of the yellow cliffs, the waterfall and the steaming springs. Back home he painted this very big picture. It is about as long as two grown-ups lying down head to toe.

People in the East could hardly believe a place like this was real. Moran's pictures helped them see it. In 1872 Congress made Yellowstone the first national park, and Congress bought this painting too.

Look closely

- Find the waterfall. Is it near or far away?
- Find the colors of the canyon walls. How many colors can you name?
- Look for two tiny people on a rock. How big do they look next to the canyon?
- Find the steam or mist rising. What do you think makes it?

Talk about it

1. Why do you think people wanted to keep this place safe for everyone to visit?
2. If you painted one special place in your state, what would you paint?

Safety first. An adult runs the oven. Salt dough is not food; do not eat it.

PROJECT: MY SALT-DOUGH STATE

You will make your own state out of dough, with a star for the capital and a little mark for your special place. When it is dry, you can paint it and keep it.

You will need

- 1 cup flour, $\frac{1}{2}$ cup salt and about $\frac{1}{2}$ cup water (or sugar-cookie dough if you want to eat it)
- A printed outline of your state, about as big as your hand
- Baking paper and a baking sheet
- A butter knife or craft stick (with a parent's help)
- A toothpick and a dry bean or bead
- Paint or markers

Steps

1. Mix the flour and salt in a bowl. Add the water a little at a time and squeeze until the dough is soft like clay.
2. Roll the dough flat on baking paper, about as thick as your finger.
3. Lay the paper outline of your state on top. With a parent, cut around it with the knife.
4. Press a bean or bead where the capital is. Draw a small star around it with the toothpick.
5. Poke a tiny hole where your special place is. Poke another where your own town is.
6. Let it dry for two or three days, or have a parent bake it at 250°F for about 2 hours until hard.
7. Paint your state. Paint the star a bright color. Say aloud: "This is my state. Its capital is ____."

Tips

- If the dough is sticky, add a pinch of flour. If it cracks, add a drop of water.
- If you make cookies, a parent cuts the shape before baking and you add the capital star with frosting or a chocolate chip.

Check your work

- I can show my state's shape.
- I can point to the capital and say its name.
- I can show where my special place is.

MAP NOTEBOOK

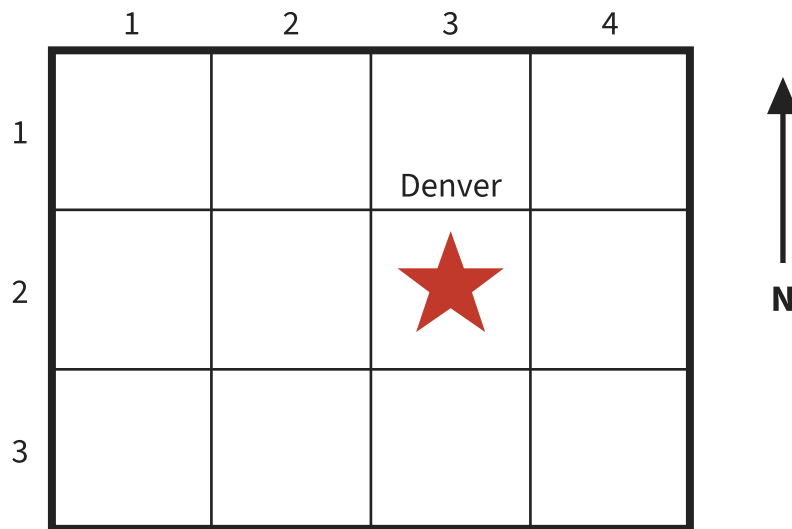
1. Trace your state's shape in your map notebook. Write its name across the middle.
2. Draw a star where the capital is and write the capital's name beside it (a parent can write it for you to copy).

3. Draw a small picture of one special place in your state, like a lake, a mountain or a big building.

From history. Before the photographs of Yellowstone and the paintings of Thomas Moran, many people thought trappers' stories of boiling springs and water shooting into the air were tall tales. The famous geyser called Old Faithful was named in 1870 because it erupts again and again, about every hour and a half.

WORKED EXAMPLES

Example 1. This picture shows a box-shaped state drawn on squares, like Colorado. How many squares wide is it? How many squares tall? Where is the capital?



My box-shaped state

Count the squares across and down. The star marks the capital.

1. Put your finger on the top left corner. Count the squares along the top: 1, 2, 3, 4. It is 4 squares wide.
2. Now count down the left side: 1, 2, 3. It is 3 squares tall.
3. Count every square, row by row: 4, then 4 more is 8, then 4 more is 12.
4. Look for the star. The star is the capital. Here it is labeled Denver.

Answer: The state is 4 squares wide and 3 squares tall, 12 squares in all. The star shows the capital, Denver.

PRACTICE

1. **EASY** Point to your own state on the map. Say its name.

(Use the map or drawing “Find your state.” shown earlier in this lesson.)

2. **EASY** What is a capital?
3. **EASY** Which state on the map looks like a mitten?

(Use the map or drawing “Look near the big lakes in the north.” shown earlier in this lesson.)

4. **MEDIUM** Which is bigger: your town or your state?
5. **MEDIUM** Draw your state’s shape. Put a star for the capital and a dot for your home.

COMMON MISTAKES

- Thinking the capital is always the biggest city. Springfield, not Chicago, is the capital of Illinois.
- Thinking a state and a country are the same. A state is one part; the country is all fifty parts together.
- Thinking borders are painted on the ground. Most borders are lines on maps; you might only see a sign by the road.

Make it a game • Guess My Shape. A parent cuts five state shapes from a printed map (include your own state and some easy ones like Florida, Michigan and Colorado). Hold up one shape at a time. The child says what it looks like (a box, a mitten, a thumb) and then finds where it fits on the big map. Finish by finding your own state and saying its capital.

Scripture. “The lines are fallen unto me in pleasant places; yea, I have a goodly heritage.” (Psalm 16:6, KJV)

King David thanked God for the land God gave him. We can thank God for the state where we live, with its own hills, rivers and people.

Practice answers

1. The child points to the family’s home state and names it.
2. The city where the leaders of a state meet to make its laws. It is shown with a star.
3. Michigan.
4. Your state. Many towns fit inside one state.
5. A drawing of the state’s outline with a star at the capital and a dot at the child’s town (placement close enough is fine).

6.2 THE UNITED STATES

OBJECTIVES

- Say that the United States has fifty states and find Alaska, Hawaii and my own state on a map.
- Find Washington, D.C., on a map and tell that it is our country's capital, named for George Washington.
- Tell the story of Washington crossing the icy Delaware River.

Warm-up. Put out a handful of buttons, beans or coins. Ask the child to make one pile for each person in the family. Then push all the piles together into one big pile. Say: "Each little pile is like a state. The big pile is like our country. Many states joined together make one country."

Video. Coming soon. A short, cheerful fifty-states song or simple animation for young children, a picture-book read-aloud about George Washington crossing the Delaware, and a short Smithsonian, Library of Congress or Homeschool Pop (Alternate) video tour of Washington, D.C. (the Capitol, the White House and the Washington Monument); each under about 8 minutes.

KEY TERMS

country

A big land with its own name, its own flag and its own leaders. Our country is the United States of America.

united

Joined together as one.

Washington, D.C.

The capital city of the whole United States, where the President lives and Congress meets. D.C. stands for District of Columbia.

CORE IDEAS

The story. On Christmas night in 1776, it was dark and freezing. Snow and sleet blew in the wind. Big chunks of ice floated down the Delaware River. General George Washington and his tired soldiers climbed into boats. All night they pushed across the icy river, from Pennsylvania to New Jersey. In the morning they marched to the town of Trenton and won a battle. That win gave the young country new hope. Washington later became our first President.

The big idea. Our country is the **United States** of America. *United* means joined together. At first there were only thirteen states, all near the Atlantic Ocean. Over many years, more

states joined. Now there are fifty. The fiftieth state was Hawaii, in 1959. The biggest state is Alaska. The smallest is Rhode Island. Fifty states, one country.

On the map. Look at a map of the United States. Most of the states sit together in one big piece of land, from the Atlantic Ocean to the Pacific Ocean. Two states are far away. Alaska is way up in the cold north, next to Canada. Hawaii is a group of islands far out in the Pacific Ocean. Mapmakers often draw them in little boxes so they fit on the page. Find your own state. Is it near an ocean, or in the middle?

The nation's capital. A country has a capital too. Ours is **Washington, D.C.** It is named for George Washington. He chose the spot himself, on the Potomac River near the Atlantic coast. A man named Pierre L'Enfant drew the plan for the city in 1791, with wide streets like the spokes of a wheel. In 1800 the leaders moved in. D.C. is not in any state. It is its own small place, so that it belongs to all the states together. Do not mix it up with Washington State, far away by the Pacific Ocean!



Fifty states. Find Alaska, Hawaii and the star for Washington, D.C.

PICTURE STUDY



Washington Crossing the Delaware, Emanuel Leutze, 1851 · Oil on canvas · Metropolitan Museum of Art, New York

Emanuel Leutze was born in Germany and grew up in Philadelphia. When he was a grown man, he went back to Germany to paint. There, in 1851, he painted this giant picture of George Washington's brave night on the Delaware River. It is more than 12 feet tall and 21 feet wide, as wide as a small house.

Leutze wanted people to feel how cold and hard that night was, and how bravely the men kept going. He changed some things to make the picture strong. The flag in the boat has stars and stripes, but that flag was not made until the next summer, in 1777.

Look closely

- Find George Washington. How can you tell he is the leader?
- Find the ice in the river. What are the soldiers doing about it?
- Count the oars you can see. Are the men working hard?
- Find the flag. What colors is it?

Talk about it

1. How do you think the soldiers felt on that freezing night?
2. Why do you think our capital city is named for George Washington?

PROJECT: COLOR MY STATE ON THE U.S. MAP

You will find your state on a big map of the whole country, color it, and add a star for Washington, D.C. This is the unit map, so keep it for your portfolio.

You will need

- A printed outline map of the United States that shows the state lines
- Crayons or colored pencils
- A red star sticker or red crayon
- Glue and a little piece of yarn (optional)

Steps

1. Find your own state with a parent's help. Put your finger on it.
2. Color your state your favorite color, all the way to the border lines.
3. Color the oceans blue. Find the Atlantic and the Pacific.
4. Find Alaska and Hawaii. Color them green.
5. Put a red star on Washington, D.C., near the Atlantic Ocean.
6. Glue a piece of yarn from your state to the star. Is the capital near or far from you?
7. Write "My State" and "U.S.A." at the top of the map (a parent can help).

Tips

- Color slowly near the edges so you stay inside the border lines.
- Washington, D.C., is very small. A parent can point to it first.

Check your work

- I can find and color my state.
- I can point to Alaska and Hawaii.
- I can find Washington, D.C.

MAP NOTEBOOK

1. Draw a little boat on a blue river with chunks of white ice. Write "Delaware River."
2. Draw a big star and write "Washington, D.C." under it.
3. Draw 13 little squares in a row for the first thirteen states. Count them as you draw.

From history. Before Washington, D.C., was built, Congress met in several cities, including New York and Philadelphia. When the leaders moved to the new capital in 1800, the city was mostly fields, mud and a few unfinished buildings. President John Adams was the first President to live in the White House.

WORKED EXAMPLES

Example 1. Look at the map. Is Washington, D.C., on the east side or the west side of the country? Which ocean is it near?

(Use the map or drawing “East is on the right. Find the star.” shown earlier in this lesson.)

1. On this map, north is at the top. So east is on the right and west is on the left.
2. Find the star for Washington, D.C.
3. The star is on the right side of the country, so it is in the east.
4. The ocean on the right side is the Atlantic Ocean.

Answer: Washington, D.C., is on the east side of the country, near the Atlantic Ocean.

PRACTICE

1. **EASY** How many states are in the United States?
2. **EASY** Point to Alaska. Point to Hawaii. Which one is made of islands?
(Use the map or drawing “Find the two far-away states.” shown earlier in this lesson.)
3. **EASY** Our capital, Washington, D.C., is named for whom?
4. **MEDIUM** In the painting, is George Washington crossing a river or an ocean? What is floating in the water?
5. **MEDIUM** Which is bigger: one state or the whole United States?

COMMON MISTAKES

- Thinking Washington, D.C., is in Washington State. They are on opposite sides of the country.
- Thinking Alaska and Hawaii are small because they are drawn in little boxes. Alaska is really the biggest state of all.
- Thinking there were always fifty states. There were thirteen at first, and the others joined over many years.

Make it a game • Row Across the River. Lay two jump ropes on the floor about three big steps apart for the banks of the Delaware River. Scatter pillows between them for ice. The child is George Washington and must “row” across without touching the ice. At the far bank, the parent asks one question (How many states? What is our capital? Where is Hawaii?). A right answer lets the child row back for another turn.

Scripture. “I exhort therefore, that, first of all, supplications, prayers, intercessions, and giving of thanks, be made for all men; For kings, and for all that are in authority; that we may lead a quiet and peaceable life in all godliness and honesty.” (1 Timothy 2:1-2, KJV)

The leaders of our country meet in Washington, D.C. God asks us to pray for all leaders, so that people can live in peace.

Practice answers

1. Fifty (50).
2. Hawaii is made of islands. Alaska is the big state in the far north.
3. George Washington, our first President.
4. A river, the Delaware River. Chunks of ice are floating in it.
5. The whole United States. It is made of fifty states.

6.3 NEIGHBORS: CANADA AND MEXICO

OBJECTIVES

- Find Canada to the north and Mexico to the south of the United States on a map.
- Tell that Niagara Falls is on the border between the United States and Canada, and that the Rio Grande runs along part of the border with Mexico.
- Name one thing about each neighbor, such as its capital, its language or its flag.

Warm-up. Stand in the middle of a room. Ask: “Who or what is on each side of me?” Name the wall, the couch or the person on your north side, then your south side. Say: “Our country has neighbors too. One is on the north side and one is on the south side.”

Video. Coming soon. Short, kid-friendly footage of Niagara Falls (both the American Falls and the Horseshoe Falls), a short nature clip of monarch butterflies gathering in the mountain forests of Mexico, and a simple animation or picture-book read-aloud about Canada and Mexico for young children; search Smithsonian, NASA (views from space of North America) and Homeschool Pop (Alternate); each under about 8 minutes.

KEY TERMS

neighbor

Someone who lives next to you. A country next to ours is a neighbor country.

Canada

The big country to the north of the United States. Its capital is Ottawa.

Mexico

The country to the south of the United States. Its capital is Mexico City.

waterfall

A place where a river drops over a cliff.

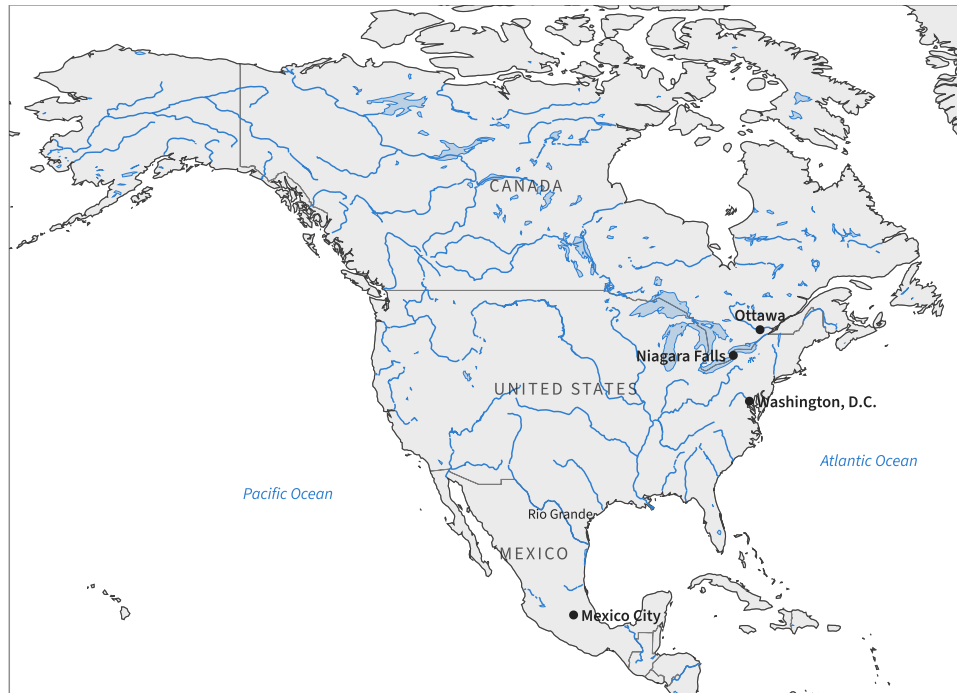
CORE IDEAS

The story. On June 30, 1859, a crowd held its breath at Niagara Falls. A French acrobat named Charles Blondin stepped onto a long rope. The rope stretched over the deep gorge of the Niagara River, high above the rushing water. Step by step, with a long pole for balance, he walked across. He started in the United States. When he stepped off, he was in Canada! He had walked from one country to another on a rope. Later he even crossed carrying a man on his back.

The big idea. A **neighbor** lives next door. Our country has two neighbor countries. **Canada** is to the north. It is even bigger than the United States, with forests, lakes and cold lands near the North Pole. Many people there speak English, and many speak French. Its flag has a red maple leaf. **Mexico** is to the south. It has deserts, mountains, beaches and old cities. People there speak Spanish. Its flag shows an eagle on a cactus.

On the map. Find the United States. Move your finger up, to the north. That is Canada. Part of the border there is a straight line, and part runs through the Great Lakes and the Niagara River. Now move your finger down, to the south. That is Mexico. Part of that border is a river called the Rio Grande, which means “big river” in Spanish. Three countries, side by side: Canada, the United States and Mexico.

Good neighbors. God made the land without lines on it. People draw borders so each country knows where it begins and ends. But the animals do not stop at the border! Every fall, orange and black monarch butterflies fly south from Canada and the United States all the way to the mountains of Mexico. In spring they head north again. Jesus taught us to love our neighbors, and that is good for countries too.



Three neighbors: Canada to the north, the United States in the middle, Mexico to the south.

PICTURE STUDY



Niagara, Frederic Edwin Church, 1857 · Oil on canvas · National Gallery of Art, Washington, D.C.

Frederic Church loved to paint the great wonders of the earth. In 1857 he painted Niagara Falls from the Canadian side, looking at the curved Horseshoe Falls. He made the picture very wide, more than seven feet across, so you feel as if you are standing right at the edge.

When the painting was first shown in New York, crowds lined up to see it. Some people said it felt like hearing the roar of the falls. Most of the Horseshoe Falls is in Canada, and the smaller American Falls next to it is in the United States.

Look closely

- Find where the water goes over the edge. What shape does the edge make?
- Find the mist. Can you see a faint rainbow?
- Is there any land in the front of the picture to stand on? How does that make you feel?
- What colors is the water?

Talk about it

1. What sound do you think you would hear if you stood here?
2. Why do you think so many people wanted to see this painting?

PROJECT: THREE NEIGHBORS MAP

You will color the three countries of North America and lay a piece of yarn on each border. Then you will make a paper monarch butterfly fly across the borders.

You will need

- A printed outline map of North America with country borders

- Crayons: one color for Canada, one for the United States, one for Mexico, and blue for water
- Two pieces of dark yarn and glue
- Orange paper, a black marker and scissors

Steps

1. Find the United States. Color it one color.
2. Find Canada, to the north. Color it a different color.
3. Find Mexico, to the south. Color it a third color.
4. Color the oceans and the Great Lakes blue.
5. Glue one piece of yarn along the border with Canada and one along the border with Mexico.
6. Draw a star for each capital: Ottawa, Washington, D.C., and Mexico City (a parent can help find them).
7. Fold a small square of orange paper, cut a butterfly, and draw black lines on it. Fly it from Canada, across the United States, to Mexico.

Tips

- The border with Canada is long. Use a long piece of yarn.
- Say each country's name as you color it.

Check your work

- I can show Canada, the United States and Mexico.
- I can show which way is north and which way is south.
- I can point to the borders.

MAP NOTEBOOK

1. Draw a red maple leaf and write "Canada."
2. Draw a waterfall with mist and a rainbow. Write "Niagara Falls."
3. Draw an orange and black monarch butterfly and an arrow pointing south to "Mexico."

From history. The long, straight part of the border between the United States and Canada follows a line on the globe called the 49th parallel. In 1818 the United States and Great Britain (which then governed Canada) agreed to use this line across the plains. Today the border with Canada is the longest border between two countries in the world.

WORKED EXAMPLES

Example 1. Look at the map. Which country is north of the United States? Which country is south?

(Use the map or drawing “North is up. South is down.” shown earlier in this lesson.)

1. On this map, north is at the top and south is at the bottom.
2. Put your finger on the United States.
3. Move your finger up. The country above is Canada. So Canada is north.
4. Move your finger down. The country below is Mexico. So Mexico is south.

Answer: Canada is north of the United States. Mexico is south of the United States.

PRACTICE

1. **EASY** Count the three big countries on the map. Say their names.
(Use the map or drawing “Count the countries.” shown earlier in this lesson.)
2. **EASY** Which famous waterfall is on the border with Canada?
3. **EASY** Match: Which country has a maple leaf on its flag? Which has an eagle on a cactus?
4. **MEDIUM** What river runs along part of the border with Mexico? What does its name mean?
5. **MEDIUM** Which butterflies fly south to Mexico every fall?

COMMON MISTAKES

- Thinking Canada is small because it has fewer cities. Canada is a bigger land than the United States.
- Mixing up north and south. On most maps, Canada is at the top (north) and Mexico is at the bottom (south).
- Thinking Alaska is part of Canada. Alaska is a state of the United States, even though Canada lies between it and the other states.

Make it a game · North, South, Neighbor!. Tape three sheets of paper on the floor in a line: CANADA at the north end, U.S.A. in the middle, MEXICO at the south end. The child stands on U.S.A. The parent calls out “North!” or “South!” and the child hops to the right country and says one thing about it (a capital, a language, a flag, Niagara Falls or monarch butterflies). Hop back to the middle each time.

Scripture. “And hath made of one blood all nations of men for to dwell on all the face of the earth, and hath determined the times before appointed, and the bounds of their habitation;” (Acts 17:26, KJV)

God made all the nations, and He knows where each one lives. Canadians, Americans and Mexicans are all people God made, so we can be good neighbors to one another.

Practice answers

1. 3: Canada, the United States and Mexico.
2. Niagara Falls.
3. Canada has the maple leaf. Mexico has the eagle on a cactus.
4. The Rio Grande. It means "big river."
5. Monarch butterflies.

6.4 SYMBOLS OF THE NATION

OBJECTIVES

- Name three symbols of our country: the flag, the bald eagle and the Liberty Bell.
- Count the stripes on the flag and tell what the stripes and stars stand for.
- Find Philadelphia, where the Liberty Bell is, on a map.

Warm-up. Show the child a stop sign in a picture book or out the window, and a heart drawn on paper. Ask: “What does this shape tell you?” A symbol is a picture that stands for something bigger. Then look at a dollar bill together and hunt for the eagle on the back.

Video. Coming soon. Short, kid-friendly videos of bald eagles in the wild (a nest, catching a fish), a simple animation or picture-book read-aloud about the American flag and Flag Day, and a short National Park Service, Smithsonian or Library of Congress clip showing the Liberty Bell and Independence Hall in Philadelphia; Homeschool Pop (Alternate) for U.S. symbols; each under about 8 minutes.

KEY TERMS

symbol

A picture or thing that stands for something bigger. Our flag is a symbol of our country.

stripe

A long, thin band of color. Our flag has 13 stripes for the first 13 states.

liberty

Being free.

CORE IDEAS

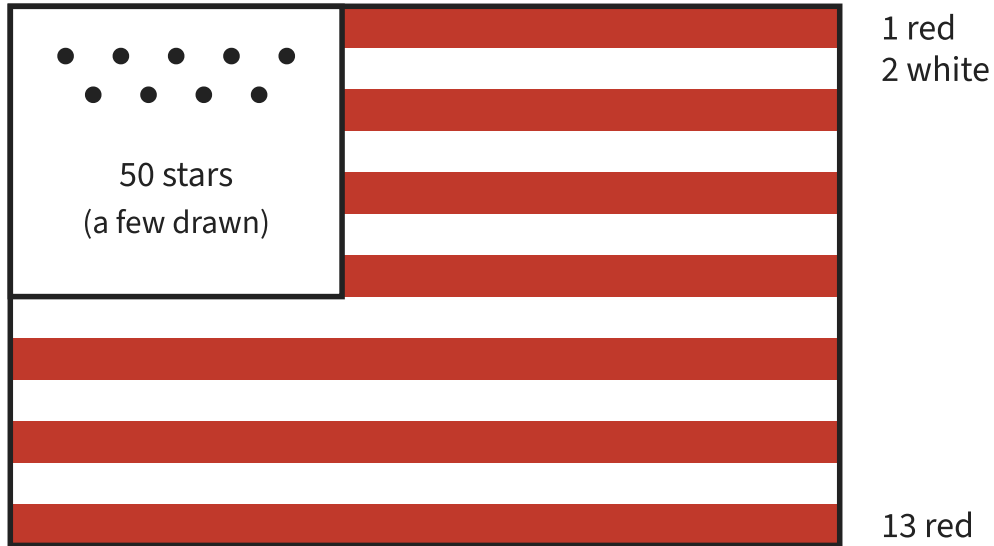
The story. In the summer of 1776, men from all thirteen states met in a brick building in Philadelphia, Pennsylvania. On July 4 they agreed to the Declaration of Independence. It said the states would be free and govern themselves. In the tower of that same building hung a big bell. Words from the Bible were written around it: “Proclaim liberty throughout all the land.” Today we call it the **Liberty Bell**.

The flag. On June 14, 1777, the leaders chose a flag. It had thirteen **stripes**, red and white, one for each of the first thirteen states. It had thirteen white stars on blue. Each time a new state joined, a star was added. Today our flag has 50 stars, one for every state, and still 13 stripes. We remember the flag’s birthday on Flag Day, June 14.

The eagle. In 1782 the leaders chose a bird for the country’s seal: the **bald eagle**. It is not really bald. Its head is covered with white feathers. Bald eagles live only in North America. They build giant nests in tall trees near rivers and lakes, and they swoop down to catch fish.

On the back of a dollar bill, the eagle holds an olive branch for peace and arrows for strength.

On the map. Where are these symbols? The Liberty Bell is in Philadelphia, across the street from the building where the Declaration was signed. It has a long crack, so it is not rung like a regular bell anymore. Our flag flies over the Capitol in Washington, D.C., over schools and post offices, and maybe on your porch. Bald eagles can be found in every state but Hawaii, and Alaska has the most of all. A symbol helps us remember who we are and the good gifts God has given.



$7 \text{ red} + 6 \text{ white} = 13 \text{ stripes}$

Count the stripes: 7 red and 6 white make 13. The box in the corner holds 50 stars.



The Liberty Bell is in Philadelphia, beside the Delaware River.

PICTURE STUDY



Declaration of Independence, John Trumbull, 1818 (placed in the Capitol Rotunda in 1826) · Oil on canvas · Rotunda of the United States Capitol, Washington, D.C.

John Trumbull fought in the war for independence and knew many of the men who started our country. He wanted people to remember their faces. He traveled to meet them and painted many of them from life. Later Congress asked him to paint this big picture for the Capitol in Washington, D.C.

It shows the room in Philadelphia where the leaders met in 1776. Five men hand the Declaration to John Hancock, who sits at the table. The Liberty Bell hung in the tower of this same building. You can also see this painting on the back of a two-dollar bill.

Look closely

- Find the five men standing in front of the table. The tallest one is Thomas Jefferson. He wrote the Declaration.
- Find the man sitting at the table. That is John Hancock.
- Find the flags and drums on the wall. What do they remind you of?
- Count the doors and windows you can see.

Talk about it

1. Why do you think the men are so quiet and serious?
2. Why would a country want to remember this day with a bell, a flag and a painting?

PROJECT: MY THIRTEEN-STRIPE FLAG

You will build a paper flag one stripe at a time, counting as you go. Then you will add stars and fly it on a stick.

You will need

- One sheet of white paper
- Red paper (or a red crayon) and a small square of blue paper
- Scissors, a glue stick and a ruler
- Star stickers or a white crayon
- A straw, a chopstick or a stick from the yard

Steps

1. With a parent, cut 7 thin red strips of the same size. Count them: 1 to 7.
2. Glue the first red strip at the very top of the white paper. Leave a white space the same size. Glue the next red strip. Keep going until all 7 are glued. The white spaces between make 6 white stripes.
3. Count all the stripes, red and white together: 13.
4. Glue the blue square in the top left corner.
5. Add stars to the blue square. Count them as you add them. (You do not need all 50. Put on as many as fit.)
6. Tape the flag to the stick. Say: "Thirteen stripes for the first states. Fifty stars for all the states."

Tips

- The top stripe and the bottom stripe are both red.

- For a quick version, color the stripes with a red crayon along lines a parent draws with a ruler.

Check your work

- My flag has 13 stripes, 7 red and 6 white.
- The blue box is in the top left corner.
- I can say what the stars stand for.

MAP NOTEBOOK

1. Draw the Liberty Bell with its crack. Write “Philadelphia” under it.
2. Draw a bald eagle with a white head and a brown body.
3. Draw our flag and count the stripes as you color them.

From history. The Liberty Bell was made in England and reached Philadelphia in 1752. It cracked the first time it was tested, so two Philadelphia men, John Pass and John Stow, melted it down and cast it again. Years later, people who wanted to end slavery began calling it the “Liberty Bell,” because its words called for liberty for all the inhabitants of the land.

WORKED EXAMPLES

Example 1. Count the stripes on the flag. How many are red? How many are white? How many in all?

(Use the map or drawing “Count red, then white, then all together.” shown earlier in this lesson.)

1. Put your finger on the top stripe. It is red. Count the red stripes going down: 1, 2, 3, 4, 5, 6, 7.
2. Now count the white stripes between them: 1, 2, 3, 4, 5, 6.
3. Put them together: 7 and 6 make 13.
4. Thirteen stripes stand for the first thirteen states.

Answer: 7 red stripes and 6 white stripes, 13 stripes in all.

PRACTICE

1. **EASY** Name three symbols of our country.
2. **EASY** How many stripes are on our flag? What color is the top stripe?
(Use the map or drawing “Count the stripes.” shown earlier in this lesson.)
3. **EASY** Point to the city where the Liberty Bell is. What is its name?
(Use the map or drawing “Find the Liberty Bell’s city.” shown earlier in this lesson.)
4. **MEDIUM** Is the bald eagle really bald? What color is its head?
5. **MEDIUM** Look at the back of a dollar bill. Find the eagle. What does it hold in its feet?

COMMON MISTAKES

- Thinking there is one stripe for each state. The 13 stripes are for the first 13 states; the 50 stars are for all the states.
- Thinking the Liberty Bell is in Washington, D.C. It is in Philadelphia, Pennsylvania.
- Thinking a bald eagle has no feathers on its head. “Bald” here means white-headed.

Make it a game · Symbol Hunt. Go on a hunt around the house, the neighborhood or a picture book. Score one point for each flag you spot, two points for an eagle (try a dollar bill or a stamp), and three points for a picture of the Liberty Bell. Count your points. Each time you find one, say what it stands for.

Scripture. “And ye shall hallow the fiftieth year, and proclaim liberty throughout all the land unto all the inhabitants thereof: it shall be a jubile unto you; and ye shall return every man unto his possession, and ye shall return every man unto his family.” (Leviticus 25:10, KJV)

These are the Bible words written on the Liberty Bell. In Israel, every fiftieth year was a year of freedom, when families went home to their own land. True liberty is a gift from God.

Practice answers

1. The flag, the bald eagle and the Liberty Bell.
2. 13 stripes. The top stripe is red.
3. Philadelphia, Pennsylvania.
4. No. Its head is covered with white feathers.
5. An olive branch (for peace) and arrows (for strength).

UNIT 6 REVIEW

A parent reads each question aloud. The child answers out loud, points or draws. The review is worth 20 points.

1. (3 pts) Point to our state on a map of the United States. What is its name? What is its capital?
2. (3 pts) What is a capital? How is it often shown on a map?
3. (3 pts) How many states are in the United States? Which state is the biggest?
4. (3 pts) What is our country's capital, and whom is it named for?
5. (3 pts) Point to the country north of the United States and the country south of it. Name them.
6. (3 pts) Count the stripes on a flag. How many are there, and what do they stand for?
7. (2 pts) In which city is the Liberty Bell?

UNIT PROJECT: MY STATE AND MY COUNTRY

Put together the salt-dough state (or a photo of the state cookie) with its capital star, the colored map of the United States with your state, Washington, D.C., Alaska and Hawaii marked, and the thirteen-stripe flag. Then the child shows the collection to a grandparent or friend and tells three things: the name and capital of our state, one special place in it, and our country's two neighbors.

- **Accuracy:** The state shape is recognizable, the capital star is in about the right place, and Washington, D.C., is marked near the Atlantic coast.
- **Map skills:** The child can point to north and south and show Canada and Mexico.
- **Telling:** The child names the state, its capital, one special place and the three national symbols in their own words.
- **Care:** The work is colored neatly inside the lines and the flag has 13 stripes.

Answer key

1. Answers vary by family. Using any U.S. map (such as the Lesson 6.1 map), the child points to the home state and names it and its capital city; the parent checks both.
2. The city where the leaders meet to make laws. It is often shown with a star.
3. Fifty states. Alaska is the biggest.
4. Washington, D.C. It is named for George Washington.
5. Canada is north. Mexico is south.
6. 13 stripes, for the first 13 states.
7. Philadelphia, Pennsylvania.

ANIMALS AND THEIR HOMELANDS

“The earth is the LORD’s, and the fulness thereof” (Psalm 24:1). God filled the whole earth with creatures, and He gave each one a **homeland**: a place with the food, water, weather and shelter it needs. In this unit your child travels around the globe, continent by continent, to meet the animals God fitted for each kind of land: the hot grasslands of Africa, the misty bamboo forests and high cold plateau of Asia, the wide plains and steamy rain forests of the Americas, and the dry bush of Australia and the ice of Antarctica.

Each lesson begins with a real moment: a zebra arriving in England for Queen Charlotte in 1762, a missionary named Armand David learning of the giant panda in 1869, fifteen bison riding a train to Oklahoma in 1907, and Captain Cook’s sailors seeing their first kangaroo in 1770. Children look at real pictures by George Stubbs, Wen Tong and John James Audubon, and week by week they build one big **Animal Homeland Map** with cut-out animals glued to their continents. By the end they can spin a globe, point to any continent and tell which animals live there and why.

BEFORE YOU BEGIN

- Can name and point to the seven continents on a globe (Kindergarten Unit 7)
- Knows north, south, east and west on a map (Unit 2)
- Knows that places near the equator are hot and places near the poles are cold (Unit 5)
- Can use child-safe scissors and a glue stick

MASTERY CHECKLIST

- I can say that every animal has a homeland where God made it to live.
- I can point to Africa and tell about lions and zebras on the savanna.
- I can point to Asia and tell where pandas and yaks live, and which lives higher up.
- I can point to North and South America and tell about bison on the plains and sloths in the rain forest.
- I can point to Australia and Antarctica and tell about kangaroos, koalas and emperor penguins.
- I can give a tour of my Animal Homeland Map.

OPTIONAL BOOKS AND RESOURCES

- **Smithsonian’s National Zoo and Conservation Biology Institute** (<https://nationalzoo.si.edu/>): Free. Animal pages, photos and live animal cams, including giant pandas. A parent can choose short clips of lions, zebras, pandas, bison, sloths and kangaroos to watch together.
- **John James Audubon’s *The Birds of America* (National Audubon Society)** (<https://www.audubon.org/birds-of-america>): Free. All 435 of Audubon’s bird plates to

browse online. Look for the wild turkey (Plate 1) for Lesson 7.3, then let your child pick a favorite bird that lives near your home.

7.1 AFRICA'S GRASSLANDS ★

OBJECTIVES

- Find Africa on a globe or world map and point to the grasslands called the savanna.
- Tell what a savanna is like and name two animals that live there, the lion and the zebra.
- Say that every animal has a homeland, a place God made it to live.

Warm-up. Gather three or four toy animals or stuffed animals from around the house. Hold up each one and ask: Where does this animal live? In a hot place or a cold place? In the trees, in the water or on the grass? Line them up from the hottest home to the coldest home. Keep them nearby for the rest of the unit.

Video. Coming soon. Short footage of lions and zebras on the African savanna for young children (Smithsonian's National Zoo lion and zebra clips, SciShow Kids on why zebras have stripes), or a short read-aloud of a picture book about the African grasslands (Brightly Storytime-style read-alouds, candidate, needs vetting; National Geographic Kids, candidate, needs vetting); keep each under about 8 minutes.

KEY TERMS

homeland

The place where an animal lives and finds its food, water and shelter.

savanna

A wide, warm grassland with a few trees standing here and there. Part of the year is rainy and part is dry.

herd

A big group of animals, like zebras, that live and travel together.

pride

A family group of lions that live and hunt together.

CORE IDEAS

The story. In the year 1762 a ship sailed into England with a very strange passenger. It was a zebra! It had come all the way from the bottom tip of Africa, near the Cape of Good Hope. It was a gift for Queen Charlotte, the wife of King George III. People crowded in to look at it. Most of them had never seen a horse with black and white stripes. The next year a painter named George Stubbs painted its picture.

The big idea. Every animal has a **homeland**, a place God made it to live. The zebra's homeland is the **savanna** of Africa. A savanna is a wide, warm grassland with a few trees standing here and there. For part of the year it rains and rains, and the grass grows tall and green. Then the dry season comes. The grass turns gold and brown, and the animals walk far to find water.

Who lives there. Zebras eat grass almost all day long. They live together in a **herd**. No two zebras have the very same stripes, just as no two people have the same fingerprints. Lions live on the savanna too. A lion family is called a **pride**. Lions rest in the shade for most of the day and often hunt when it is cool. They hunt zebras, so a zebra must keep its ears up and its eyes open! Giraffes, elephants and antelope share the grassland too.

On the map. Find Africa on the globe. The equator runs right across its middle. Big grasslands spread across Africa on both sides of the warm, wet rain forest in the middle. A famous savanna is the Serengeti, in the country of Tanzania. Every year huge herds of zebras and wildebeest walk across it in a giant loop. They follow the rain to find fresh green grass.



Africa's grasslands lie on both sides of the equator. The zebra in our story came from near the Cape of Good Hope.

PICTURE STUDY



Zebra, George Stubbs, 1763 · Oil on canvas · Yale Center for British Art, New Haven, Connecticut (Paul Mellon Collection)

George Stubbs was an English painter who loved animals, especially horses. He studied how their bones and muscles fit together so that he could paint them just right. When Queen Charlotte's zebra came to England, Stubbs painted it standing sideways so that every stripe would show.

Stubbs had never been to Africa. So he put the zebra in a green, shady woods that looks more like England than the savanna!

Look closely

- Find the zebra's stripes. Do they go up and down, or side to side? Do they change on the legs?
- Look at the zebra's ears, mane and tail. How are they like a horse's?
- Look at the trees and the ground. Does this look like a wide, sunny grassland?
- Where is the light brightest in the painting?

Talk about it

1. If you could move this zebra back to its homeland, what would you paint behind it?
2. Why do you think people in England crowded to see the zebra?

PROJECT: ANIMAL HOMELAND MAP, PART 1: AFRICA

In this unit you will make one big world map and fill it with cut-out animals, one continent at a time. Today you make the map and give Africa its first animals: a lion and a zebra on the savanna.

You will need

- A large printed outline map of the world (or a parent traces one from a globe or atlas onto poster board)
- Poster board or two sheets of paper taped together
- Crayons or colored pencils (blue, yellow, light green, brown, black)
- White card stock or an old cereal box, cut flat
- Child-safe scissors and a glue stick

Steps

1. Glue or tape the world map onto the poster board. Write “Animal Homelands” across the top.
2. Color all the oceans blue.
3. Find Africa. Put your finger on the equator line where it crosses Africa.
4. Color a wide band of yellow-green on both sides of the middle of Africa. That is the savanna. Color the Sahara in the north light brown.
5. On card stock, draw a lion and a zebra, each about as tall as your thumb. Color them. Give the zebra black stripes and the lion a brown mane.
6. Cut them out and glue them onto the savanna in Africa.
7. Point to them and tell your parent: “Lions and zebras live on the savanna in Africa.”

Tips

- Keep each animal small so there will be room for more animals in the next lessons.
- If cutting is hard, draw the animal inside a little circle and cut out the circle.

Check your work

- I can point to Africa on my map.
- I can show where the savanna is.
- I can name two savanna animals.

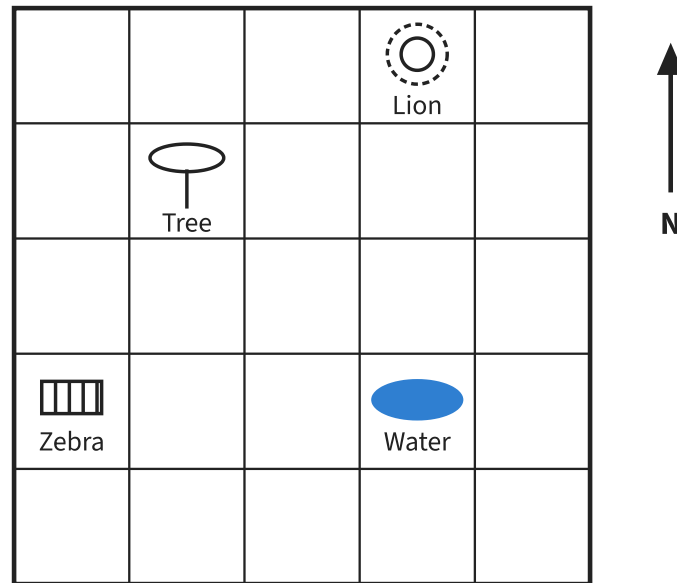
MAP NOTEBOOK

1. Draw a savanna: lots of grass, one or two flat-topped trees and a bright sun.
2. Draw a zebra and give it your very own stripe pattern. No other zebra has stripes just like it!
3. Draw a lion pride resting in the shade. How many lions did you draw? Write the number.

From history. The Serengeti in Tanzania became a national park in 1951, so that its great herds would have a safe home. Today people come from all over the world to watch the zebras and wildebeest move across the grass, with lions watching them from the shade.

WORKED EXAMPLES

Example 1. This picture map shows part of the savanna drawn on squares. The zebra is thirsty. How many squares must it walk to get to the water? Which way does it go?



A picture map of the savanna. Count the squares from the zebra to the water.

1. Find the north arrow. North is up, so east is to the right.
2. Put your finger on the zebra.
3. Move your finger to the right, one square at a time, until you reach the water: 1, 2, 3.
4. The zebra walked 3 squares, and it walked to the right, which is east.

Answer: The zebra walks 3 squares east to reach the water.

PRACTICE

1. **EASY** Point to Africa on the globe or world map.
2. **EASY** What do we call a family of lions? What do we call a big group of zebras?
3. **EASY** Look at the savanna picture map. How many squares is it from the lion down to the water? Is the lion north or south of the water?
(Use the map or drawing "Count from the lion to the water." shown earlier in this lesson.)
4. **MEDIUM** Match each animal to its food: zebra, lion. Foods: grass, meat.
5. **MEDIUM** Is the savanna a hot place or a cold place? Tell one thing that changes when the dry season comes.

COMMON MISTAKES

- Thinking all of Africa is jungle. Much of Africa is grassland, and the north has the big Sahara desert.
- Thinking lions live in the jungle. Lions live mostly on grasslands and open woodlands.
- Thinking all zebras look the same. Every zebra's stripes are a little different.

Make it a game • Lion and Zebras. One player is the lion and lies “asleep in the shade” in the middle of the room. The others are zebras who tiptoe around and “eat grass.” When the parent calls “Dry season!”, the zebras walk to the “water hole” (a blue towel). When the parent calls “The lion wakes up!”, the lion roars and the zebras run back to their herd (the couch). Take turns being the lion.

Scripture. “The young lions roar after their prey, and seek their meat from God.” (Psalm 104:21, KJV)

Psalm 104 is a song about God caring for every creature. Even the strong lion depends on God for its food.

Practice answers

1. The child points to Africa, the large continent south of Europe with the equator across its middle.
2. A pride of lions. A herd of zebras.
3. 3 squares. The lion is north of the water.
4. Zebra eats grass. Lion eats meat (it hunts animals such as zebras).
5. A warm or hot place. In the dry season the grass turns brown and gold, and animals must walk far to find water.

7.2 ASIA'S BAMBOO FORESTS AND MOUNTAINS

OBJECTIVES

- Find Asia and China on a globe and point to the high mountains where pandas and yaks live.
- Tell that pandas live in cool bamboo forests on the mountainsides and yaks live higher up on cold, high land.
- Tell how a missionary named Armand David helped the world learn about the giant panda.

Warm-up. Hold up a drinking straw, a celery stalk or a stick of bamboo if you have one. Look at the end. Is it hollow or solid? Bamboo is a giant grass with a hard, hollow stem, a little like this straw. Now pretend you are a panda: sit down, hold your “bamboo” with both paws and munch. Pandas sit and eat like this for most of the day!

Video. Coming soon. Short footage of giant pandas eating bamboo (Smithsonian’s National Zoo panda videos and Panda Cam clips), a short clip of yaks on the Tibetan Plateau or in the Himalayas (National Geographic Kids, candidate, needs vetting), or a short read-aloud of a picture book about pandas (Brightly Storytime-style read-alouds, candidate, needs vetting); keep each under about 8 minutes.

KEY TERMS

bamboo

A very tall grass with a hard, hollow stem. Giant pandas eat it almost all day.

plateau

High land that is flat on top. The Tibetan Plateau in Asia is so high it is called the Roof of the World.

missionary

A person who goes to another land to tell people about Jesus and to help them.

CORE IDEAS

The story. In March of 1869, a French **missionary** named Armand David was living in the high, misty mountains of western China. He loved God, and he loved to study the plants and animals God had made. One day a family showed him the skin of a strange bear. It was black and white! Soon hunters brought him a panda. Father David sent it to a museum in Paris. That is how people far away first learned about the giant panda.

The big idea. The panda’s homeland is the cool, wet **bamboo** forests on the sides of the mountains in China. Bamboo is a giant grass with a hard, hollow stem. A panda eats bamboo for more than half of every day. It has a special bump on its wrist that works like a thumb. It uses it to hold the bamboo stalks while it munches.

Higher up. Climb higher up the mountains and the trees stop. Up there is the Tibetan **Plateau**, high, flat land that is cold and windy. It is so high that people call it the Roof of the World. Yaks live there. Their long, shaggy hair hangs almost to the ground like a warm blanket. The people of Tibet have kept yaks for a very long time. Yaks carry heavy loads. They give milk for butter and cheese. Their hair is made into ropes and tents.

On the map. Asia is the biggest continent of all. Find China on the globe. The panda forests are in the mountains in the middle of China. West of them is the high Tibetan Plateau. On its south side stand the Himalaya Mountains, with Mount Everest, the tallest mountain in the world. The higher you go, the colder it gets, so each animal lives where God fitted it to live.



Pandas live in the mountain forests of China. Yaks live higher up, on the Tibetan Plateau.

PICTURE STUDY



Ink Bamboo, Wen Tong, 11th century (Northern Song dynasty) · Hanging scroll, ink on silk · National Palace Museum, Taipei

Wen Tong was a Chinese painter and poet who lived almost a thousand years ago. He loved bamboo so much that he planted it around his home and watched it in the wind, the rain and the snow. His friends said he knew bamboo so well that he could see the whole picture in his mind before he ever touched his brush.

This painting uses only black ink on silk. Some leaves are dark and some are pale gray. The painting is kept rolled up as a scroll and hung up to be looked at.

Look closely

- Find the stem. Can you see the joints, the little rings where the stem is divided?
- Look at the leaves. Are they round or long and pointed?
- Find a dark leaf and a light gray leaf. How do you think the painter made them different?
- How many colors did the painter use?

Talk about it

1. Would a hungry panda like this branch? Why?
2. Why do you think Wen Tong watched bamboo for so long before he painted it?

PROJECT: ANIMAL HOMELAND MAP, PART 2: ASIA

Today you add Asia's animals to your big world map: a panda in a bamboo forest and a shaggy yak up on the Roof of the World.

You will need

- Your Animal Homeland Map from Lesson 7.1
- White card stock or cereal-box cardboard
- Crayons or colored pencils (black, green, brown, gray)
- Green paper strips or a few green-colored toothpicks for bamboo
- A small piece of brown yarn or a brown cotton ball for yak hair (optional)
- Child-safe scissors and a glue stick

Steps

1. Find Asia on your map. Put your finger on China.
2. Color a small patch of green in the middle of China for the bamboo forests.
3. Color the Tibetan Plateau, west of the forests, light gray or brown for high, cold land.
4. Glue three or four thin green paper strips standing up in the green patch. That is your bamboo.
5. On card stock, draw a black-and-white panda and a brown yak, each about as tall as your thumb. Cut them out.
6. If you like, glue bits of brown yarn or cotton on the yak to make it shaggy.
7. Glue the panda by the bamboo and the yak on the plateau. Tell your parent which one lives higher up.

Tips

- Remember the panda's black patches: around the eyes, on the ears, and on the legs and shoulders.
- Keep the animals small. There are more continents to fill!

Check your work

- I can point to Asia and China.
- I can show where pandas live and where yaks live.
- I can say which animal lives higher up.

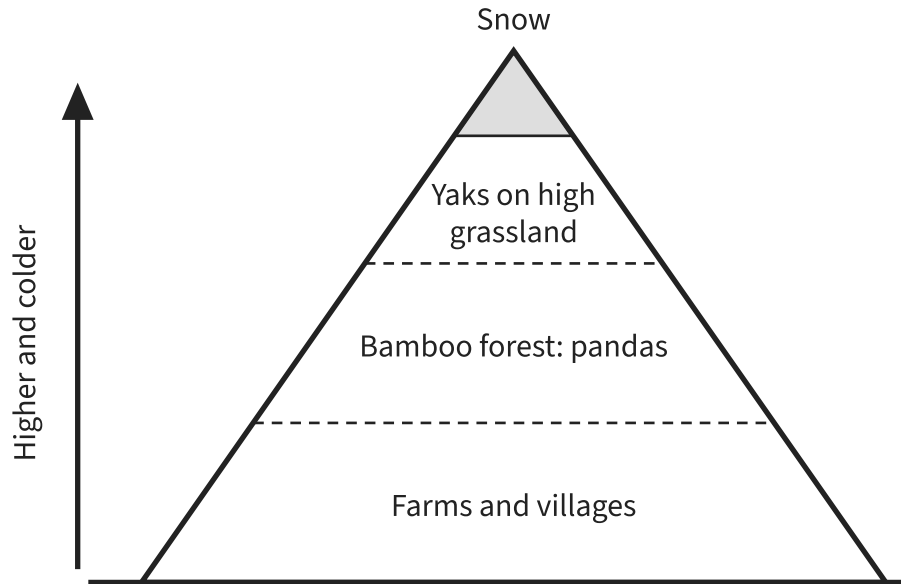
MAP NOTEBOOK

1. Draw a panda sitting and eating bamboo. Show how it holds the stalk.
2. Draw a tall mountain. Draw bamboo halfway up and a yak near the top, with snow on the very peak.
3. Draw a yak and, around it, three things people get from yaks: milk, rope and a heavy load carried.

From history. In 1936 an American named Ruth Harkness traveled into the mountains of western China and came home with a baby panda named Su Lin. Su Lin was the first live giant panda ever brought to America. The next year Su Lin went to live at the Brookfield Zoo near Chicago, and crowds lined up to see the little black-and-white bear.

WORKED EXAMPLES

Example 1. Look at the picture of the mountain. Who lives higher up, the panda or the yak? Is it colder where the yak lives or where the panda lives?



The higher you climb, the colder it gets. Each animal has its own band.

1. Put your finger at the bottom of the mountain, where the farms and villages are.
2. Slide your finger up. The next band is the bamboo forest. That is where the panda lives.
3. Keep sliding up. Above the forest is the high, cold grassland. That is where the yak lives.
4. The arrow says that the higher you go, the colder it gets.

Answer: The yak lives higher up, and it is colder where the yak lives. That is why the yak has such thick, shaggy hair.

PRACTICE

1. **EASY** Point to Asia on the globe. Then point to China.
2. **EASY** What does a giant panda eat almost all day?
3. **EASY** A panda ate 4 bamboo stalks in the morning and 5 in the afternoon. How many stalks did it eat? Draw them if it helps.
4. **MEDIUM** Name two ways yaks help the people who live on the Tibetan Plateau.
5. **MEDIUM** Which is bigger: Asia or Africa?

COMMON MISTAKES

- Thinking pandas live in hot jungles. They live in cool, wet mountain forests.
- Thinking bamboo is a kind of tree. It is a very tall grass.
- Thinking it gets warmer as you climb toward the sun. It gets colder the higher you go.

Make it a game • Panda or Yak?. The parent says a clue, and the child calls out “Panda!” or “Yak!” and acts it out (munching bamboo or stomping like a shaggy yak).
Clues: I am black and white. I have long, shaggy hair. I carry heavy loads. I eat bamboo all day. I live up high where trees do not grow. A missionary sent my skin to Paris. Then switch: the child gives the clues.

Scripture. “The high hills are a refuge for the wild goats; and the rocks for the conies.”
(Psalm 104:18, KJV)

God gives every creature a place to live. The high, cold mountains are a good home for yaks and wild goats, and the bamboo forests are a good home for the panda.

Practice answers

1. The child points to Asia, the biggest continent, and then to China in the east of Asia.
2. Bamboo.
3. 9 stalks.
4. Any two: they carry loads; they give milk for butter and cheese; their hair makes ropes and tents.
5. Asia. It is the biggest continent of all.

7.3 THE AMERICAS

OBJECTIVES

- Find North America and South America on a globe and say that together they are called the Americas.
- Tell that bison live on the grassy Great Plains and sloths live in the warm, rainy forests farther south.
- Tell how people saved the bison when only a few were left.

Warm-up. Set a timer for one minute. First, walk across the room as fast as you safely can, like a big bison running on the plains. Then try it again as slowly as you possibly can, like a sloth. How far did you get in one minute as a sloth? Today you will meet one of the biggest animals of the Americas and one of the slowest.

Video. Coming soon. Short footage of bison herds on the plains or in Yellowstone (National Park Service or Smithsonian clips) and of sloths in the rain forest (SciShow Kids on sloths; Smithsonian’s National Zoo sloth videos), or a short read-aloud of a picture book about bison or sloths (Brightly Storytime-style read-alouds, candidate, needs vetting); keep each under about 8 minutes.

KEY TERMS

the Americas

The two continents of North America and South America, joined by a narrow strip of land.

plains

Wide, flat land covered with grass. The Great Plains are in the middle of North America.

rain forest

A thick, warm forest where it rains almost every day and the trees grow very tall.

CORE IDEAS

The story. In October of 1907, fifteen bison climbed into wooden crates in New York City. They lived at the Bronx Zoo. They rode a train for many days, all the way to the Wichita Mountains in Oklahoma. Why? Long ago, millions of bison roamed the Great Plains. But hunters killed so many that by the 1880s fewer than a thousand were left. A zoo leader named William Hornaday and his friends wanted to save them. When the crates opened, the fifteen bison trotted out onto the grass. They became a new wild herd.

The bison’s homeland. Bison live on the **plains**, the wide, flat grasslands in the middle of North America. They eat grass, just like zebras. A bison has a big hump on its shoulders and a shaggy coat for the snowy winters. It is the biggest land animal in North America. A big bull can weigh as much as a small car!

The sloth's homeland. Now travel far to the south, to Central America and South America. Here is the **rain forest**. It is hot, and it rains almost every day. A sloth hangs upside down from the branches with its long, curved claws. It eats leaves and moves very, very slowly. Tiny green plants grow in its fur, so it looks green and is hard to see in the leaves. About once a week it climbs down to the ground, and then back up it goes.

On the map. North America and South America are two continents joined by a narrow strip of land. Together we call them **the Americas**. The Great Plains are in the north. The great Amazon rain forest is in South America, near the equator. God made the wide, grassy plains a home for the strong bison and the warm, green treetops a home for the slow sloth.



Bison live on the Great Plains in the north. Sloths live in the rain forests in the south. The line shows the bison trip of 1907.

PICTURE STUDY



Wild Turkey, Plate 1 of The Birds of America, John James Audubon (engraved by William H. Lizars, later retouched by Robert Havell Jr.), painted about 1825, printed 1827 · Hand-colored engraving · The original watercolor is at the New-York Historical Society, New York; printed copies of the book are in many libraries and museums

John James Audubon loved birds more than anything. He walked through the woods and swamps of America for years, watching birds and painting them. He wanted to paint every bird in America, and he painted them life-size, as big as they really are. His great book, *The Birds of America*, was printed in Great Britain between 1827 and 1838. It had 435 pictures, and its pages were more than three feet tall!

The very first picture in the book is the wild turkey. The wild turkey's homeland is the forests and fields of North America.

Look closely

- Find the turkey's feet. Is it standing still or walking?
- Look at the feathers. How many colors can you find?
- Find the red skin hanging under the turkey's beak and the bristly beard on its chest.
- Look at the tall plants behind it. Where do you think this turkey lives?

Talk about it

1. Why do you think Audubon painted the birds life-size?
2. If you made a book of the animals of the Americas, which animal would be on the first page?

PROJECT: ANIMAL HOMELAND MAP, PART 3: THE AMERICAS

Today you fill the Americas on your big world map: a bison on the Great Plains and a sloth hanging in the rain forest.

You will need

- Your Animal Homeland Map from Lessons 7.1 and 7.2
- White card stock or cereal-box cardboard
- Crayons or colored pencils (brown, dark green, light green, yellow)
- A green pipe cleaner or a short piece of green yarn
- Tape, child-safe scissors and a glue stick

Steps

1. Find North America on your map. Find your own country and put a dot where you live.
2. Color a band of yellow-green in the middle of North America. That is the Great Plains.
3. Find South America. Color a big patch of dark green in the north part, near the equator. That is the Amazon rain forest.
4. Tape a short pipe cleaner or piece of yarn across the dark green patch. That is a branch.
5. On card stock, draw a brown bison with a big hump and a small sloth, each about as tall as your thumb. Cut them out.
6. Glue the bison on the Great Plains. Fold the sloth's arms over the branch and tape it so it hangs upside down.
7. Point to each one and say where it lives. Then trace with your finger from the bison to the sloth. Which way did you go?

Tips

- Draw the sloth with long arms and curved claws so it can hang.
- If you have been to see bison at a zoo or park, add a star there on the map.

Check your work

- I can point to North America and South America.
- I can show where bison live and where sloths live.
- I can say that the rain forest is south of the Great Plains.

MAP NOTEBOOK

1. Draw a bison on the plains. Give it a big hump and a shaggy coat.
2. Draw a sloth hanging upside down from a branch. Color a little green in its fur.
3. Draw Audubon's wild turkey, or another bird you have seen near your home, as big as your page.

From history. The bison came very close to disappearing, but people worked hard to protect them in parks and on ranches. Today there are bison again in Yellowstone National Park and in many other places. In 2016 the United States named the bison its national mammal.

WORKED EXAMPLES

Example 1. On the map, start at the Great Plains, where the bison live. Travel to the Amazon rain forest, where the sloths live. Which way do you go: north or south?

(Use the map or drawing “Trace from the bison to the sloths.” shown earlier in this lesson.)

1. Remember that on most maps north is at the top and south is at the bottom.
2. Put your finger on the words Great Plains.
3. Slide your finger to the words Amazon rain forest. Your finger moved down the map.
4. Down the map is south.

Answer: You travel south. The sloths live south of the bison.

PRACTICE

1. **EASY** Point to North America on the globe. Then point to South America.
2. **EASY** Which animal moves slower, a bison or a sloth?
3. **EASY** Fifteen bison rode the train to Oklahoma. If 5 of them walked out of their crates first, how many were still waiting?
4. **MEDIUM** Match each animal to its home: bison, sloth. Homes: rain-forest trees, grassy plains.
5. **MEDIUM** Why does a sloth’s fur often look green? How does that help the sloth?

COMMON MISTAKES

- Thinking America is only one country. The Americas are two whole continents with many countries.
- Calling the bison a buffalo and thinking it is the same as an African buffalo. Many people call it a buffalo, but the American bison is a different animal.
- Thinking sloths live everywhere in the Americas. They live only in the warm rain forests of Central and South America.

Make it a game • Bison Run, Sloth Hang. The parent calls out “Bison!” and the child stomps and runs in place, head low like a bison. The parent calls “Sloth!” and the child moves in super-slow motion, arms reaching up as if hanging from a branch. Add “Turkey!” for a proud strut. Speed up the calls. Finish by pointing to where each animal lives on the map.

Scripture. “And God made the beast of the earth after his kind, and cattle after their kind, and every thing that creepeth upon the earth after his kind: and God saw that it was good.” (Genesis 1:25, KJV)

God made the big bison and the slow sloth, each after its kind, and called them good. When people saved the bison, they were caring for something God made.

Practice answers

1. The child points to each continent. North America is the upper one; South America is below it, joined by a narrow strip of land.
2. A sloth.
3. 10 bison.
4. Bison: grassy plains. Sloth: rain-forest trees.
5. Tiny green plants grow in its fur. The green helps it hide among the leaves.

7.4 AUSTRALIA AND ANTARCTICA

OBJECTIVES

- Find Australia and Antarctica on a globe and say that Antarctica is far to the south and is the coldest continent.
- Tell that kangaroos and koalas carry their babies in a pouch, and that emperor penguin fathers keep the egg warm on their feet.
- Finish the Animal Homeland Map and tell where each animal lives.

Warm-up. Put a small ball, a beanbag or a rolled-up sock on top of your feet. Can you shuffle across the room without letting it fall off? That is how an emperor penguin father carries his egg all winter long. Next, put a stuffed animal in the front of your shirt or in a pocket and hop like a kangaroo. Did your “joey” stay in its pouch?

Video. Coming soon. Short footage of kangaroos and koalas in Australia and of emperor penguins huddling on the Antarctic ice (SciShow Kids on penguins or marsupials; Smithsonian’s National Zoo kangaroo clips; NASA images of Antarctica from space), or a short read-aloud of a picture book about emperor penguins or kangaroos (Brightly Storytime-style read-alouds, candidate, needs vetting; National Geographic Kids, candidate, needs vetting); keep each under about 8 minutes.

KEY TERMS

pouch

A pocket of skin on a mother kangaroo’s or koala’s tummy where her baby lives and grows.

joey

A baby kangaroo or a baby koala.

Antarctica

The icy continent around the South Pole. It is the coldest place on earth.

huddle

To crowd close together to stay warm, the way emperor penguins do.

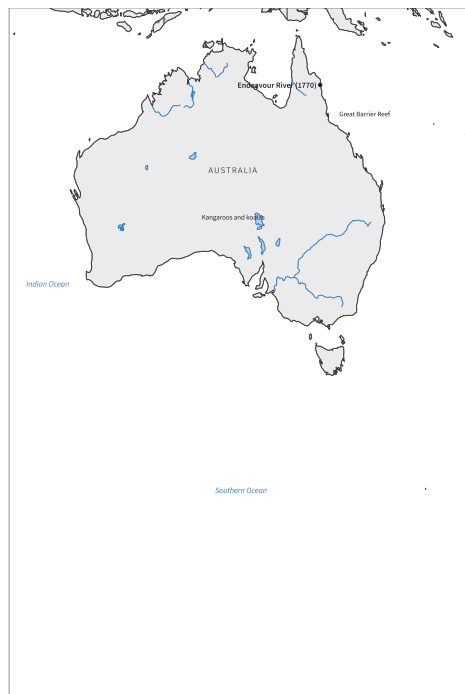
CORE IDEAS

The story. In June of 1770, a ship named the *Endeavour* was sailing along the coast of Australia. Its captain was James Cook. Crunch! The ship hit a sharp coral reef and began to leak. The sailors steered it to the bank of a river and fixed it there. While they worked, they saw a strange animal. It hopped on two big back legs and had a long, strong tail. The people who lived there called it something that sounded like “kangaroo.” A scientist on the ship, Joseph Banks, took a kangaroo skin home to England, and George Stubbs painted it.

Australia. Australia is the smallest continent. It is also a giant island. Big kangaroos and wild koalas live there and nowhere else in the world. A mother kangaroo carries her baby, called a **joey**, in a **pouch** on her tummy. A koala has a pouch too. Koalas are not bears. They live in gum trees, eat the leaves and sleep most of the day.

Antarctica. Now go south, far across the cold ocean, to **Antarctica**. It is the coldest continent. It is covered with thick ice, and no trees grow there. Emperor penguins live on the ice and swim in the icy sea. They are the tallest penguins, about as tall as you! In the dark, freezing winter, the mother lays one egg and goes to sea to eat. The father holds the egg on his feet, under a warm flap of his belly, for about two months. The fathers **huddle** together to stay warm.

On the map. Find Australia on the globe, below Asia. Now turn the globe and look at the very bottom. That white land around the South Pole is Antarctica. It is almost twice as big as Australia! From the hot savanna to the icy south, God made a homeland for every creature and fitted each one to live there.



Kangaroos and koalas live in Australia. Emperor penguins live far to the south, on the ice of Antarctica.

PICTURE STUDY



The Kongouro from New Holland, George Stubbs, 1772 · Oil on panel · National Maritime Museum, Greenwich, London

Do you remember George Stubbs, who painted the queen's zebra in Lesson 7.1? This is his kangaroo. Stubbs never saw a living kangaroo. Joseph Banks brought home a kangaroo skin and some drawings from Captain Cook's voyage, and Stubbs used them to paint this picture. In those days the English called Australia "New Holland."

This was the first painting of a kangaroo that people in Europe had ever seen. Many of them could hardly believe such an animal was real!

Look closely

- Find the kangaroo's back legs and its front legs. Which are bigger?
- Find the long tail. What do you think the kangaroo uses it for?
- Look at the kangaroo's ears and face. Which way is it looking?
- Look at the land behind it. Is it a jungle, a desert of sand or open, rolling land?

Talk about it

1. Stubbs had only a skin to look at. What might be hard about painting an animal you have never seen alive?
2. If you were the first person to see a kangaroo, how would you describe it to someone back home?

PROJECT: ANIMAL HOMELAND MAP, PART 4: AUSTRALIA AND ANTARCTICA

Today you finish your big world map. You will add a kangaroo and a koala in Australia and a huddle of emperor penguins on the ice of Antarctica. Then you will give a tour of the whole

map.

You will need

- Your Animal Homeland Map from Lessons 7.1 to 7.3
- White card stock or cereal-box cardboard
- Crayons or colored pencils (brown, gray, black, yellow, orange)
- Cotton balls or white paper scraps for snow and ice
- Child-safe scissors and a glue stick

Steps

1. Find Australia on your map. Color it light brown and green. Draw one small gum tree.
2. On card stock, draw a kangaroo with a joey peeking out of its pouch, and a gray koala. Cut them out and glue them on Australia. Glue the koala on the gum tree.
3. Find Antarctica at the very bottom of the map. Glue on cotton balls or white paper scraps for ice and snow.
4. Draw three small emperor penguins: black backs, white tummies and a touch of yellow-orange near the neck. Cut them out and glue them close together in a huddle.
5. Draw a tiny egg on one penguin's feet.
6. Give a map tour. Point to each continent and tell which animals live there: lion and zebra, panda and yak, bison and sloth, kangaroo and koala, emperor penguins.
7. Hang your finished map where the family can see it.

Tips

- If Antarctica is just a thin strip at the bottom of your map, look at a globe. On a globe you can see how big it really is.
- Leave room on your map. Whenever you learn about a new animal, you can add it to its homeland.

Check your work

- I can point to Australia and Antarctica.
- I can tell which animals carry babies in a pouch.
- I can give a tour of my whole Animal Homeland Map.

MAP NOTEBOOK

1. Draw a mother kangaroo with her joey peeking out of the pouch.
2. Draw an emperor penguin father with an egg on his feet. Draw snow falling.
3. Draw a globe. Color Australia brown and Antarctica white at the bottom.

From history. In the dark winter of 1911, three men from Captain Robert Scott's expedition, Edward Wilson, Henry Bowers and Apsley Cherry-Garrard, pulled their sledges for weeks through bitter cold and darkness to reach an emperor penguin colony.

They wanted eggs for scientists to study. They brought back three eggs and made it back to their hut alive. Cherry-Garrard later wrote a book about it called *The Worst Journey in the World*, and the eggs are still kept at the Natural History Museum in London.

WORKED EXAMPLES

Example 1. On the map, start in Australia. Sail across the ocean to Antarctica, where the emperor penguins live. Which way do you sail: north or south?

(Use the map or drawing “Trace from the kangaroos to the penguins.” shown earlier in this lesson.)

1. North is at the top of the map and south is at the bottom.
2. Put your finger on Australia.
3. Slide your finger across the Southern Ocean to Antarctica. Your finger moved down the map.
4. Down the map is south.

Answer: You sail south. Antarctica is south of Australia.

PRACTICE

1. **EASY** Point to Australia on the globe. Then point to Antarctica.
2. **EASY** What is a baby kangaroo called? Where does it ride?
3. **EASY** Which is bigger: Australia or Antarctica?
4. **EASY** Seven emperor penguins are in a huddle. Five more waddle over to join them. How many penguins are in the huddle now?
5. **MEDIUM** Who keeps the emperor penguin egg warm in the winter, the mother or the father? Where does he hold it?

COMMON MISTAKES

- Thinking a koala is a bear. Koalas carry their babies in pouches, like kangaroos.
- Thinking penguins live at the North Pole. Almost all wild penguins live in the southern half of the world, and emperor penguins live in Antarctica.
- Thinking Antarctica is small because it looks like a thin strip on many flat maps. On a globe you can see it is almost twice as big as Australia.

Make it a game • Penguin Egg Shuffle. Each player puts a ball or a rolled-up sock on top of his or her feet as the “egg.” Shuffle together from one side of the room to the other without dropping it. If the egg rolls off, go back to the start. For a second round, everyone huddles close and shuffles together as one group, like a penguin huddle. Finish with a kangaroo hopping race back across the room.

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

“Manifold” means many and different. Lions and zebras, pandas and yaks, bison and sloths, kangaroos, koalas and penguins: God made them all with wisdom and gave each one a home.

Practice answers

1. The child points to Australia, south and east of Asia, and to Antarctica, the icy land around the South Pole at the bottom of the globe.
2. A joey. It rides in its mother’s pouch.
3. Antarctica. It is almost twice as big as Australia.
4. 12 penguins.
5. The father. He holds it on his feet, under a warm flap of skin on his belly.

UNIT 7 REVIEW

Read each question aloud. The child may answer aloud, point to the globe or map, or draw. The review is worth 20 points.

1. (3 pts) Point to Africa on the globe. What is the name of Africa's warm grassland, where lions and zebras live?
2. (3 pts) What do zebras eat? What is a family of lions called?
3. (3 pts) Point to Asia. What does the giant panda eat, and who lives higher up in the mountains, the panda or the yak?
4. (3 pts) Point to North America and South America. Which animal lives on the grassy plains, and which hangs upside down in the rain forest?
5. (3 pts) On a map, you go from the bison on the Great Plains to the sloths in the Amazon rain forest. Do you go north or south?
6. (3 pts) Name two animals in Australia that carry their babies in a pouch. What is the baby called?
7. (2 pts) Point to Antarctica. Which penguin lives there, and who keeps its egg warm in winter?

UNIT PROJECT: MY ANIMAL HOMELAND WORLD MAP

Over four lessons, make one big world map on poster board. Color the oceans blue and the homelands in their own colors: the savanna in Africa, the bamboo forests and high plateau in Asia, the Great Plains and the Amazon rain forest in the Americas, Australia's bush and Antarctica's ice. Glue a cut-out animal on each homeland: lion and zebra, panda and yak, bison and sloth, kangaroo and koala, and a huddle of emperor penguins. Finish by giving your family a tour of the map, pointing to each continent and telling one thing about each animal's home.

- **Right places:** Each animal is glued on the correct continent and in a sensible part of it (for example, the yak on the high plateau and the sloth near the equator in South America).
- **Homelands shown:** The oceans are blue and each homeland (savanna, bamboo forest, plateau, plains, rain forest, ice) is colored or marked.
- **Map tour:** The child points to each continent and tells, in his or her own words, which animals live there and one thing about their home.
- **Care:** The animals are drawn and cut out with care, the map is labeled "Animal Homelands," and it is neat enough to hang up.

Answer key

1. The child points to Africa. The grassland is the savanna.
2. Zebras eat grass. A family of lions is a pride.
3. The child points to Asia. Pandas eat bamboo. The yak lives higher up, on the high, cold Tibetan Plateau.

4. The child points to both continents. The bison lives on the plains; the sloth hangs in the rain forest.
5. South.
6. The kangaroo and the koala. The baby is called a joey.
7. The child points to the icy land at the bottom of the globe. The emperor penguin lives there, and the father keeps the egg warm on his feet.

EXPLORERS BY LAND AND SEA

“The earth is the LORD’s, and the fulness thereof; the world, and they that dwell therein” (Psalm 24:1). God made a world full of wide oceans, long rivers and tall mountains. People cannot walk across an ocean or swim up a river for months. But God gave people good minds and good gifts, wood, wool, wind and strong animals, and with them people built ships, canoes and wagons that carried them where their feet could not go.

In this unit you will sail west with **Leif Erikson** in a Norse ship about the year 1000, and cross the Atlantic Ocean with **Christopher Columbus** and his three small ships in 1492. You will paddle up the Missouri River with **Lewis and Clark**, Seaman the dog and **Sacagawea**, and walk beside a **covered wagon** on the Oregon Trail. You will build a little Norse ship, a fleet of paper sailing ships, a foil canoe and a shoebox wagon, and you will trace every journey on a map. In every story, look for the answer to one question: **what helped these travelers go where they could not walk?**

BEFORE YOU BEGIN

- Can point to north, south, east and west on a map (Unit 2)
- Knows that a map is a picture of a place from above, with a key (Unit 1)
- Can find the oceans and the continents of North America and Europe on a globe or world map
- Can count to 20

MASTERY CHECKLIST

- I can tell how Leif Erikson sailed west to Vinland in a Norse ship.
- I can name Columbus’s three ships and tell what pushed them across the ocean.
- I can tell how Lewis and Clark went up the Missouri River and how Sacagawea helped them.
- I can tell how pioneer families traveled west in covered wagons.
- I can trace the journeys of Leif Erikson, Columbus and Lewis and Clark on a map and show that they went west.

OPTIONAL BOOKS AND RESOURCES

- **Lewis and Clark National Historic Trail (National Park Service)**
(<https://www.nps.gov/lecl/>): Free. Maps, pictures and short stories about the places Lewis and Clark visited. A parent can pick a few pictures to show during Lesson 8.3.
- **Oregon National Historic Trail (National Park Service)**
(<https://www.nps.gov/oreg/>): Free. Photographs of Chimney Rock, Independence Rock and real wagon ruts still worn into the ground. Good to show during Lesson 8.4.

8.1 LEIF ERIKSON SAILS WEST ★ ⚙️

OBJECTIVES

- Tell the story of Leif Erikson, who sailed west from Greenland to a land he called Vinland about the year 1000.
- Name three parts of a Norse ship (the sail, the oars and the steering oar) and tell how the ship let people cross the sea.
- Find Norway, Iceland, Greenland and Vinland on a map and show that Leif sailed west.

Warm-up. Fill a sink or a tub with a little water. Set a plastic lid or a small plastic tray on the water. Blow on it gently from behind. Which way does it go? Now hold a sheet of paper up behind it like a sail and blow on the paper. Does it go faster? Tell your parent what pushed your little boat.

Video. Coming soon. A kid-friendly video under 8 minutes on Leif Erikson and the Viking ships, or a read-aloud of a picture book about Leif Erikson: search Drive Thru History, Smithsonian and Homeschool Pop (Alternate); candidates needing vetting: National Geographic Kids, Free School, Brightly Storytime-style read-alouds.

KEY TERMS

explorer

A person who travels to find out about a place he or she has never seen.

Norse

The people of long ago from Norway and the lands nearby. Some of them were the sea raiders we call Vikings.

sail

A big piece of cloth on a ship that catches the wind so the wind can push the ship.

voyage

A long trip, most often by ship across the sea.

CORE IDEAS

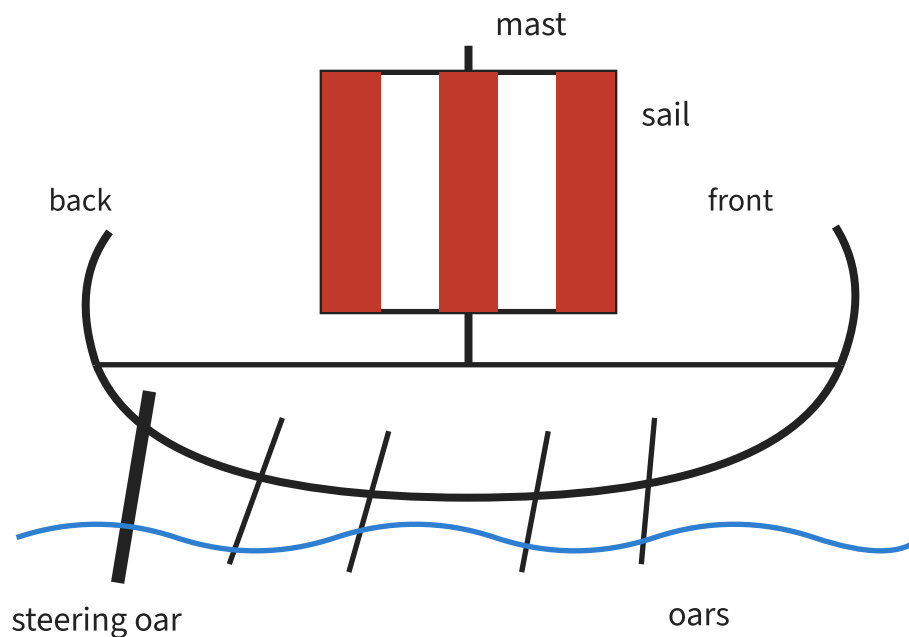
The story. About a thousand years ago, around the year 1000, a tall, strong man named Leif Erikson lived in Greenland. Greenland is a huge, icy island far to the north. Leif's father was Erik the Red, who had led Norse families to live there. Leif heard about a sailor who had been blown off course and had seen a strange new land far to the west. So Leif got a ship and a crew of about thirty-five men, and they sailed west to find it.

How it worked. Leif sailed in a Norse ship. It was made of long wooden boards that overlapped, like the shingles on a roof. That made it strong but light, so it rode up and over the waves. It had one big square **sail** made of wool. When the wind blew, the sail caught it and pushed the ship. When there was no wind, the men pulled long **oars**. At the back, on the

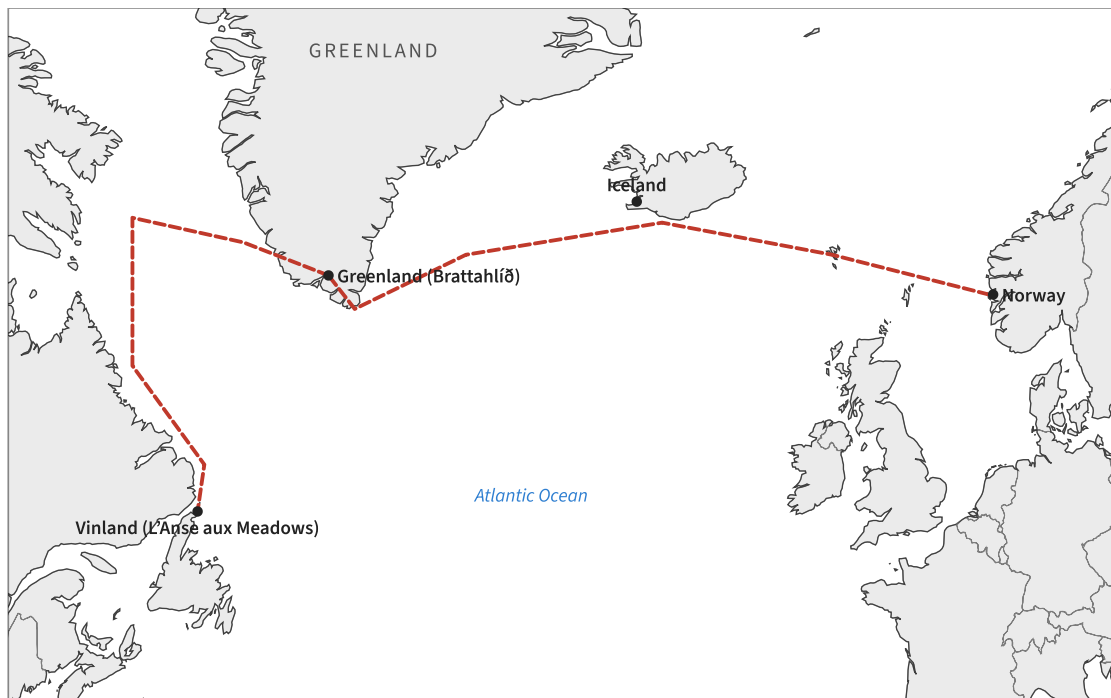
right side, was a big steering oar to turn the ship. The Norse called that side the “steer board.” Sailors today still call the right side of a ship *starboard*.

Technology overcoming geography. People cannot walk across the ocean. But God gave people wood, wool and wind, and good minds to put them together. With a ship, the Norse could cross the cold sea from Norway to Iceland, from Iceland to Greenland, and from Greenland all the way to North America. Leif passed a rocky land and a land of forests. At last he came to a land with grass, salmon in the rivers and, the old stories say, wild grapes. He named it **Vinland**, which means “wine land.” The Norse built houses there for a little while and then sailed home.

On the map. Find Norway on the right side of the map. Move your finger left, which is west, to Iceland, then to Greenland. Keep going west and a little south across the sea to Vinland. The Norse camp we have found there is at the tip of a big island we now call Newfoundland, in Canada. Leif reached North America almost five hundred years before Columbus. The old stories also tell us that Leif was a Christian and helped bring the good news of Jesus to the people of Greenland.



A Norse ship. Find the sail, the mast, the oars and the steering oar.



The Norse sailed west from Norway to Iceland and Greenland. Leif sailed on from Greenland to Vinland.

PICTURE STUDY



Leiv Eirikson Discovering America, Christian Krohg, 1893 · Oil on canvas · National Museum of Norway, Oslo

Christian Krohg was a painter from Norway, the land the Norse sailors came from. He liked to paint sailors and people who worked on the sea. In this big painting he shows the moment when Leif Erikson and his men first see the new land far to the west.

Krohg painted it in 1893, about nine hundred years after Leif's voyage. Nobody had a photograph of Leif, so Krohg had to imagine how he looked. The painting hangs today in the National Museum of Norway, in the city of Oslo.

Look closely

- Find Leif. Where on the ship is he standing? Why is that a good place for the leader to stand?
- Look at the men behind Leif. What are they doing? Can you find any oars?
- Look at the sea. Is it calm or rough? How can you tell?
- Can you find the sail or the edge of the ship?

Talk about it

1. How do you think the men felt when they saw land after many days at sea?
2. Would you like to sail on a ship like this? What would you bring?

PROJECT: MY FLOATING NORSE SHIP

You will make a little Norse ship with a square sail and oars, float it in a tub of water, and use your own "wind" to sail it across the sea.

You will need

- A clean foam meat tray, a kitchen sponge or a small plastic tub lid (for the ship)
- A drinking straw or a wooden skewer (for the mast)
- A small square of paper (for the sail)
- Crayons or markers (red and white for stripes)
- Six toothpicks (for oars)
- Tape and a lump of play dough or clay
- A tub, sink or baking pan with a little water

Steps

1. With a parent, cut the tray or sponge into a long boat shape, pointed at both ends.
2. Color the paper square with stripes, like a Norse sail. Write your name on it if you like.
3. Poke the straw through the top and bottom of the sail so it stands up like a mast.
4. Press a small lump of play dough into the middle of the ship and stand the mast in it.
5. Tape three toothpick oars along each side of the ship.
6. Float the ship. Kneel down and blow on the sail from behind. Watch the wind push your ship across the "sea."
7. Now take the sail off and push the ship with one finger, like rowing. Which way was easier?

Tips

- If the ship tips over, use a smaller lump of play dough or a shorter mast.

- Put a book at one end of the tub for Norway and a sponge at the other end for Vinland, and sail from one to the other.

Check your work

- I can point to the sail, the mast and the oars on my ship.
- I can tell what pushes a sailing ship across the sea.

MAP NOTEBOOK

1. Draw Leif's ship on the sea. Give it a striped square sail and a row of oars.
2. Draw four islands in a row from right to left. Label them Norway, Iceland, Greenland and Vinland, and draw an arrow pointing west.
3. Draw what Leif found in Vinland: grass, trees, a river with a salmon, and grapes.

From history. For hundreds of years, many people thought the Vinland stories were only legends. Then in 1960 a Norwegian explorer, Helge Ingstad, and his wife Anne Stine Ingstad, an archaeologist, found the remains of Norse houses at a place called L'Anse aux Meadows, at the northern tip of Newfoundland in Canada. They dug up iron nails, a bronze cloak pin and the floors of sod houses. Later, scientists studied wood cut by the Norse there and found it was cut in the year 1021. Apart from Greenland, it is the only place in North America where we are sure the Norse lived.

WORKED EXAMPLES

Example 1. Look at the map. Leif sailed from Greenland to Vinland. Which way did he go: east or west?

(Use the map or drawing "Follow the red line from Greenland to Vinland." shown earlier in this lesson.)

1. On this map, north is at the top. So west is on the left and east is on the right.
2. Put your finger on Greenland. Then find Vinland.
3. Move your finger from Greenland to Vinland. Your finger moves to the left (and a little down).

Answer: West (and a little south). Left on the map is west.

PRACTICE

1. **EASY** Point to the sail on the Norse ship picture. What pushes the sail?
(Use the map or drawing "Point to the sail." shown earlier in this lesson.)
2. **EASY** When there was no wind, how did the Norse men move their ship?
3. **EASY** On the map, count the places from Norway to Vinland: Norway, Iceland, Greenland, Vinland. How many are there?
4. **MEDIUM** What did Leif name the new land? What does the name mean?

5. **MEDIUM** Who came to North America first, Leif Erikson or Columbus?

COMMON MISTAKES

- Thinking the Norse ship had an engine. It had only a sail for the wind and oars for the men to pull.
- Mixing up Greenland and Iceland. Greenland is the big one to the west; Iceland is the smaller one between Greenland and Norway.
- Thinking Columbus was the first person from Europe to reach North America. Leif Erikson came first, about the year 1000.

Make it a game • Row, Row, Sail! Lay four pillows across the floor in a line for Norway, Iceland, Greenland and Vinland. Start at Norway. A parent calls “Wind!” and you hold up your arms like a sail and glide to the next pillow. The parent calls “No wind!” and you sit and row with your arms. Name each place as you land on it. When you reach Vinland, shout “Land ho!” and tell one thing Leif found there.

Scripture. “If I take the wings of the morning, and dwell in the uttermost parts of the sea; Even there shall thy hand lead me, and thy right hand shall hold me.” (Psalm 139:9–10, KJV)

Leif sailed far across the cold sea to the edge of the world he knew. No sea is so wide that God is not there. He leads and holds His people wherever they go.

Practice answers

1. The wind.
2. They rowed with oars.
3. 4.
4. Vinland. It means “wine land,” because of the grapes.
5. Leif Erikson, about the year 1000, almost five hundred years before Columbus.

8.2 COLUMBUS CROSSES THE OCEAN ★ ⚙️

OBJECTIVES

- Tell the story of Christopher Columbus and his three ships, the Niña, the Pinta and the Santa María, and their voyage across the Atlantic Ocean in 1492.
- Tell how sails and steady winds carried the ships west, and how a compass helped Columbus keep going the right way.
- Trace Columbus's voyage on a map from Spain to the Canary Islands to the Bahamas.

Warm-up. Set a fan or a hair dryer on cool on one side of a table. Put a paper cup on its side in front of it and turn the fan on low. What happens to the cup? Now stand up a book in front of the cup like a wall. Does the cup still move? Talk with your parent: the wind can push things, and a sail is a way to catch the wind.

Video. Coming soon. A kid-friendly video under 8 minutes on Christopher Columbus and his three ships, or a read-aloud of a picture book about Columbus's 1492 voyage: search Drive Thru History, Smithsonian, Library of Congress and Homeschool Pop (Alternate); candidates needing vetting: Brightly Storytime-style read-alouds, Free School.

KEY TERMS

ocean

A very big, very deep body of salt water. The Atlantic Ocean lies between Europe and America.

compass

A tool with a needle that always points north, so a sailor can tell which way to go.

crew

The people who work together on a ship.

trade winds

Steady winds that blow over the ocean in the same direction day after day.

CORE IDEAS

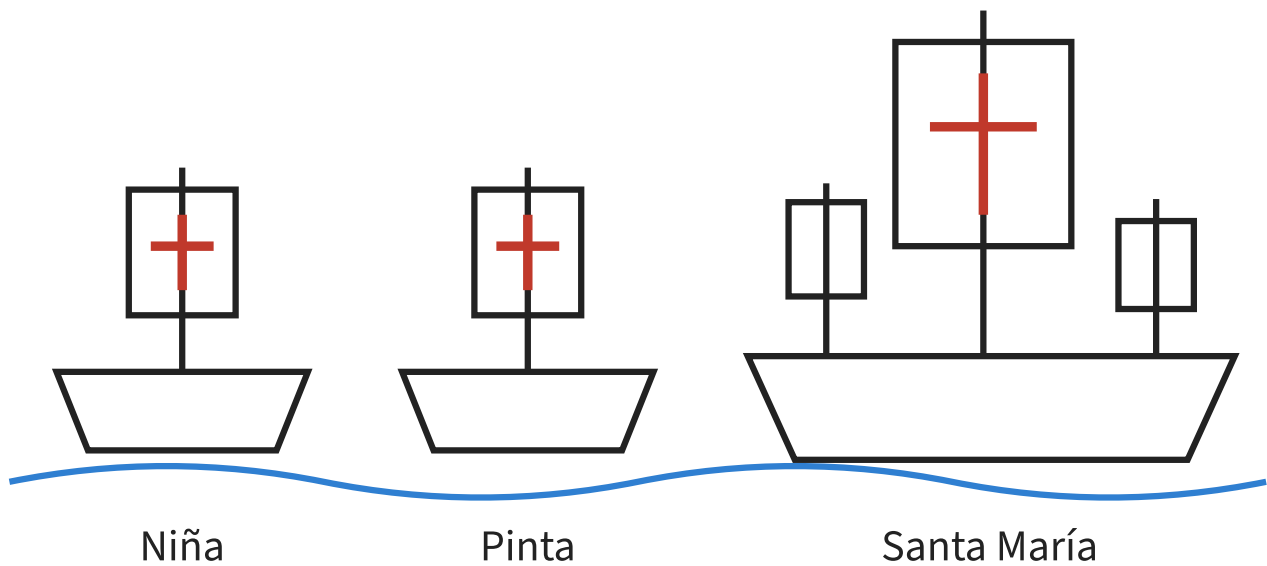
The story. Christopher Columbus was a sailor from the city of Genoa, in Italy. He believed that if he sailed west across the ocean, he could reach the rich lands of Asia, which people then called the Indies. For years he asked kings and queens for ships. At last King Ferdinand and Queen Isabella of Spain said yes. On August 3, 1492, Columbus sailed from the little port of Palos, in Spain, with three small ships: the **Niña**, the **Pinta** and the **Santa María**. About ninety men were in his **crew**.

How it worked. First the ships sailed south to the Canary Islands. Then Columbus turned west into the open **ocean**. Day after day there was nothing but water. But God made steady winds, called **trade winds**, that blow from the east in that part of the sea. They filled the

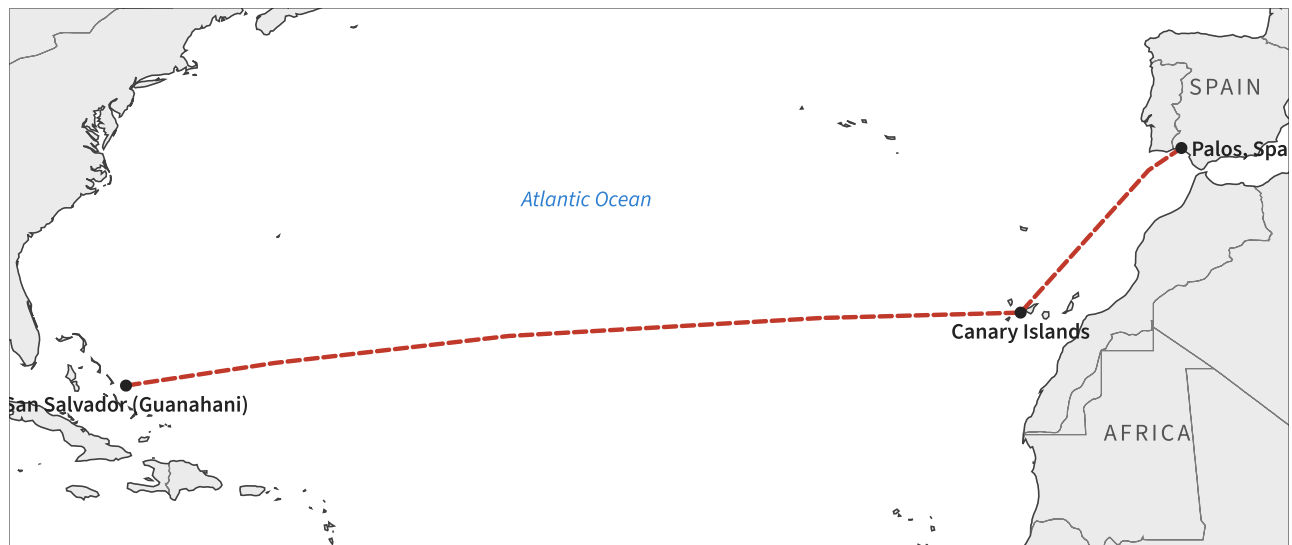
sails and pushed the ships west. Columbus used a **compass** to keep going the right way, and he guessed each day how far they had gone. The men grew afraid and wanted to turn back. Then, early in the morning of October 12, 1492, a sailor on the Pinta shouted, "Land!"

Technology overcoming geography. The ocean was too wide to row across and too stormy for little boats. But the sailing ship, the compass and the wind made it possible. Columbus had not found Asia. He had reached an island in the Bahamas, near America. People already lived there: the Taíno people, who called the island Guanahani. They came out to meet the ships. Sadly, Columbus and the Spanish who came after him did great wrongs to the Taíno. They took their land and forced many of them to work. That was wrong.

On the map. Find Spain on the right side of the map. Trace the red line south to the Canary Islands, then west across the wide Atlantic Ocean to the Bahamas. The trip from the Canary Islands took about five weeks. Columbus made four voyages to America in all. After him, ships crossed back and forth between Europe and America, and the two halves of the world were joined.



Columbus's three ships. The Santa María was the biggest.



Columbus's first voyage, 1492.

PICTURE STUDY



Landing of Columbus, John Vanderlyn, 1847 (ordered by Congress in 1836) · Oil on canvas · The Rotunda of the United States Capitol, Washington, D.C.

John Vanderlyn was an American painter from New York. The United States Congress asked him to paint the moment when Columbus stepped onto the island in 1492. The painting is huge, much bigger than a car. It hangs in the round hall in the middle of the Capitol building in Washington, D.C., where the laws of our country are made.

Vanderlyn painted it more than three hundred years after Columbus landed, so he had to imagine much of it. Look closely, because there are many people in it, and they are not all doing the same thing.

Look closely

- Find Columbus. What is he holding up high?
- Find the sailors. Some are kneeling. What are some of the others doing?
- Look at the edge of the picture for the people who already lived on the island. Where are they?
- Find the ships out on the water. How do you think the men got from the ships to the beach?

Talk about it

1. How do you think the sailors felt after five weeks on the ocean?
2. How do you think the Taíno people felt when they saw the strange ships and men?
3. What would you want to see first if you came to a new island?

PROJECT: A FLEET OF PAPER SAILING SHIPS

You will make three paper sailing ships, the Niña, the Pinta and the Santa María, and test them in a tub of water with a fan or your own breath for wind.

You will need

- Three sheets of paper (one larger sheet for the Santa María) or three small foam trays
- Three drinking straws or wooden skewers
- Three small paper squares for sails, and crayons (draw a red cross on each sail, as the ships had)
- Play dough or clay, and tape
- A tub or baking pan with a little water
- A fan or a straw to blow through

Steps

1. With a parent, fold each sheet of paper into a paper boat. (Or cut three boat shapes from foam trays.) Make the Santa María the biggest.
2. Draw a red cross on each paper sail.
3. Poke a straw through each sail to make a mast.
4. Press a little play dough into the bottom of each boat and stand the mast in it.
5. Write a name on each ship: Niña, Pinta, Santa María.
6. Put a block at one end of the tub for Spain and a sponge at the other end for the island. Float your ships at Spain.
7. Make wind from behind with the fan or by blowing. Which ship reaches the island first?

Tips

- Paper boats get soggy after a few minutes. Race them quickly, or cover them with clear tape first.

- Try turning the sail sideways. Does the ship still go straight?

Check your work

- I can name Columbus's three ships.
- I can show how the wind pushes a sail.

MAP NOTEBOOK

1. Draw the three ships in a row. Make the Santa María the biggest. Write their names under them.
2. Draw a compass with a needle pointing north. Write N at the tip.
3. Draw the island the sailors saw, with palm trees and a beach, and the Taíno people who lived there.

From history. The Santa María never sailed home. On Christmas Eve night in 1492, while a young boy was steering, she ran onto a reef off the island of Hispaniola and was wrecked on Christmas Day. Columbus used her wood to build a little fort on shore and sailed back to Spain in the Niña, with the Pinta following. The Pinta was known as the fastest of the three ships.

WORKED EXAMPLES

Example 1. Look at the picture of the three ships. Which ship is the biggest? How many ships did Columbus have?

(Use the map or drawing "Count the ships and find the biggest one." shown earlier in this lesson.)

1. Look at all three ships. Point to each one and count: one, two, three.
2. Now look at their size. Two ships are smaller and about the same size.
3. The ship on the right is bigger than the others. Read its name: Santa María.

Answer: The Santa María was the biggest. Columbus had 3 ships.

PRACTICE

1. **EASY** Say the names of Columbus's three ships.
2. **EASY** Point to Spain on the map. Then trace Columbus's route with your finger. Which way did he sail across the ocean, east or west?
(Use the map or drawing "Trace the red line." shown earlier in this lesson.)
3. **EASY** What pushed Columbus's ships across the ocean?
4. **MEDIUM** The trip from the Canary Islands to the new island took about five weeks. Hold up one finger for each week. How many fingers are you holding up?
5. **MEDIUM** Columbus thought he had reached Asia. Where was he really?

COMMON MISTAKES

- Thinking Columbus was the first person to come to America. The Taíno and many other peoples already lived there, and Leif Erikson had sailed to North America about five hundred years before.
- Thinking Columbus landed in the United States. His first landing was on an island in the Bahamas, southeast of Florida.
- Thinking people in 1492 believed the world was flat. Educated people knew it was round. The question was how far it was to Asia, and Columbus guessed too short.

Make it a game • Land Ho!. One player is the lookout and stands on a chair (with a parent close by) holding a paper tube for a spyglass. The others are the crew and “sail” around the room, swaying like a ship. A parent hides a toy island (a green towel or a pillow) somewhere in the house. The lookout watches, and when the crew sails near it, the lookout shouts “Land!” just as the sailor on the Pinta did. Take turns being the lookout.

Scripture. “They that go down to the sea in ships, that do business in great waters; These see the works of the LORD, and his wonders in the deep.” (Psalm 107:23-24, KJV)

Sailors on the wide ocean see the wonders God made: the deep water, the steady winds and the stars at night. God made the trade winds that carried Columbus west long before any ship sailed on them.

Practice answers

1. The Niña, the Pinta and the Santa María.
2. West.
3. The wind (the trade winds) blowing on the sails.
4. 5.
5. On an island in the Bahamas, near America, where the Taíno people lived.

8.3 LEWIS AND CLARK GO WEST

OBJECTIVES

- Tell the story of Meriwether Lewis, William Clark and their team, who traveled up the Missouri River and over the mountains to the Pacific Ocean from 1804 to 1806.
- Tell how boats and canoes, horses and the help of Sacagawea and the Shoshone made the long trip possible.
- Trace the route on a map from St. Louis, up the Missouri River, over the Rocky Mountains and down the Columbia River to the Pacific.

Warm-up. Fill a long baking pan with water and tilt it a little by putting a book under one end. Drop a cork or a bottle cap at the high end and watch it float down. Now try to push it back up to the high end with a straw by blowing. Is it harder to go up or down? Going up a river is called going upstream. Lewis and Clark had to go upstream for a long, long way.

Video. Coming soon. A kid-friendly video under 8 minutes on Lewis and Clark, Sacagawea and the Corps of Discovery, or a read-aloud of a picture book about Lewis and Clark or Seaman the dog: search Drive Thru History, Smithsonian, Library of Congress and Homeschool Pop (Alternate); candidates needing vetting: National Park Service (Lewis and Clark National Historic Trail), Brightly Storytime-style read-alouds.

KEY TERMS

river

Water that flows in a long path downhill to a lake or the sea.

upstream

Going against the flowing water of a river, toward where it starts. It is hard work.

canoe

A long, narrow boat that people move with paddles. Some are made by hollowing out a big log.

guide

A person who knows the way and helps others find it.

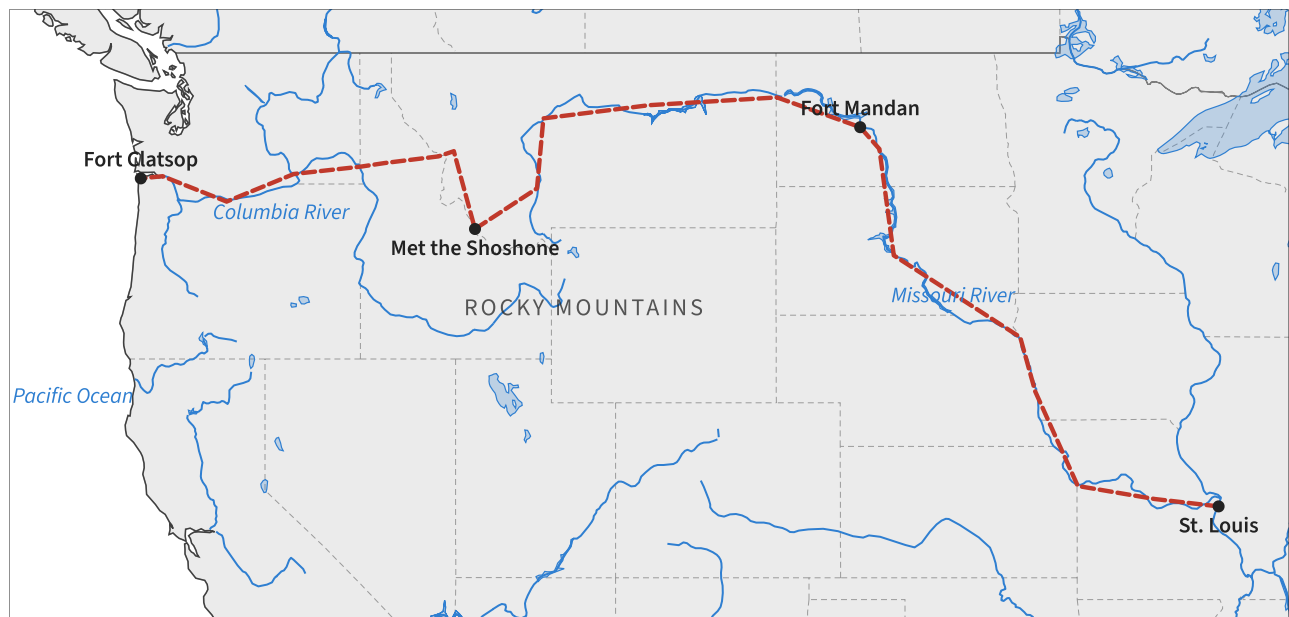
CORE IDEAS

The story. In 1803 the United States bought a huge piece of land west of the Mississippi River. President Thomas Jefferson wanted to know what was there. So he sent two brave men, Meriwether Lewis and William Clark, with a team of about forty men. They called it the Corps of Discovery. Lewis brought his big black Newfoundland dog, Seaman. Clark brought York, a Black man whom Clark held as a slave; York worked as hard as anyone on the trip. In May 1804 they started from near St. Louis and pushed their boats up the Missouri River.

How it worked. The Missouri River flows toward St. Louis, so the men had to go **upstream**, against the water. They rowed, poled and sometimes pulled their boats with ropes from the shore. In the first winter they stayed with the Mandan people in what is now North Dakota. There they met Sacagawea, a young Shoshone woman, and her husband. In the spring she came along with her new baby boy on her back. She knew some of the land and could speak with the Shoshone people.

Technology overcoming geography. Boats could not climb the Rocky Mountains. The men needed horses. When they met the Shoshone, Sacagawea saw that their chief was her own brother, whom she had not seen for years! The Shoshone traded horses to the explorers, and the Nez Perce people helped them too. On the far side of the mountains, the men made **canoes** by hollowing out big pine logs. Now the rivers flowed their way, and they paddled downstream to the Columbia River. In November 1805 they reached the Pacific Ocean. Clark wrote in his notebook, "Ocian in view! O! the joy." (He spelled it his own way.)

On the map. Put your finger on St. Louis, on the right side of the map. Follow the Missouri River up and to the left, which is north and west, to the Mandan villages. Keep going west over the Rocky Mountains, then down the Columbia River to the Pacific Ocean. The team spent the winter near the ocean and came all the way home to St. Louis in September 1806. They had been gone more than two years.



The route of Lewis and Clark, 1804-1806.

PICTURE STUDY



Lewis and Clark on the Lower Columbia, Charles M. Russell, 1905 · Watercolor on paper · Amon Carter Museum of American Art, Fort Worth, Texas

Charles M. Russell was a painter who lived in Montana, where Lewis and Clark had traveled about a hundred years before him. He loved the West and painted cowboys, horses and the Native peoples of the plains and mountains.

In this painting the explorers are on the Columbia River, near the end of their trip to the ocean. Russell shows Sacagawea using her hands to speak with people who lived along the river. Many tribes used hand signs so they could talk even when they spoke different languages.

Look closely

- Find Sacagawea. What is she doing with her hand?
- Find Lewis and Clark. Are they standing or sitting?
- Count the canoes you can see. Are they long or short? How do the people move them?
- Look at the water and the sky. Is it a calm day or a stormy day?

Talk about it

1. Why was it so important that Sacagawea could talk with the people they met?
2. If you met someone who spoke a different language, how could you say “hello” and “friend” with your hands?

PROJECT: A FOIL CANOE THAT CARRIES CARGO

Lewis and Clark’s canoes had to carry men, food, tools and gifts. You will shape a canoe from foil and find out how much cargo it can carry before it sinks.

You will need

- A square of aluminum foil about as big as a sheet of paper
- A tub or sink with water
- Pennies, dried beans or small washers (about 20) for cargo
- A towel

Steps

1. Fold the foil in half to make it stronger.
2. Shape it into a long, narrow canoe. Pinch up the sides and the two ends so water cannot get in.
3. Float your canoe in the water.
4. Load one penny at a time, near the middle. Count out loud as you go.
5. Keep counting until the canoe tips or sinks. How many pennies did it carry?
6. Now make a second canoe that is wider and flatter. Does it carry more or fewer pennies?

Tips

- Spread the pennies out evenly. A canoe tips over when all the cargo is on one side.
- Keep a towel close by, because canoe testing gets splashy!

Check your work

- I can tell how many pennies my canoe carried.
- I can tell why the men needed horses to cross the mountains.

MAP NOTEBOOK

1. Draw a long canoe on a river with men paddling. Add Seaman the dog in the canoe.
2. Draw Sacagawea with her baby on her back.
3. Draw a wavy river that runs from mountains on the left to a town on the right. Write St. Louis by the town and draw an arrow showing that Lewis and Clark went upstream.

From history. Sacagawea's baby, Jean Baptiste, was born in February 1805 at Fort Mandan, just a few weeks before the trip went on. William Clark grew very fond of the little boy and nicknamed him "Pomp." On the way home, Clark named a tall rock by the Yellowstone River in Montana "Pompy's Tower" after him. Today it is called Pompeys Pillar, and you can still see where Clark carved his own name and the date, July 25, 1806, into the rock.

WORKED EXAMPLES

Example 1. Look at the map. Lewis and Clark started at St. Louis and went to Fort Clatsop by the Pacific Ocean. Which way did they go: east or west? Is the ocean on the left or the right side of the map?

(Use the map or drawing “Find the start and the end of the trip.” shown earlier in this lesson.)

1. On this map, north is at the top. So west is on the left and east is on the right.
2. Find St. Louis. It is on the right side of the map.
3. Find Fort Clatsop by the Pacific Ocean. It is on the left side of the map.
4. Going from right to left on the map is going west.

Answer: They went west. The Pacific Ocean is on the left side of the map.

PRACTICE

1. **EASY** What was the name of Lewis’s big black dog?
2. **EASY** Point to the Missouri River on the map. Did Lewis and Clark paddle up the river or down the river from St. Louis?
(Use the map or drawing “Find the Missouri River.” shown earlier in this lesson.)
3. **EASY** Boats could not go over the Rocky Mountains. What animals did the explorers get to cross them?
4. **MEDIUM** Who was Sacagawea, and how did she help?
5. **MEDIUM** Lewis and Clark left in May 1804 and came home in September 1806. Were they gone more than one year or less than one year?

COMMON MISTAKES

- Thinking Lewis and Clark rode in canoes all the way. They used a big keelboat and other boats on the Missouri, walked and rode horses over the mountains, and made canoes on the other side.
- Thinking Sacagawea led the whole trip by herself. She was a great help, especially with the Shoshone, but many people helped, including the Mandan, the Shoshone and the Nez Perce.
- Thinking the land was empty. Many Native nations lived all along the way, and Lewis and Clark met dozens of them.

Make it a game • Upstream, Downstream. Lay a long rope or a row of towels on the floor for the river. Mark one end “mountains” and the other end “St. Louis.” A parent calls “Upstream!” and you walk slowly toward the mountains, pretending to pull a heavy boat with a rope. The parent calls “Downstream!” and you paddle quickly back toward St. Louis. When the parent calls “Mountains!” you gallop on your pretend horse. Finish by shouting Clark’s words: “Ocean in view! O! the joy!”

Scripture. “And hath made of one blood all nations of men for to dwell on all the face of the earth, and hath determined the times before appointed, and the bounds of their habitation;” (Acts 17:26, KJV)

On their trip Lewis and Clark met many nations: the Mandan, the Shoshone, the Nez Perce, the Chinook and more. God made all of them, and all of us, from one family, and He placed each people in its land.

Practice answers

1. Seaman.
2. Up the river (upstream), against the flowing water.
3. Horses.
4. A young Shoshone woman. She could speak with the Shoshone, knew some of the land and helped them get horses from her brother's people.
5. More than one year. They were gone more than two years.

8.4 COVERED WAGONS ⚙️

OBJECTIVES

- Tell how families traveled west in covered wagons on the Oregon Trail, starting with the big wagon train of 1843.
- Tell how the covered wagon and its team of oxen carried a family's whole home across the plains and mountains.
- Count squares on a picture map of the trail and trace the journeys of this unit on a world map.

Warm-up. Get a small box or a laundry basket. Your family is moving far away, and everything must fit in this box! Choose five things from your room to take. Then put them in. Do they fit? Take out the one thing you need the least. Tell your parent why you chose what you kept.

Video. Coming soon. A kid-friendly video under 8 minutes on covered wagons and pioneer families on the Oregon Trail, or a read-aloud of a picture book about a pioneer family going west by wagon: search Drive Thru History, Smithsonian, The Henry Ford and Homeschool Pop (Alternate); candidates needing vetting: National Park Service (Oregon National Historic Trail), Brightly Storytime-style read-alouds.

KEY TERMS

pioneer

One of the first people to go and live in a new place.

covered wagon

A big wooden wagon with a cloth top stretched over hoops, pulled by oxen, mules or horses.

trail

A path that many people follow across the land.

plains

Wide, flat lands covered with grass, where you can see a long, long way.

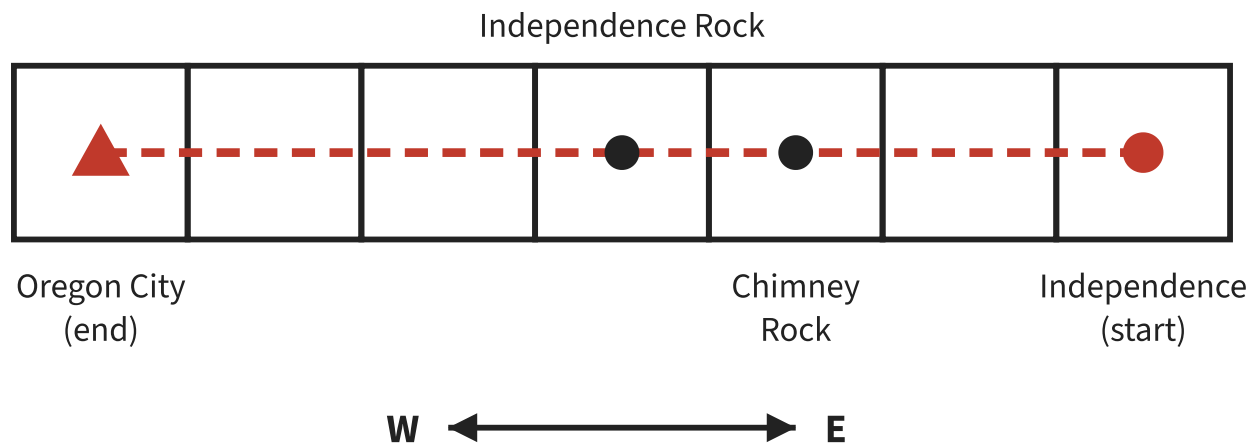
CORE IDEAS

The story. In May 1843, about one thousand people gathered near the town of Independence, Missouri. They had more than a hundred covered wagons and thousands of cows and oxen. Fathers, mothers, grandparents, boys, girls and babies were all going west to Oregon, far away by the Pacific Ocean. They wanted good farmland and a new home. People later called it the Great Migration. After them, many more families came, year after year, on the same **trail**. We call it the Oregon Trail.

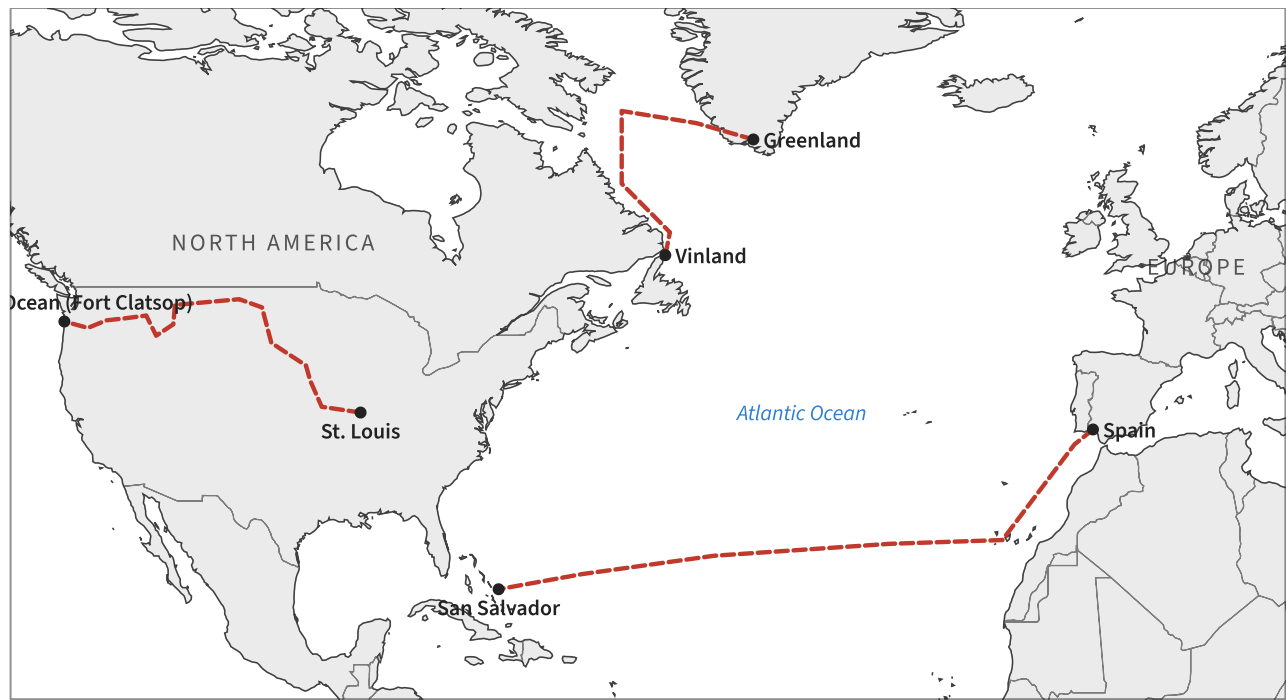
How it worked. A **covered wagon** was a wooden box on four big wheels, about as long as a small car is today. Wooden hoops held a cloth cover over the top to keep out sun and rain. From far away, a line of white wagon tops looked like ships sailing on a sea of grass, so people called them “prairie schooners.” A schooner is a kind of sailing ship. Most wagons were pulled by oxen, which are big, strong, patient cattle. The wagon was packed full of flour, bacon, beans, tools, seeds, pots and clothes. So the family mostly walked beside it, mile after mile!

Technology overcoming geography. The trip was about two thousand miles long and took about five months. The wagons rolled over the flat **plains**, crossed wide rivers and climbed slowly over the Rocky Mountains. Families looked for landmarks. Chimney Rock looked like a tall chimney sticking up from the plains. At Independence Rock, many people carved or painted their names. The wagon trail also crossed the lands of Native nations, such as the Pawnee, the Lakota and the Shoshone. Often they traded with the travelers. But as more and more settlers came, the Native peoples lost much of their land.

On the map. In this unit you have followed four journeys, and every one went **west**. Leif Erikson sailed west in a Norse ship. Columbus sailed west with three ships. Lewis and Clark went west by boat, horse and canoe. Pioneer families went west in covered wagons. Each time, a ship, a canoe or a wagon helped people go where their feet alone could not take them.



A picture map of the Oregon Trail. The wagons rolled from right to left, which is west.



Three great journeys west.

PICTURE STUDY



Ships of the Plains, Samuel Colman, 1872 · Oil on canvas · Union League Club of New York

Samuel Colman was an American painter who traveled to the West and painted its wide lands and big skies. He named this painting *Ships of the Plains* because the white tops of the wagons look like the sails of ships on a sea of grass.

Look how small the wagons and people seem under the huge sky. Colman wanted us to feel how big the plains were and how long the trip was.

Look closely

- Count the wagons you can see. How many are there?
- Find the animals pulling the wagons. Are they horses or oxen?
- Find people walking beside the wagons. Why do you think they are walking and not riding?
- Look at the land. Is it flat or full of hills? Are there many trees?

Talk about it

1. Why do the wagons look like ships? What part looks like a sail?
2. How would you feel walking beside the wagon all day long?

PROJECT: A SHOEBOX COVERED WAGON

You will build a covered wagon from a shoebox and then pack it for the long trip west, choosing only what will fit.

You will need

- A shoebox (without its lid)
- Four paper plates or cardboard circles for wheels
- Four brass paper fasteners or tape
- Three pipe cleaners or strips of cardboard for hoops
- A white paper towel, napkin or piece of white cloth for the cover
- Glue or tape, crayons
- Small things to pack: dried beans, a little bag of flour, a toy pot, a spoon, a scrap of cloth, a seed packet

Steps

1. Color the shoebox brown like wood.
2. With a parent, fasten two wheels on each long side of the box with paper fasteners or tape. Make the back wheels bigger if you have big plates; real wagons had bigger back wheels.
3. Bend the pipe cleaners into arches and tape their ends inside the box, one at the front, one in the middle and one at the back.
4. Lay the white cover over the hoops and tape or glue the edges to the box.
5. Now pack your wagon. Lay out your small things and decide: food first, then tools, then one special thing.
6. Pull your wagon across the floor from the “east” wall to the “west” wall of the room with a string.

Tips

- Tie a string to the front of the box so you can pull it like a team of oxen.

- Many pioneer families packed a Bible and seeds for their new farm. What would you pack that you cannot buy on the trail?

Check your work

- I can point to the wheels, the hoops and the cover on my wagon.
- I can name three things a pioneer family packed.

MAP NOTEBOOK

1. Draw a covered wagon with a white top and a team of oxen pulling it.
2. Draw Chimney Rock standing tall on the flat plains.
3. Draw a pioneer family walking beside their wagon. Draw yourself walking with them.

From history. Before the big wagon trains, a few missionaries had already gone west. In 1836 Marcus Whitman and his wife Narcissa traveled with Henry and Eliza Spalding to bring the gospel to the Native peoples of the Oregon Country. Narcissa Whitman and Eliza Spalding were the first women from the eastern United States known to cross the Rocky Mountains on the way to Oregon. Their letters home helped show families back east that women and children could make the long trip.

WORKED EXAMPLES

Example 1. Look at the picture map of the Oregon Trail. Count the squares the wagons moved from Independence to Oregon City.

(Use the map or drawing “Count the squares from Independence to Oregon City.” shown earlier in this lesson.)

1. Find Independence. It is in the square on the far right, where the trip starts.
2. Find Oregon City. It is in the square on the far left, where the trip ends.
3. Put your finger on Independence. Move one square at a time to the left and count each move: 1, 2, 3, 4, 5, 6.
4. Your finger is on Oregon City after 6 moves.

Answer: 6 squares, all going west (to the left).

PRACTICE

1. **EASY** On the picture map, count the squares from Independence to Chimney Rock.
(Use the map or drawing “Count the squares.” shown earlier in this lesson.)
2. **EASY** What animals pulled most covered wagons?
3. **EASY** Why did people call covered wagons “prairie schooners”?
4. **MEDIUM** Match each traveler to the way he traveled: Leif Erikson, Columbus, pioneer families. Ways: covered wagon, three sailing ships, Norse ship.

5. **MEDIUM** Look at the map of three journeys. Point to each red route. Which way did all of them go, east or west?

(Use the map or drawing "Point to each journey." shown earlier in this lesson.)

COMMON MISTAKES

- Thinking the family rode inside the wagon all day. The wagon was full of supplies, so most people walked beside it.
- Thinking horses pulled most wagons. Most families used oxen, which were slow but strong and could live on the grass along the trail.
- Thinking the trip took a few days. It took about five months to go about two thousand miles.

Make it a game • Pack the Wagon. A parent sets out about twelve things on the floor, some useful for the trail (a pot, a blanket, a bag of beans, a hammer, a Bible) and some silly (a bowling ball, a fancy hat, a piano book). Your wagon (a laundry basket) can hold only six. Choose six and tell why each one will help your family on the trail. Then take turns: one person names a trail problem ("The river is deep!" "It is cold tonight!"), and the other tells which packed thing will help.

Scripture. "Now the LORD had said unto Abram, Get thee out of thy country, and from thy kindred, and from thy father's house, unto a land that I will shew thee:" (Genesis 12:1, KJV)

Long ago, Abram and his family packed up and traveled far to a new land, trusting God along the way. Pioneer families also left home for a land they had never seen, and many of them prayed for God's help every day of the trail.

Practice answers

1. 2 squares.
2. Oxen.
3. Their white tops looked like the sails of ships on a sea of grass.
4. Leif Erikson: Norse ship. Columbus: three sailing ships. Pioneer families: covered wagon.
5. West.

UNIT 8 REVIEW

A parent reads each question aloud. The child answers out loud, points on a map or draws. Give partial points for partly right answers. The review is worth 20 points.

1. (2 pts) Who sailed from Greenland to a land he called Vinland about the year 1000?
2. (3 pts) Point to two parts of a Norse ship in your drawing or model: the part that catches the wind and the parts the men pulled when there was no wind. Name them.
3. (3 pts) Name Columbus's three ships. Which one was the biggest?
4. (2 pts) On a map, point to Spain and then to the Bahamas. Which way did Columbus sail across the ocean?
5. (3 pts) Who was Sacagawea, and how did she help Lewis and Clark?
6. (2 pts) Lewis and Clark used boats, horses and canoes. Which one did they need to cross the Rocky Mountains?
7. (3 pts) Name three things a pioneer family might pack in a covered wagon. What animals pulled most wagons?
8. (2 pts) On the picture map of the Oregon Trail, count the squares from Independence to Independence Rock.

UNIT PROJECT: MY EXPLORERS' MAP

On a large printed or hand-drawn world map, trace three journeys in three colors: Leif Erikson from Greenland to Vinland, Columbus from Spain to the Bahamas, and Lewis and Clark from St. Louis to the Pacific Ocean. Draw a small picture beside each route: a Norse ship, a sailing ship with a red cross on its sail, and a canoe. Add a compass rose and a key that tells what each color means. Set your map beside your paper sailing ship and your shoebox covered wagon, and tell your family the story of each journey.

- **Routes:** All three journeys are traced from the right starting place to the right ending place, and every one goes west.
- **Key and compass rose:** The map has a key that matches each color to a journey and a compass rose with N, E, S and W.
- **Models:** The paper sailing ship and the shoebox covered wagon are finished, and the child can point to the sail, the wheels and the cover.
- **Telling:** The child tells each story in a few sentences and names what helped each traveler go where they could not walk.

Answer key

1. Leif Erikson.
2. The sail catches the wind; the oars were pulled when there was no wind (1 point for pointing, 1 for each name).
3. The Niña, the Pinta and the Santa María; the Santa María was the biggest (1 point for two names, 1 for all three, 1 for the biggest).
4. West.

5. A young Shoshone woman who traveled with them. She could talk with the Shoshone, knew some of the land, and helped them get horses from her brother's people to cross the mountains.
6. Horses.
7. Any three sensible supplies, such as flour, bacon, beans, tools, seeds, pots, clothes, a Bible, blankets or quilts (2 points); oxen (1 point).
8. 3 squares.

BONUS: MAP LAB

Map Lab is a playful bonus unit for any time of the year. There are no new big ideas here. Instead, you will take everything you learned about maps and turn it into games. You will walk “ten steps north, five steps east” to find a hidden surprise, match map symbols in a memory game, make a pirate map on tea-stained paper, and spin a globe to see where your finger lands.

Along the way you will meet real people who used maps: young George Washington measuring land in Virginia in 1748, Konrad Peutinger and his long Roman road map, Robert Louis Stevenson drawing *Treasure Island* on a rainy day in 1881, and Martin Behaim, who made the oldest globe we still have in 1492. Every game reminds us that the world is God’s, from the yard outside the door to the far side of the globe: “And hath made of one blood all nations of men for to dwell on all the face of the earth, and hath determined the times before appointed, and the bounds of their habitation;” (Acts 17:26).

BEFORE YOU BEGIN

- Can name the four directions: north, south, east and west
- Knows that a map symbol stands for a real thing and that a map key explains the symbols
- Can count to 20
- Has seen a globe or world map and knows land from water

MASTERY CHECKLIST

- I can follow “steps north, steps east” directions to find a spot.
- I can match map symbols to the real things they stand for.
- I can draw a treasure map with symbols, a compass rose and an X.
- I can spin a globe and tell if I landed on land or water, and name the continent or ocean.
- I can tell one true thing about a place on the globe.

OPTIONAL BOOKS AND RESOURCES

- **Library of Congress: Maps collection** (<https://www.loc.gov/maps/>): Free. Thousands of old maps to look at with a parent. Search for “treasure,” “pictorial map” or your own state to find colorful old maps for ideas before making a pirate map.
- ***Treasure Island* by Robert Louis Stevenson (free at Project Gutenberg)** (<https://www.gutenberg.org/ebooks/120>): Free. The whole book is for older readers and has scary pirates, so a parent may simply show the map and retell the part where Jim finds it (Lesson 9.3).

9.1 COMPASS WALK

OBJECTIVES

- Walk a set number of steps north, south, east or west and say where I end up.
- Follow a path on a map grid by counting squares in one direction and then another.

Warm-up. Stand in the middle of the room. Your parent points and says, “That way is north.” Turn to face north. Now turn to your right: that is east. Turn again: south. Turn again: west. Spin back to north and shout “Never Eat Soggy Waffles!”

Video. Coming soon. Search Homeschool Pop (Alternate) and SciShow Kids for a short kid video (under 8 minutes) on the four directions and using a compass; candidates (needs vetting): National Geographic Kids, Free School. A read-aloud of Joan Sweeney’s picture book *Me on the Map* also fits.

KEY TERMS

direction

The way you are going or facing: north, south, east or west.

step

One move of one foot. Counting steps is a way to measure how far you walked.

grid

Lines that cross to make rows of little squares on a map, so you can count your way from place to place.

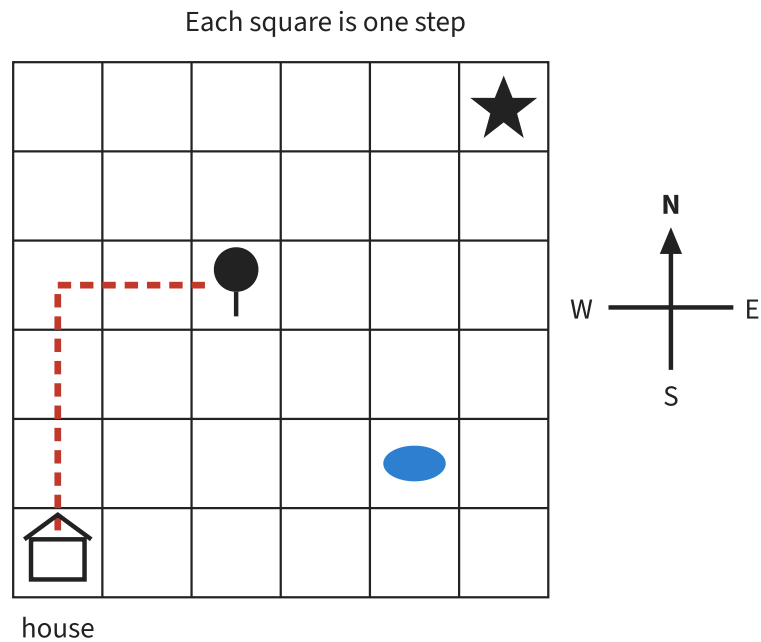
CORE IDEAS

The story. In the spring of 1748, a tall boy of sixteen rode west over the Blue Ridge Mountains of Virginia. His name was George Washington. He was helping men measure land for a rich landowner named Lord Fairfax. The men carried a compass to tell north from south. They carried a long metal chain to measure how far they walked. Step by step, they walked along the edge of each farm and wrote down the way they went and how far. Then they drew it on paper. That is how a map of the land was made.

How it worked. Long before that, Roman soldiers counted their steps too. Every time the left foot and right foot both stepped, that made one “pace.” A thousand paces made a Roman mile. Our word *mile* comes from the Latin word for a thousand. So people have been finding their way by counting steps and knowing their directions for a very long time.

The big idea. To tell someone where a place is, you need two things: **which way** to go and **how far**. “Ten steps north, then five steps east” tells both. On a map with a **grid**, each square can stand for one step. North is up, south is down, east is to the right and west is to the left. Count the squares one way, then turn and count the other way, and your finger lands

right on the spot. God gave us a sun that rises in the east and sets in the west, so we can always find our way.



A compass walk map. Each square is one step. North is up.

PICTURE STUDY



Snap the Whip, Winslow Homer, 1872 · Oil on canvas · Butler Institute of American Art, Youngstown, Ohio

Winslow Homer was an American painter who loved to paint children playing outdoors and the sea. In this painting, boys have run out of a little country schoolhouse to play a game called Snap the Whip. They hold hands in a long line and run. The boy at the front turns

hard, and the boys at the end go flying! Look at how much open grass they have to run on. A field like this is a perfect place for a compass walk.

Look closely

- Count the boys. How many are holding hands in the line?
- Find the red schoolhouse. Is it near or far away?
- Find the boys who have fallen down. Where are they in the line?
- Look at the shadows on the grass. Which way is the sun shining from?

Talk about it

1. If you stood by the schoolhouse door, how many steps do you think it would take to reach the boys?
2. Where would be a good open place near your home for a compass walk?

PROJECT: MY COMPASS WALK TREASURE HUNT

You will find north outside, then follow step directions to a hidden surprise. Then you will draw your walk on a grid map.

You will need

- A yard, park or long hallway
- Four sticky notes or paper signs marked N, S, E and W
- A small surprise to hide (a cookie, a toy or a note)
- Graph paper or a paper with squares drawn on it, and crayons
- A compass or a phone compass (for the parent)

Steps

1. With your parent, find north. Use the compass, or remember that the sun rises in the east in the morning. Put the N, S, E and W signs on sticks, trees or walls around you.
2. Your parent stands at a starting spot and secretly hides the surprise by walking some steps one way and some steps another way.
3. Your parent gives you the directions, such as “Ten steps north, five steps east.” Count your steps out loud.
4. Look down. Did you land on the surprise? If not, go back to the start and try again with smaller, careful steps.
5. Now switch. You hide something and give your parent the directions.
6. Inside, draw your walk on graph paper. Draw the start, then color one square for each step north and one square for each step east. Put a star where the surprise was.

Tips

- Grown-up steps are longer than child steps. Have the same person hide and find, or take “child steps” together.

- Walk heel to toe for very careful, short steps on a small hunt indoors.

Check your work

- I can face north, south, east and west.
- I can follow “steps north, steps east” directions to a spot.
- I can draw my walk on a grid.

MAP NOTEBOOK

1. Draw a big compass rose and write N, S, E and W in the right places.
2. Draw your compass walk on a grid: a start, your steps and a star at the end.
3. Draw young George Washington with his compass, walking over the hills.

From history. The chain that surveyors like George Washington carried was called Gunter’s chain, after an English mathematician named Edmund Gunter who made it in 1620. It was 66 feet long, and 80 chains made one mile. American surveyors used chains like this to measure farms, towns and whole states for more than two hundred years.

WORKED EXAMPLES

Example 1. Look at the compass walk map. Start at the house. Go 3 squares north and then 2 squares east. What do you land on?

(Use the map or drawing “Up 3 squares (north), then right 2 squares (east), lands on the tree.” shown earlier in this lesson.)

1. Put your finger on the house.
2. North is up. Move up 1, 2, 3 squares.
3. East is to the right. Move right 1, 2 squares.
4. Look under your finger.

Answer: The tree.

PRACTICE

1. **EASY** Point to the N on the compass. Which way on the map is north: up, down, left or right?
2. **EASY** Start at the house. Go 1 square north and then 4 squares east. What do you land on?
(Use the map or drawing “Use the compass walk map.” shown earlier in this lesson.)
3. **MEDIUM** Start at the house. How many squares north and how many squares east to reach the star?
(Use the map or drawing “Use the compass walk map.” shown earlier in this lesson.)

4. **MEDIUM** You walk 10 steps north. Which way do you walk to get back to where you started, and how many steps?

COMMON MISTAKES

- Mixing up east and west. On a map, east is to the right. A trick: W and E spell “WE” from left to right.
- Counting the square you start on. Start on the house, then count each new square you move into.
- Taking giant steps one time and tiny steps the next. Keep your steps the same size so your count is fair.

Make it a game · Simon Says Compass. Put N, S, E and W signs on the walls of a room. A parent calls out, “Simon says take 3 steps north!” and you march that way, counting out loud. If the parent leaves off “Simon says,” stand still! Take turns being the caller.

Scripture. “And thine ears shall hear a word behind thee, saying, This is the way, walk ye in it, when ye turn to the right hand, and when ye turn to the left.” (Isaiah 30:21, KJV)

In the compass walk, you listen to directions and walk the way you are told. God promises to guide His people too, telling them the way to walk.

Practice answers

1. Up.
2. The pond.
3. 5 squares north and 5 squares east.
4. 10 steps south.

9.2 SYMBOL MATCH

OBJECTIVES

- Match common map symbols to the real things they stand for.
- Make a set of symbol cards and play a matching game with them.

Warm-up. Go on a symbol hunt around the house. Find three little pictures that stand for something: the arrow on a door, the trash can on a computer, the snowflake on the freezer, the play triangle on a remote. Tell what each one means.

Video. Coming soon. Search Homeschool Pop (Alternate) and SciShow Kids for a short kid video (under 8 minutes) on map symbols and map keys; candidates (needs vetting): National Geographic Kids, Free School. A read-aloud of *There's a Map on My Lap!* (Cat in the Hat's Learning Library) or Scot Ritchie's *Follow That Map!* also fits.

KEY TERMS

symbol

A little picture or shape that stands for a real thing.

map key

A box on a map that shows each symbol and tells what it means.

match

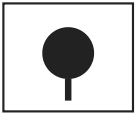
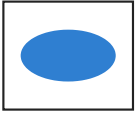
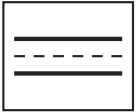
To put together two things that go with each other.

CORE IDEAS

The story. More than five hundred years ago, in the year 1508, a man named Konrad Peutinger lived in the German city of Augsburg. He loved old books and old maps. A friend who had just died left him a wonderful thing: a long, skinny map rolled up like a scroll. It was a copy of a very old map of the roads of the Roman Empire. Today it is called the Peutinger Map, after him. You can still see it in a library in Vienna, Austria.

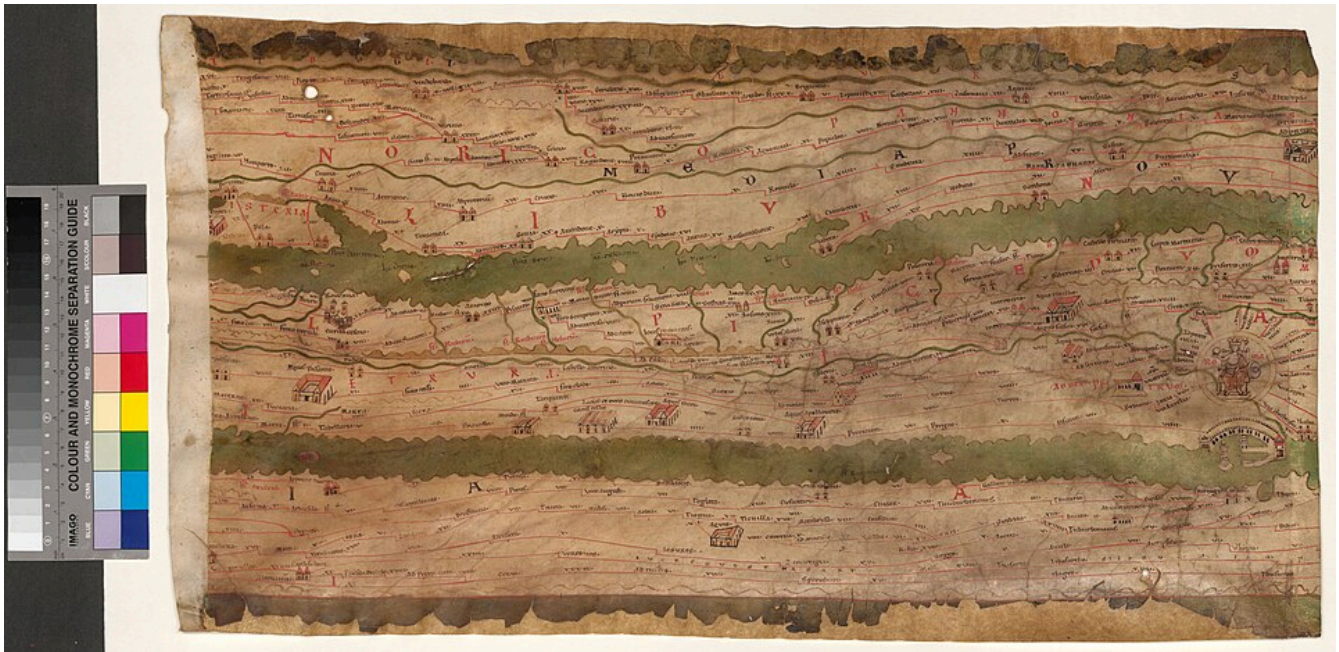
How it worked. The Peutinger Map is about 22 feet long, longer than a car, but only about one foot tall. It shows roads as red lines. Along the roads are tiny pictures. A little building with two towers stands for a town where travelers could stop. Great cities like Rome are shown as a queen sitting on a throne. A Roman traveler did not need to read every word. He could look at the little pictures and know what he would find on the road ahead.

The big idea. Those little pictures are **symbols**. A symbol is a small picture that stands for a real thing. On our maps, a little green circle on a stick can stand for a tree. A small square with a pointed roof can stand for a house. A blue patch stands for water. The **map key** shows each symbol and tells what it means. When you can **match** each symbol to the real thing, you can read the whole map, even a map of a place you have never been.

- | | | |
|---|---|-----------|
| 1 |  | A. road |
| 2 |  | B. tree |
| 3 |  | C. church |
| 4 |  | D. lake |
| 5 |  | E. house |

Symbol match: draw a line from each symbol to its word.

PICTURE STUDY



The Peutinger Map (Tabula Peutingeriana), Unknown copyist, from an older Roman map, copied about the year 1200 · Ink and paint on parchment · Austrian National Library, Vienna

This map was copied by hand from a much older Roman map that showed the roads of the Roman Empire, all the way from Britain to India. The map maker squashed the whole world into one long strip, so the seas look like thin rivers. It is not a true picture of the shapes of the lands. It is a map for travelers, to show which roads go where and what they will find along the way.

Look closely

- Find the red lines. What do you think they stand for?
- Find a tiny building with two towers. How many can you count in one part of the map?
- Find the blue or green wiggly water. Is it wide or thin?
- Look for a bigger picture of a person sitting down. That symbol stands for a great city.

Talk about it

1. Why would a traveler like a map with little pictures instead of only words?
2. If you made a symbol for your home town, what would you draw?

PROJECT: MAP SYMBOL MEMORY GAME

You will make a set of cards: half show map symbols and half show the real things. Then you will play a memory matching game.

You will need

- Twelve index cards (or a cereal box cut into 12 squares)
- Crayons or markers
- Old magazines or catalogs (optional, for cutting out pictures)
- Glue stick

Steps

1. Choose six things for your map: a tree, a house, a lake, a road, a church and a bridge (or a school, a park or a mountain).
2. On six cards, draw the map symbol for each one. Keep it simple: a green circle on a stick for a tree, a blue patch for a lake, two lines for a road.
3. On the other six cards, draw or glue a real picture of each thing, the way it looks when you stand next to it.
4. Mix up all twelve cards and lay them face down in rows.
5. Take turns flipping two cards. If the symbol matches the real thing, say, "The symbol stands for a tree!" and keep the pair.
6. When all the cards are matched, lay the six symbol cards in a column and make a map key on paper with them.

Tips

- Use the same colors maps use: blue for water, green for trees and parks.
- For a younger child, play with the cards face up first, just matching.

Check your work

- I can tell what each map symbol stands for.
- I can make a map key with my symbols.

MAP NOTEBOOK

1. Draw a map key with five symbols: tree, house, lake, road and church.
2. Make up a new symbol for something you love, like a playground or an ice cream shop.
3. Draw a tiny Roman town with two towers, like the ones on the Peutinger Map.

From history. In the United States, map makers at the U.S. Geological Survey have drawn careful maps of the whole country since the 1880s. On their maps, blue stands for water, green stands for woods, and tiny black squares stand for buildings. Hikers, farmers and soldiers have all learned to read those same symbols.

WORKED EXAMPLES

Example 1. Look at the symbol match sheet. Symbol 1 is a round circle on a short stick. Which word does it match?

(Use the map or drawing “Symbol 1 is a tree.” shown earlier in this lesson.)

1. Look at symbol 1. It is round and has a little trunk under it.
2. Think: what real thing is round on top with a trunk? A tree.
3. Find the word “tree” in the list. It is B.

Answer: Symbol 1 matches B, tree.

PRACTICE

1. **EASY** On the symbol match sheet, point to symbol 3, the blue shape. Which word does it match?
(Use the map or drawing “Use the symbol match sheet.” shown earlier in this lesson.)
2. **EASY** Match the rest: symbols 2, 4 and 5. Draw a line from each one to its word.
(Use the map or drawing “Use the symbol match sheet.” shown earlier in this lesson.)
3. **MEDIUM** What color do maps usually use for water?
4. **MEDIUM** A map has a symbol you do not know. Where on the map do you look to find out what it means?

COMMON MISTAKES

- Thinking a symbol must look exactly like the real thing. A symbol is a simple picture, not a photograph.
- Guessing what a symbol means instead of checking the map key. Different maps can use different symbols.
- Making symbols too fancy. A good symbol is quick to draw and easy to tell apart from the others.

Make it a game · Symbol Charades. A parent draws a map symbol on a whiteboard or paper, one line at a time. Shout out what it stands for as soon as you know: tree, house, lake, road, church, bridge! Then trade places and you draw for the parent. Whoever guesses in the fewest lines wins the round.

Scripture. “That this may be a sign among you, that when your children ask their fathers in time to come, saying, What mean ye by these stones?” (Joshua 4:6, KJV)

When Israel crossed the Jordan River, they set up twelve stones as a sign. The stones stood for something bigger: God’s help. A sign or symbol makes us ask, “What does this mean?”

Practice answers

1. D, lake.
2. 2 is E, house. 4 is A, road. 5 is C, church.
3. Blue.
4. The map key.

9.3 PIRATE MAP

OBJECTIVES

- Draw a treasure map of an island with a compass rose, symbols and an X.
- Give and follow directions on a map grid to find the X.
- Make paper look old by staining it with tea.

Warm-up. Hide a spoon somewhere in one room. Give your child only three clues, such as “It is near something soft,” “It is low,” “It is by the window.” Then ask: would a map have made it faster to find?

Video. Coming soon. Search Smithsonian and Library of Congress for short clips (under 8 minutes) on old hand-drawn maps and how maps were made long ago; Homeschool Pop (Alternate) for a kid video on making a treasure map; candidate (needs vetting): Free School. A parent may also read aloud the opening of *Treasure Island* where Jim finds the map, retold simply.

KEY TERMS

island

Land with water all around it.

treasure map

A map that shows the way to something hidden. An X often marks the spot.

compass rose

The star-shaped drawing on a map that shows north, south, east and west.

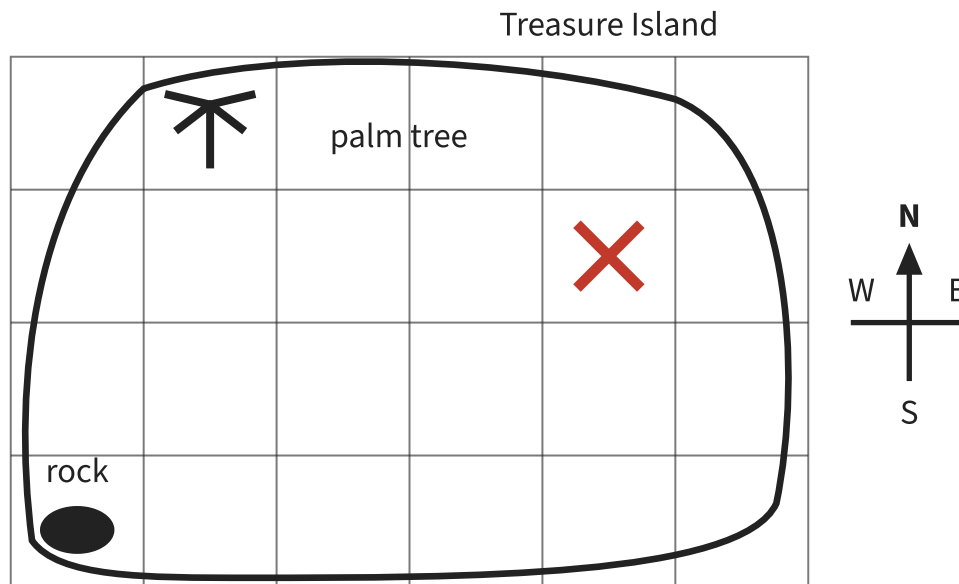
CORE IDEAS

The story. In the summer of 1881, a Scottish writer named Robert Louis Stevenson was staying in a cottage in the Scottish Highlands. It rained and rained. His young stepson, Lloyd, was bored. So Stevenson sat down with Lloyd’s paints and drew a map of a made-up island. He gave it hills, bays and a harbor, and he named it Treasure Island. As he looked at the map, a story began to grow in his mind about pirates and hidden gold. That story became the famous book *Treasure Island*, printed in 1883 with a copy of the map inside.

How it worked. Stevenson later told how the first map was lost in the mail. He had to draw it all over again! On his map, a red cross shows where the pirates buried the treasure. The map also has a compass so readers can tell which way is north, and little drawings of hills and woods. It looks like an old sailor’s chart, with wavy edges and faded colors.

The big idea. A treasure map is a real map with a secret. It uses everything we have learned: **symbols** for trees and rocks, a **compass rose** for north, south, east and west, and steps or squares to show how far. Old maps were drawn by hand on paper that turned yellow

and brown with age. We can make our own map look old by staining it with tea. Then a friend can use it to find the X!



A treasure map on a grid. North is up.

PICTURE STUDY



*Map of Treasure Island, Robert Louis Stevenson, 1883 (first printed in the book *Treasure Island*) · Printed map in a book · Printed in the first edition of *Treasure Island* (London: Cassell and Company, 1883); copies are kept in many libraries*

Robert Louis Stevenson drew a map of a make-believe island to play with his stepson, and that map gave him the idea for his book. When the book was printed, the first map had been lost, so Stevenson had to draw it all over again from his own story. The island is made up, but the map is drawn the way real sea charts were drawn in the days of sailing ships. It shows hills, bays, a little island off the coast, and the place where the treasure is hidden.

Look closely

- Find the red cross. What do you think it marks?
- Find the compass. Which way is north?
- Look at the shape of the island. What animal or thing does it look like to you?
- Find the water all around. How do you know this land is an island?

Talk about it

1. Why did the pirates need a map to find their treasure again?
2. If you drew a made-up island, what would you name it?

Safety first. A grown-up should make and pour the hot tea. Let the tea cool before a child touches the paper. If you use an oven to dry the paper, a grown-up does that part too. Do not burn the edges with a flame; tear them instead.

PROJECT: MY TEA-STAINED PIRATE MAP

You will make a sheet of paper look hundreds of years old, draw an island with a hidden treasure, and then let someone follow your map to a real surprise.

You will need

- White printer paper
- Two or three tea bags and a cup of hot water (grown-up job)
- A baking sheet or tray with sides, and old towels
- A sponge or paintbrush
- Brown and black markers or crayons, and one red crayon
- A ribbon or string to tie the scroll
- A small treat to hide

Steps

1. Crumple the paper into a tight ball, then gently open it flat again. The wrinkles will help it look old.
2. Carefully tear a thin strip off each edge so the sides are rough and wavy.
3. A grown-up makes strong tea and lets it cool until it is just warm.
4. Lay the paper on the tray. Dab the tea all over with the sponge. Press a wet tea bag in a few spots for darker patches.
5. Let the paper dry flat on a towel for a few hours or overnight.

6. Draw your island: the coastline, a few symbols (trees, rocks, a hill, a cave) and a compass rose with N, S, E and W.
7. Draw a dotted path from a starting place to the treasure and mark it with a big red X.
8. Hide a real treat in your house or yard in the spot that matches the X. Roll up the map, tie it with string and give it to a friend or parent to follow.

Tips

- Wait until the paper is completely dry before you draw, or the marker will run.
- Keep the map simple: four or five symbols and one clear path are better than a crowded map.
- Write directions on the back, like “From the big rock, walk 4 steps east and 2 steps north.”

Check your work

- My map has an island, symbols, a compass rose and an X.
- Someone could follow my map and find the treasure.

MAP NOTEBOOK

1. Draw a made-up island and give it a name.
2. Draw a fancy compass rose for your pirate map.
3. Draw a pirate ship sailing toward your island, and the treasure chest the crew is looking for.

From history. Most real pirates spent their gold instead of burying it. But in 1699 Captain William Kidd really did bury some treasure on Gardiners Island, near Long Island in New York. It was soon dug up and sent to the governor in Boston, and Kidd was arrested. Stories like his helped give writers the idea of buried pirate treasure.

WORKED EXAMPLES

Example 1. Look at the treasure map. Start at the rock. Walk 4 squares east, then 2 squares north. What do you find?

(Use the map or drawing “4 squares east and 2 squares north of the rock is the X.” shown earlier in this lesson.)

1. Put your finger on the rock in the bottom left corner.
2. East is to the right. Move right 1, 2, 3, 4 squares.
3. North is up. Move up 1, 2 squares.
4. Look under your finger.

Answer: The red X, where the treasure is buried.

PRACTICE

1. **EASY** Point to the water around the island. What do we call land with water all around it?
2. **EASY** Is the X east or west of the palm tree?
(Use the map or drawing "Use the treasure map." shown earlier in this lesson.)
3. **MEDIUM** Start at the rock. How many squares north do you go to reach the row with the palm tree?
(Use the map or drawing "Use the treasure map." shown earlier in this lesson.)
4. **MEDIUM** Name three things every good treasure map needs.

COMMON MISTAKES

- Drawing on the tea-stained paper while it is still wet, so the colors run.
- Forgetting the compass rose. Without it, no one knows which way is north.
- Hiding the real treat in a different place than the X shows. Check your map against the real spot.

Make it a game • Pirate Says Arrr. One player is the pirate captain. The captain calls, "Arrr! Two steps west!" or "Arrr! Three hops north!" and the crew obeys, counting out loud. After five orders, the captain hides a coin where the crew ends up for the next round. Take turns being captain.

Scripture. "Again, the kingdom of heaven is like unto treasure hid in a field; the which when a man hath found, he hideth, and for joy thereof goeth and selleth all that he hath, and buyeth that field." (Matthew 13:44, KJV)

Jesus told a story about a man who found hidden treasure. He was so happy that he gave up everything to have it. Knowing God is the best treasure of all.

Practice answers

1. An island.
2. East.
3. 3 squares north.
4. Any three: symbols, a compass rose (north), an X for the treasure, a starting place, a path or directions.

9.4 GLOBE SPIN GAME

OBJECTIVES

- Tell whether a spot on the globe is land or water, and name the continent or ocean.
- Say one true thing about the place where my finger lands, using what I learned this year.

Warm-up. Hold a ball and turn it slowly. Can you see all of it at once? Now look at a flat paper map of the world. Talk about it: the globe is round like the real earth, and the flat map shows all of it at one time.

Video. Coming soon. Search NASA for short footage (under 8 minutes) of the whole earth turning, seen from space; SciShow Kids and Homeschool Pop (Alternate) for a kid video on continents and oceans; candidates (needs vetting): National Geographic Kids, Free School. A read-aloud of Gail Hartman’s *As the Crow Flies* also fits.

KEY TERMS

globe

A round model of the earth, shaped like a ball.

continent

One of the seven very big pieces of land on the earth.

ocean

One of the five very big bodies of salt water on the earth.

CORE IDEAS

The story. In the year 1492, in the German city of Nuremberg, a man named Martin Behaim made a globe. A painter helped him paint the lands and seas on it. People called it the “earth apple,” because it was round like an apple. That very same year, Christopher Columbus sailed across the ocean, but no one in Nuremberg knew it yet. So Behaim’s globe has no North America and no South America on it at all! Between Europe and Asia there is only wide ocean. It is the oldest globe in the world that we still have. You can see it in a museum in Nuremberg today.

How it worked. A **globe** is a little model of the whole earth. Because it is round like the earth, the shapes of the lands are right. Spin it, and you can see that there is much more water than land. Most of the blue is the five **oceans**. The big pieces of land are the seven **continents**: North America, South America, Europe, Asia, Africa, Australia and Antarctica.

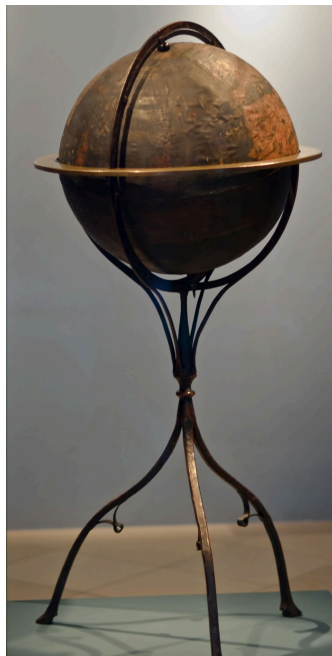
The big idea. This year you have learned a lot about the world. You know about hot lands near the equator and icy lands at the poles. You know mountains, deserts and plains, lions in Africa and pandas in Asia, and explorers who crossed the sea. Now spin the globe, close your

eyes and put your finger down. Wherever it lands, you can tell something true about that place. The whole round earth belongs to the God who made it, and every place on it is full of His wonders.



The seven continents and five oceans. A flat map shows the whole world at once.

PICTURE STUDY



The Behaim Globe (the "Earth Apple"), Martin Behaim, painted by Georg Glockendon, 1490–1492 · Painted globe · Germanisches Nationalmuseum, Nuremberg, Germany

This is the oldest globe that still exists. It is about 20 inches across, bigger than a basketball. It was finished in 1492, just before news came back to Europe that Columbus had found lands across the Atlantic Ocean. So it shows Europe, Africa and Asia, but not the Americas. It

is covered with tiny paintings of kings, ships, flags and animals, and lots of writing about faraway places.

Look closely

- Look at the colors. Do they look bright and new, or old and faded?
- Find the little pictures painted on the globe. What can you see?
- Look at the stand that holds the globe. Could the globe spin?
- Think about what is missing. Which continents are not on this globe?

Talk about it

1. Why do you think Martin Behaim did not paint North and South America?
2. If you could add one thing to this old globe, what would you paint on it?

PROJECT: SPIN AND TELL CARDS

You will make a set of “tell me” cards, one for each continent and ocean. Then you will play the Globe Spin Game and tell one thing about where your finger lands.

You will need

- A globe, or a beach-ball globe (a flat world map laid on the table works too)
- Twelve index cards
- Crayons or markers
- Stickers or small sticky notes

Steps

1. On seven cards, write the name of each continent. On five cards, write the name of each ocean. A parent can write and you can draw.
2. On each card, draw one thing you learned about that place: a lion for Africa, a panda for Asia, a penguin for Antarctica, a kangaroo for Australia, a bison for North America, a sloth for South America, a longship for the Atlantic Ocean.
3. Spin the globe gently. Close your eyes and put one finger on it to stop it.
4. Open your eyes. Is your finger on land or water? Find the card for that continent or ocean.
5. Tell one true thing about the place: an animal, the weather, a landform or an explorer.
6. Put a sticker on the spot. After ten spins, count your stickers on land and on water.

Tips

- Spin gently. A globe is not a top!
- If you land on a place you know nothing about, look at the colors: is it near the equator (hot) or near a pole (cold)? That is something true to tell.

Check your work

- I can say if my finger landed on land or water.
- I can name the continent or ocean.
- I can tell one true thing about it.

MAP NOTEBOOK

1. Draw a round globe and color the land green and the water blue.
2. Draw Martin Behaim's globe with a big blue ocean where the Americas should be.
3. Draw the place your finger landed on most often, and one thing that lives there.

From history. In December 1972, the astronauts of Apollo 17 took a famous photograph of the whole round earth on their way to the moon. It is called the Blue Marble. In it you can see Africa, the blue ocean, white clouds and the ice of Antarctica, just like a giant globe floating in space.

WORKED EXAMPLES

Example 1. You spin the globe, and your finger lands on the big continent just south of Europe, where the equator runs across the middle. Where are you, and what is one thing you can tell?

(Use the map or drawing "Africa is just south of Europe." shown earlier in this lesson.)

1. Look at your finger. The color is land, not blue water.
2. Find Europe. The big continent just south of it is Africa.
3. Remember what you learned: Africa has grasslands called the savanna, with lions and zebras.
4. Remember the equator: lands near it are hot.

Answer: Africa. One true thing: lions and zebras live on the savanna there (or: it is hot near the equator, or: the Sahara Desert is there).

PRACTICE

1. **EASY** Spin the globe ten times and count. Did your finger land on water more times, or on land?
2. **EASY** Point to the continent where you live. What is its name?
3. **MEDIUM** Count the continents on the map. How many are there? How many oceans?
(Use the map or drawing "Use the world map." shown earlier in this lesson.)
4. **MEDIUM** Your finger lands on the icy continent at the very bottom of the globe. Name it and one animal that lives there.

COMMON MISTAKES

- Thinking the globe and the flat map show different worlds. They show the same earth; the globe is round like the real one.
- Mixing up continents and countries. A continent is a huge piece of land with many countries on it.
- Calling Antarctica an ocean because it is white. It is land covered with thick ice.

Make it a game · I Spy on the Globe. One player says, “I spy a continent with kangaroos,” or “I spy the ocean Columbus sailed across.” The other player spins the globe to that place and points to it. Take turns. For a harder round, give the clue using north, south, east or west, like “I spy the continent south of Europe.”

Scripture. “The earth is the LORD's, and the fulness thereof; the world, and they that dwell therein.” (Psalm 24:1, KJV)

Wherever your finger lands on the globe, that place belongs to God. He made the lands, the oceans, the animals and all the people who live there.

Practice answers

1. Usually water, because most of the earth is covered with water (about 7 parts out of 10).
2. North America (for children in the United States).
3. 7 continents and 5 oceans.
4. Antarctica. Emperor penguins live there.

UNIT 9 REVIEW

This is a short, friendly review a parent asks aloud. Let the child point, walk, draw or answer out loud. Use a grid map, a globe or world map, and a few symbol cards. The review is worth 20 points.

1. (4 pts) Stand in a room with N, S, E and W signs on the walls. “Take 3 steps north, then 2 steps east.” (Parent watches.) Then ask: “Which way would you go to walk back toward the start?”
2. (3 pts) On a map, which way is north: up, down, left or right? Which way is east?
3. (3 pts) Show three symbol cards: a green circle on a stick, a blue patch and a small square with a pointed roof. “What does each symbol stand for?”
4. (3 pts) “If you do not know what a symbol on a map means, where do you look?”
5. (4 pts) “Draw a tiny treasure map. It needs land with water all around, one symbol, a compass rose and an X.” Then ask, “What do we call land with water all around it?”
6. (3 pts) Spin a globe (or point to a world map) and let the child stop it with a finger. “Is your finger on land or water? Name the continent or ocean, and tell one true thing about it.”

UNIT PROJECT: MY MAP LAB TREASURE HUNT

Plan a treasure hunt for your family. Make a tea-stained pirate map of your yard or house with at least four symbols, a map key, a compass rose and a red X. On the back, write (or tell a parent to write) step directions, such as “From the back door, walk 10 steps north and 5 steps east.” Hide a treat at the X, then watch your family follow your map. Keep your map, your symbol cards and a photo of the hunt in your map notebook.

- **Map parts:** The map has symbols, a map key, a compass rose and an X.
- **Directions:** The step directions use north, south, east or west and lead to the right spot.
- **It works:** Someone in the family could follow the map and find the treasure.
- **Care:** The map is colorful, neat and looks like an old pirate map.

Answer key

1. The child walks 3 steps toward the N sign and 2 steps toward the E sign. To go back: walk 2 steps west and 3 steps south.
2. North is up. East is to the right.
3. A tree, water (a lake or pond) and a house.
4. In the map key.
5. The drawing has an island, at least one symbol, a compass rose with N (and S, E, W) and an X. Land with water all around is an island.
6. Any correct answer, for example: “Land. Africa. Lions live on the savanna there.” or “Water. The Pacific Ocean. It is the biggest ocean.”