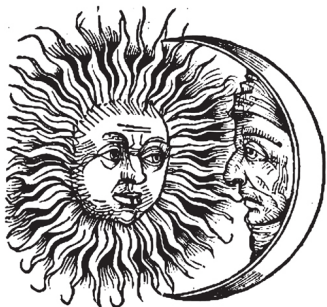
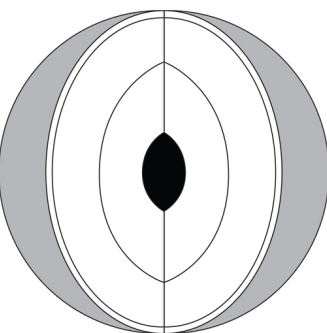


EARTH: YOU ARE HERE

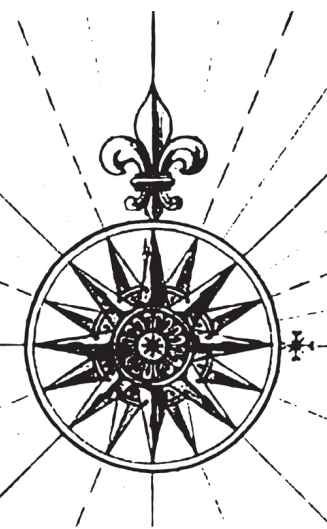
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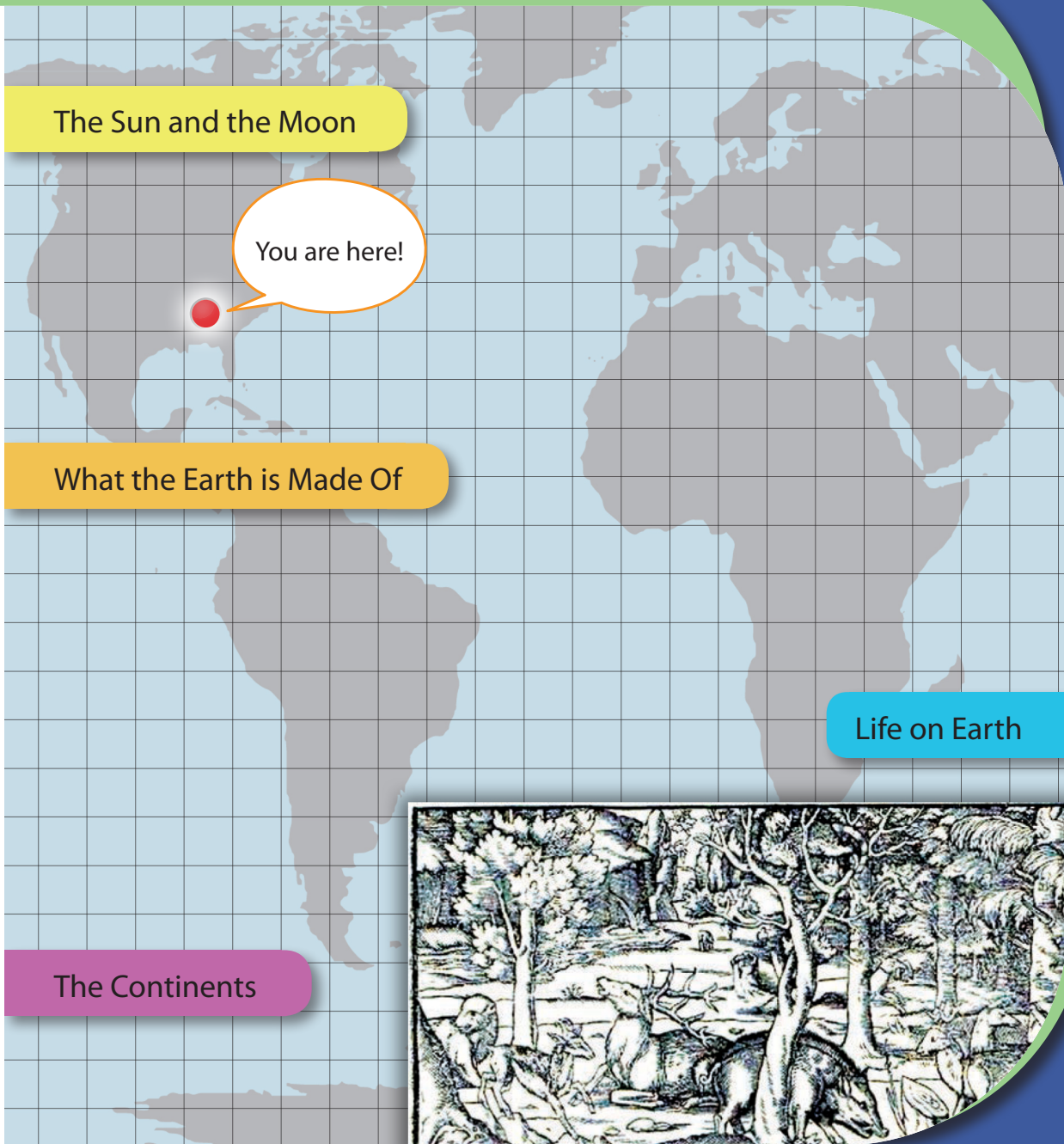
The Sun and the Moon



What the Earth is Made Of



The Continents



Life on Earth



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Certificate of Completion

Answer Sheets

** Has an Answer Sheet*

🦋 INTRODUCING...THE EARTH

THE EARTH IS THE THIRD PLANET from the Sun. It's part of a group of planets called the **Solar System**, in a galaxy called the **Milky Way**, in a collection of planets, stars, meteors, black holes, dark matter, and a bunch of other objects we haven't explored yet called **The Universe**.

The earth is different from other planets in many ways. The Earth has an **atmosphere**, a layer of gases that surrounds the planet and protects us from the dangers of space. The Earth orbits around the **Sun**, and the **Moon** orbits the Earth. Both provide us with light, and the Sun provides us with warmth.

The Earth is the only planet we know of that humans can live on. Everything we need to survive exists on or near this planet.

The Earth is our home.



🦋 Word Search

	C	N	N	H	U	I	X	A	X	A	Y	P
EARTH	A	P	O	Y	N	W	O	T	V	Y	A	L
PLANET	H	O	O	K	I	Q	W	M	Z	B	W	A
MILKY WAY	J	T	M	D	V	F	C	O	F	D	Y	N
SOLAR SYSTEM	H	S	U	N	E	J	T	S	L	D	K	E
UNIVERSE	J	T	Y	R	R	J	G	P	V	L	L	T
LIFE	X	F	R	H	S	G	E	H	R	H	I	I
ATMOSPHERE	G	X	L	A	E	R	U	E	N	B	M	P
SUN	Z	Q	E	Z	E	R	Z	R	E	F	I	L
MOON	Z	K	F	H	L	Z	X	E	E	E	W	E
	M	E	T	S	Y	S	R	A	L	O	S	X
	R	S	V	Q	Q	P	M	B	M	Z	M	U

HOW BIG IS ONE BILLION?

1,000,000,000

$$\begin{array}{r} \text{(one hundred million)} \\ 100,000,000 \\ \times 10 \\ \hline 1,000,000,000 \end{array}$$

$$\begin{array}{r} \text{(ten million)} \\ 10,000,000 \\ \times 100 \\ \hline 1,000,000,000 \end{array}$$

$$\begin{array}{r} \text{(one million)} \\ 1,000,000 \\ \times 1,000 \\ \hline 1,000,000,000 \end{array}$$

$$\begin{array}{r} \text{(one hundred thousand)} \\ 100,000 \\ \times 10,000 \\ \hline 1,000,000,000 \end{array}$$

Imagine some of the species that have existed on Earth over the last billion years. Draw them along this graph.



ONE BILLION IS A BIG NUMBER. It's hard to understand how big it is, but one billion is the same as one thousand million. There has been life on earth for about 3.6 billion years, and all of the plants and animals there have ever been evolved during that time.

The first life was tiny, single-celled organisms, and these were all Earth had for billions of years. One billion years ago, multi-cellular life showed up, and 500 million years ago fish first evolved. Seventy-five million years after that, there were plants. The reptiles first evolved 300 million years ago. The dinosaurs ruled the Earth starting about 200 million years ago, and went extinct 66 million years ago. The very first mammals evolved around the same time as the dinosaurs.

In the last 100 million years, the dinosaurs went extinct, the very first primates arrived, and humans evolved from our early ancestors. The entire history of our species, *homo sapiens*, has only happened in the last 200,000 years. The amount of space that would take up on the graph to the right would not be visible to our eyes.


HOW IT GOT HERE

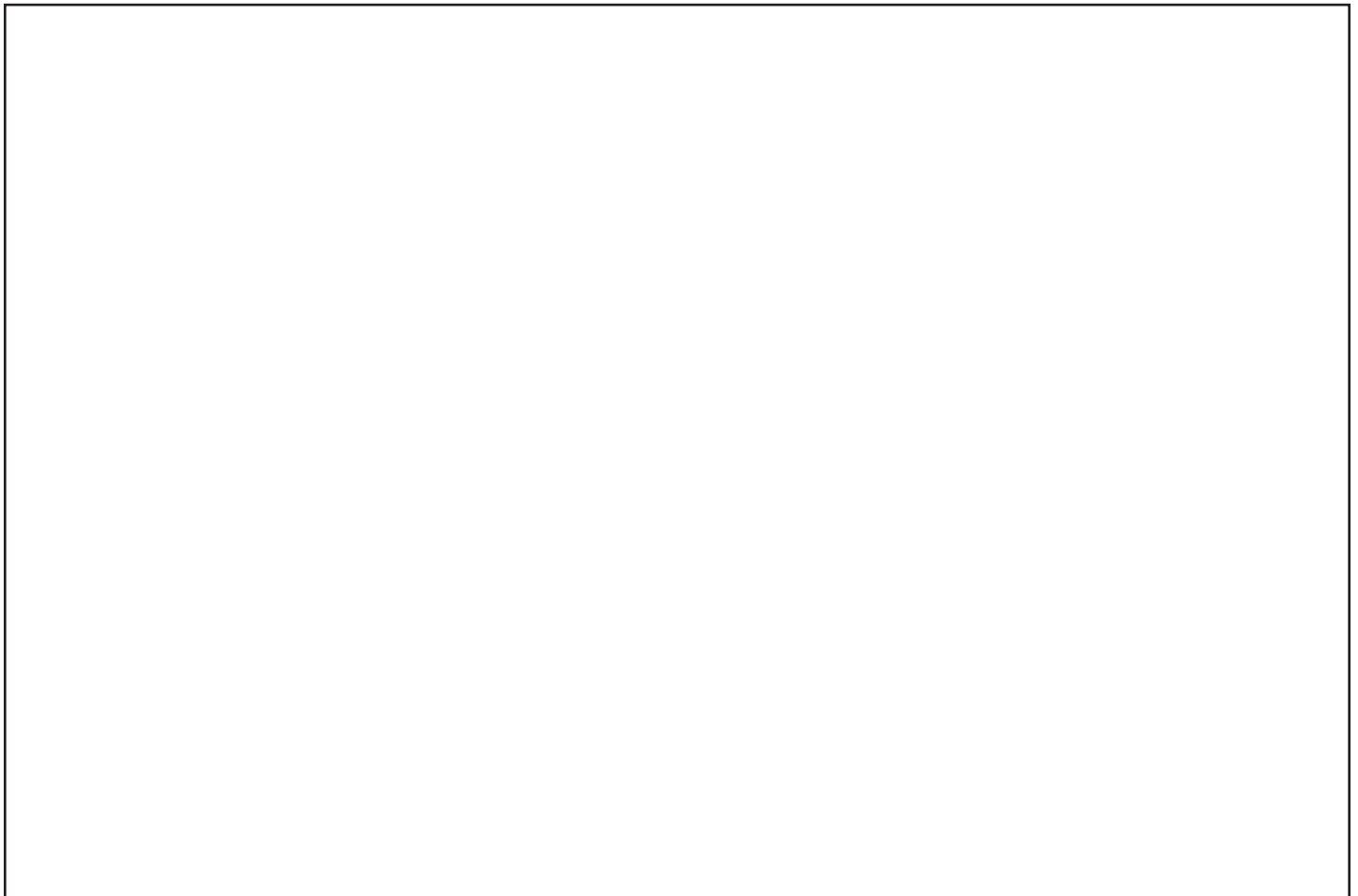
THE EARTH IS VERY OLD, but like all of us there was a time when it wasn't here. Scientists believe that one hundred billion years ago, the solar system we live in was nothing but cold dust particles swirling around in space. Gravity, the same thing that keeps our feet on the ground, attracted these particles to each other, and they clumped together to form large masses of gas and rock that eventually became the planets and the sun. When these particles came together they became white-hot from rubbing against each other and the rock particles melted together.

When the earth was young, it was a large mass of molten rock and gases. The rocks eventually cooled down, but for a very long time the Earth was a red-hot planet bursting with volcanoes and lava. It

wasn't until about 3.8 billion years ago that the Earth cooled down enough for oceans and an atmosphere to form, and these were the first steps toward life beginning on our planet.

All of that molten rock is still with us underneath many miles of cool and stable crust, but it still occasionally comes to the surface. This is what is happening when volcanoes erupt.

 In the box below, draw an idea of what you think the Earth might have looked like when it was still very young.



🦋 WHERE ARE WE IN SPACE?



EARLY THEORIES ABOUT THE EARTH and the Universe placed the Earth in the center, with all of the planets and stars orbiting around us. This theory was proven wrong hundreds of years ago, but scientists are still trying to figure out where the Earth actually is in the Universe.

What we do know is that our solar system is made up of one star, the Sun, which several planets revolve around. Our solar system is one of over 200 billion other stars and solar systems, which make up a galaxy. All of the stars and solar systems in our galaxy, called the Milky Way, revolve around one center point. The closest galaxy to ours is 27,000 light-years away, which means it takes light 27,000 years to reach us from there. There is no way, right now, of telling how many galaxies there are in the universe, but scientists say there are at least 100 billion. The universe is too large to measure and it is constantly expanding, all of the galaxies are moving outward and away from each other.

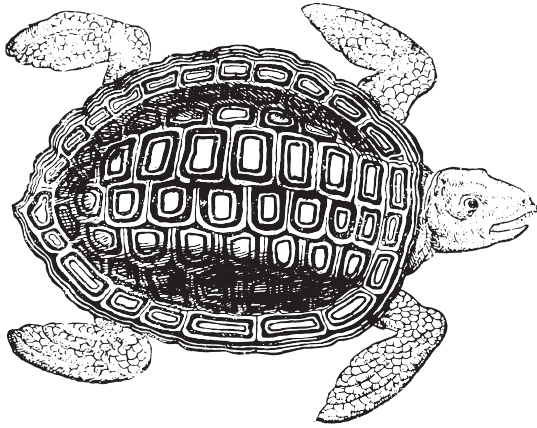
🦋 Questions

1. What is the name of the galaxy we live in?

2. How long would it take a ship going the speed of the light to reach a planet 10,000 light years away?

3. What are some of things that you think make exploring space and understanding the Universe so difficult?

EARLY MYTHS



ALMOST EVERY culture has had some kind of story, or **myth**, that describes how the Earth was made. A myth is a story that is used to pass down wisdom from generation to generation, and to help a group of people understand the world they live in. All of the stories here are summaries of myths from very old cultures—some are still with us; some of them are gone.

All of the myths like these are part of much larger groups of myths, called **mythology**. The cultures that tell them have hundreds or thousands of these stories in their mythology, explaining the world—how it was made, why it is the way it is, how to live in it—and they are all connected.

The cultures that told the myths below are from the Northwest of Canada, Greece, and the Great Lakes region of Canada and the U.S.

Haida

In the Haida mythology, the creator of the world is the trickster god Raven. The myth says there was an old man, with a daughter, who kept all of the light of world in a little box. The Raven became jealous of it. He tried to steal it but there was no way into the house. He saw the daughter leave the house to fetch water, so he transformed himself into a tiny pine needle, floated into her water bucket and was drunk by her. Later she became pregnant from this and gave birth to the Raven inside the house. Once he was inside he was able to get to the light. He took his opportunity, stole the light and flew out of the chimney of the house with the light. But he was attacked by the

god Eagle as he was flying away, and he dropped the light from his beak. It shattered on the ground and bounced back into the sky, creating the sun, moon, and stars.

There are several more myths about the Raven that describe how the mountains, rivers, and people came to be.

Greek

IN ANCIENT Greek mythology the goddess Gaia is the creator of the world. She was considered the first of all the gods. Before Gaia, everything was chaos and darkness. When she came she created the stars and the Earth and everything on it, and she gave birth to all the gods of these things. Many more gods were a part of the Greek mythology. Hades was the god of the Underworld, Poseidon was god of the Sea, and Zeus was the ruler of all of Gaia's children and the god of the sky.

Ojibwa

THE STORY of Turtle Island is common in many Native American cultures, and Turtle Island is sometimes used as a name for North America.

In the Ojibwa story, a great flood covered all of the land on Earth and killed most of the animals. Only a few good swimmers and animals that could fly survived. These animals decided that they needed dry land, so they thought they would go the bottom of the sea to get it. Many of the animals tried—the loon, the mink, the turtle—but they all failed. Finally the muskrat said he could do it and he dove down under the water. He was gone for such a long time that all of the other animals thought he was dead. Then, he came back up with land in his paws. Now there was land, but no one knew where to put it. Then the turtle said to put the land on his shell, and he would hold up the new world. They did this, and the land and animals grew and grew and are still growing, and the turtle still holds them all on his shell.

EARLY MYTHS

Each culture on the previous page also had their own style of art. The artworks from these cultures were often woven into their mythology, telling the stories with drawings and sculpture. See if you can match the artwork to the culture. Write the name by the picture.



A



B

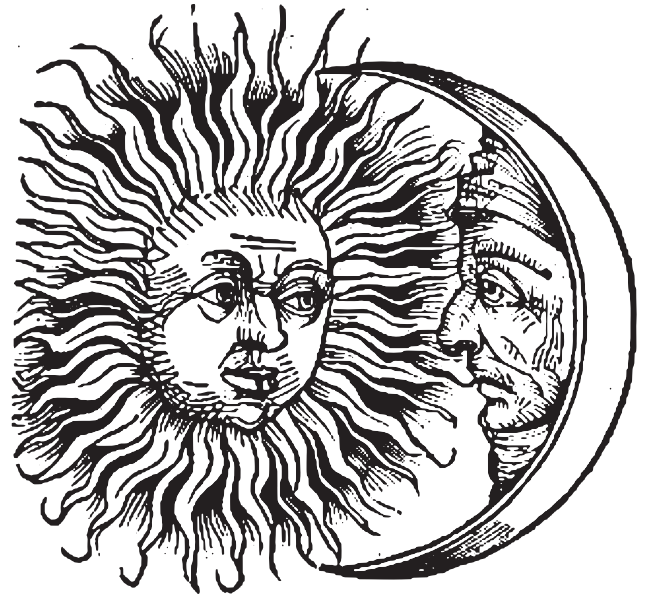


C

Answers: A, an example of Ojibwa picture writing, B, Roman bust of Tellus (the Roman name for Gaia), C, Haida carving of the Raven

☞ NEIGHBORS:

THE SUN AND THE MOON



THE EARTH ISN'T next-door neighbors with the Sun, but they still share a special bond. We need the Sun's light and warmth to survive. Without the Sun, the Earth would be too cold for us to live, and plants wouldn't be able to absorb the light from it to grow. Our atmosphere absorbs and traps the heat from the Sun so we can stay warm.

The Earth moves around the Sun, and the Moon moves around the Earth. The Moon controls ocean tides: the gravity of the moon pulls on the Earth, which causes water to move. It also gives us enough light to be able to see at nighttime.

☞ Questions

Name one more thing the Sun does for us.

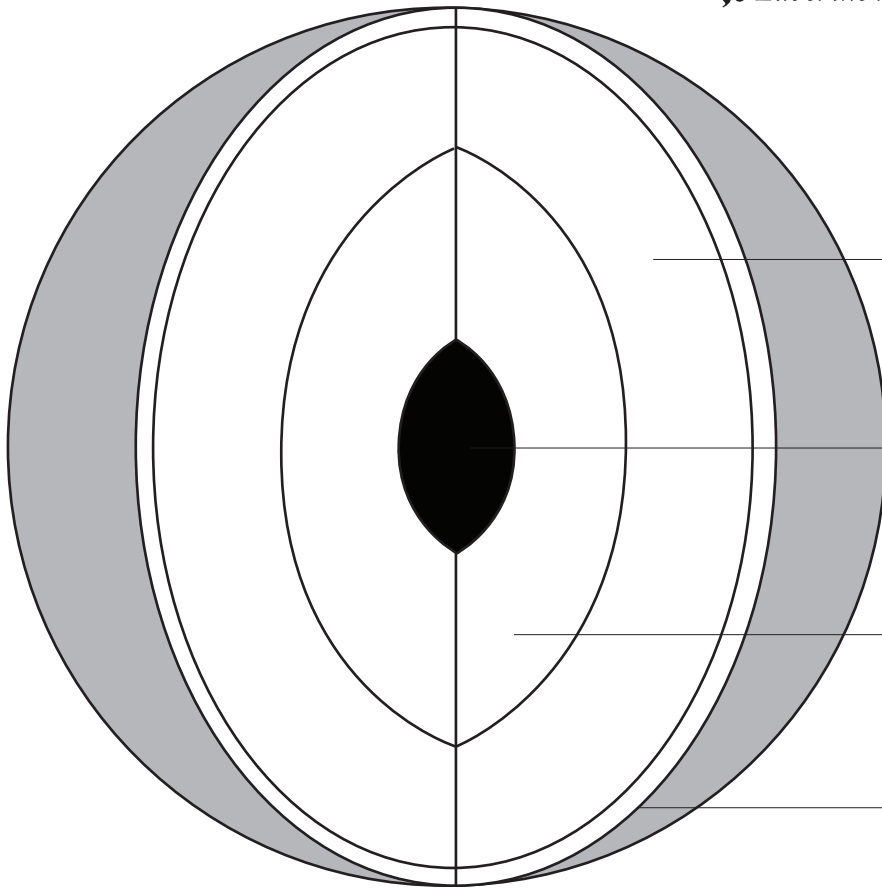
Name another thing the Moon does for us.

WHAT'S THE EARTH MADE OF?



THE EARTH IS MADE OF FOUR LAYERS: the crust, the mantle, the outer core, and the inner core. The crust is only a few miles thick and is made of rocks. The mantle is the largest layer—about 1,800 miles thick—and is made of hot magma, which comes up out of the ground when volcanoes erupt. The core is even hotter, and is made up almost completely of metallic elements. Because it is made up of metal, scientists believe the core is what makes magnetism possible on Earth.

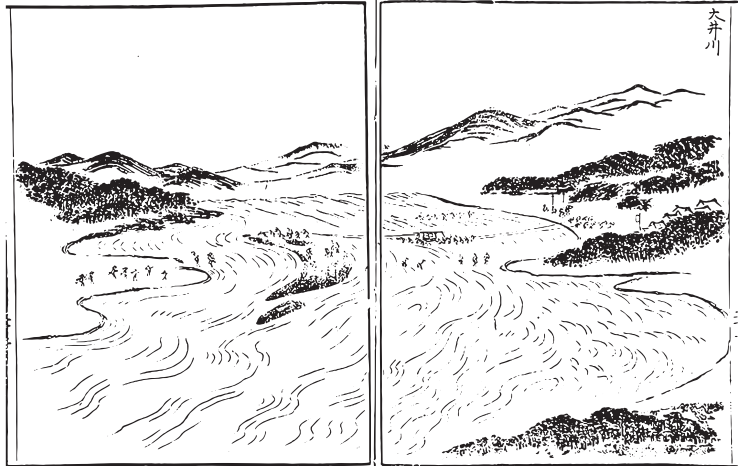
Label the layers of the Earth



WHAT IT LOOKS LIKE

FROM SPACE, the Earth looks like a big, blue ball, but because of its rotation, it actually bulges a little bit near the equator. From far away, it looks smooth and round.

Up close, the Earth has many landforms. A landform is a natural feature on the Earth's surface. The biggest landforms on Earth are the oceans and the continents. Some of the most common kinds of landforms are mountains, rivers, lakes, beaches, and plains.



🔗 Match the landform to the definition.


- | | |
|--|---|
| <p>1. Mountain</p> <p>2. Hill</p> <p>3. Plain</p> <p>4. Beach</p> <p>5. River</p> <p>6. Island</p> <p>7. Cave</p> <p>8. Desert</p> <p>9. Volcano</p> <p>10. Valley</p> | <p>A. A dry area of land where there is very little rainfall and few plants or animals.</p> <p>B. A flat area of land.</p> <p>C. A tall landform that rises high above the land around it.</p> <p>D. A long, low area in between mountains or hills.</p> <p>E. An underground area big enough for a person to enter.</p> <p>F. A small piece of land surrounded by water.</p> <p>G. An opening in the Earth that allows hot lava to escape.</p> <p>H. A landform along the shoreline of an ocean, lake, or river. It is usually made of sand.</p> <p>I. A waterway that flows toward a lake or ocean.</p> <p>J. A landform that rises above the land around it, but is smaller than a mountain.</p> |
|--|---|

🔗 Look at a map of your town or city. Are there any landforms near you? What do they look like?

answers: 1. c, 2. j, 3. b, 4. h, 5. i, 6. f, 7. e, 8. a, 9. g, 10. d

EARTH EXTREMES

THOUGH IT'S JUST a tiny planet in an ever-expanding universe, the Earth is an amazing place! Check out some of the most extreme places on the planet.

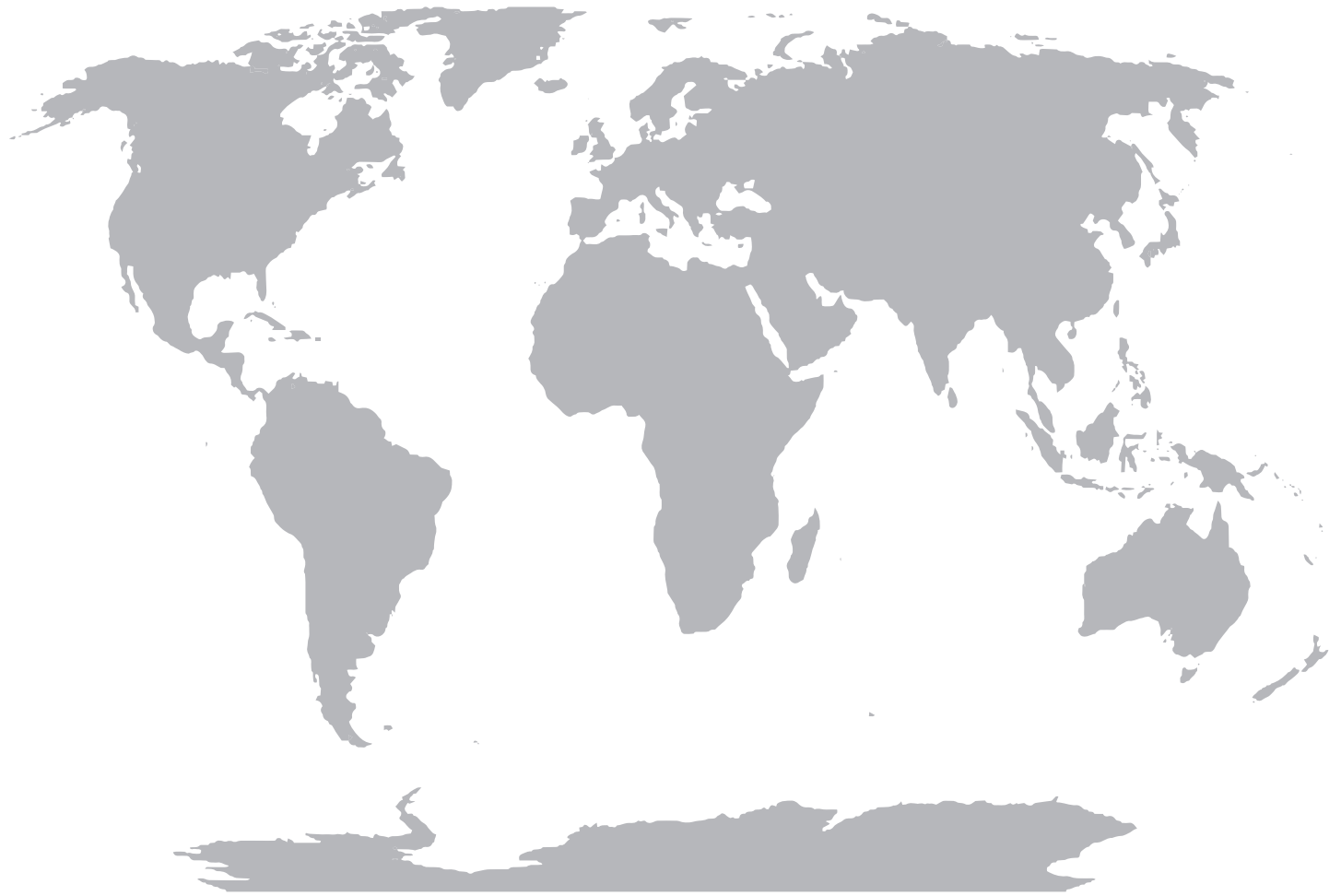
 Match these places on Earth with their claim to fame. Use clues in the text to help you.

Word Bank

Highest Point on Earth
Lowest Point on Earth
Hottest Recorded Temperature
Coldest Recorded Temperature
Most Isolated Island
Rainiest Place on Earth
Driest Place on Earth
Country with the Most People for its Size
Country with the Least People for its Size
Oldest Material Found on Earth

- 1 **Macau**, with 541,200 people in just 11.3 square miles. That's almost 48,000 people per square mile!
- 2 **Tristan da Cunha Island**, 1,700 miles from Africa and 2,000 from South America.
- 3 **Atacama Desert, Chile**, where some areas haven't had rain for 400 years.
- 4 **The Challenger Deep**, estimated to be almost 36,000 feet beneath the surface of the Pacific Ocean.
- 5 **Mawsynram, India**, which gets about 465 inches of rain every year.
- 6 **Mount Chimborazo, Ecuador**, which is 6,268 miles above sea level (the Earth bulges around the Equator, which gives it a boost).
- 7 **134 degrees Fahrenheit**, recorded in Death Valley, California, USA on July 10th, 1913
- 8 **Greenland**. Greenland is 840,000 square miles but has only 57,000 people living there; an average of 0.07 people for every square mile.
- 9 **-135 degrees Fahrenheit**, recorded in Vostok Station, Antarctica on August 10th, 2010
- 10 **Zircon**, found in Australia and dated to 4.4 billion years old.

THE CONTINENTS




CONTINENTS are described as large landmasses on earth that are separated by water. The world is usually said to have seven continents (Asia, Africa, North America, South America, Antarctica, Europe, and Australia), but most of these don't fit that definition. North and South America are connected by land, and so are Asia, Africa, and Europe. Earlier in U.S. history, we actually considered North and South America one continent called America, and many countries still do.

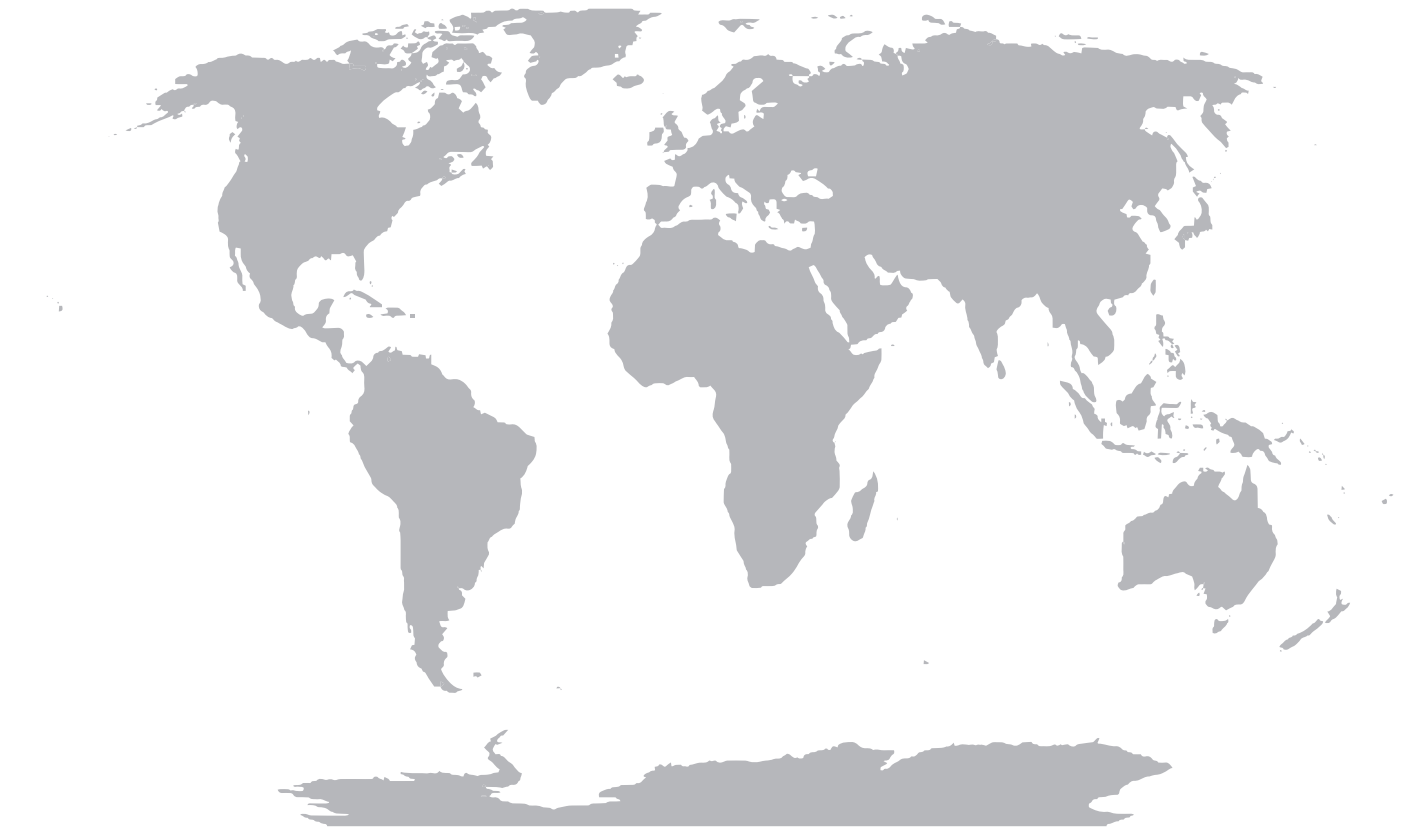
The reason we say we have seven continents has as much to do with cultural history as it does geography. Europe, Asia, and Africa were originally considered separate continents because of their very different cultures. North and South America were broken up much later for this same reason.

Geologists—people who study the Earth and the rocks it's made of—use the term continents also, but it has a different meaning. When they

talk about continents they are talking about large sections of rock under the Earth's crust called tectonic plates, and the dry land above them. There are several of these giant plates of rock and they are always moving, though very slowly. Because they are always moving the Earth looked much different many years ago, and many years from now it will look much different again. Several times in the Earth's history the tectonic plates moved around in a way that all of the dry land on Earth was connected as one giant island.

 On the map above, label all of the continents. How many countries can you place?


THE OCEAN



ABOUT 70% OF THE EARTH'S surface is covered by water. Most of this is one large body of salt water we call **the ocean**. This one large body of water is usually divided into five different smaller oceans: the Arctic, Atlantic, Indian, Pacific and Southern. They are divided up based on the landforms they separate.

Unlike most lakes and rivers, the ocean is salt water. The Earth has large amounts of salt deposits in its rocks, and when the ocean washes against these deposits, or rivers run over them and empty into the ocean, the salt is dissolved into the water. Most running water eventually empties into the ocean, and all this dissolved salt eventually makes its way there.

The earliest life on Earth started in the oceans and there are millions of species still living in it. Most of the ocean is still a mystery to humans, and there are many more species living there than we know of. The ocean is so large and deep that it has been impossible for us to explore all of it.

 On the map above, label all of the oceans. How many seas can you find?



🦋 WHO LIVES ON IT?

PEOPLE, PLANTS, AND ANIMALS depend on the Earth to survive. You can find life everywhere on Earth, from the bottom of the sea to the North and South poles. Even in the most extreme climates, life finds a way to flourish.



Why Do Humans Need The Earth?

WITHOUT THE RESOURCES available on Earth, we wouldn't be able to survive. Everything we use comes from materials found here. We breathe the air that surrounds us and stay warm thanks to the heat from the Sun. We eat the plants that grow out of the ground and build our homes from materials made from the Earth. We fuel our homes and vehicles with oil found deep underground and coal from rocks.

Why Do Animals Need The Earth?

PEOPLE ARE ANIMALS, too, but other animals use the land a little differently. Carnivores hunt other animals that live on earth. Herbivores eat the plants that grow out of the ground. Omnivores eat both. Animals make their homes in or on the ground, under the sea, or in plants. Animals have adapted to the Earth in hundreds of ways: They can have cold blood to keep them cool, fur to keep them warm, wings to let them fly over the land, or camouflage to help them blend in with it. They also need to drink water to survive.

Why Do Plants Need The Earth?

PLANTS NEED THE NUTRIENTS from the soil, the light of the sun, and elements from the air to grow. Plants go through a process called **photosynthesis**, where they absorb the light from the Sun and elements from the air and soil and turn them into their own food.

🦋 Read the attributes of each living thing below. Is it a person, plant, or animal? Careful: Some can be more than one!

1 I use oil and coal as fuel.

PERSON PLANT ANIMAL

2 I eat plants and make my home out of the Earth.

PERSON PLANT ANIMAL

3 I make my own food from natural materials.

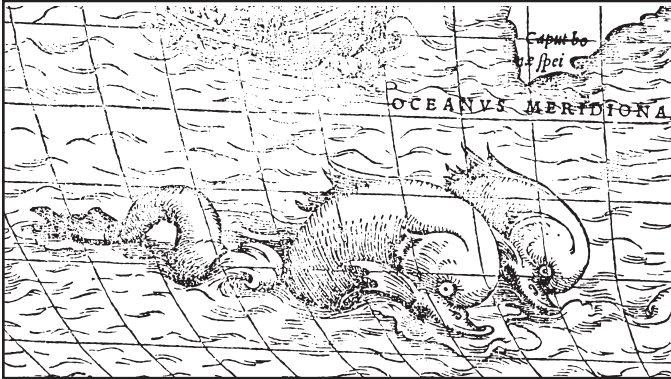
PERSON PLANT ANIMAL

4 I have fur that keeps me warm.

PERSON PLANT ANIMAL

answers: 1. person and animal 2. person and animal 3. all three 4. animal

PERCEPTIONS OF THE EARTH



WE HAVEN'T ALWAYS understood everything about the Earth. In the past, there have been many misconceptions about the Earth's shape, size, its place in the Universe, and what lived on it.

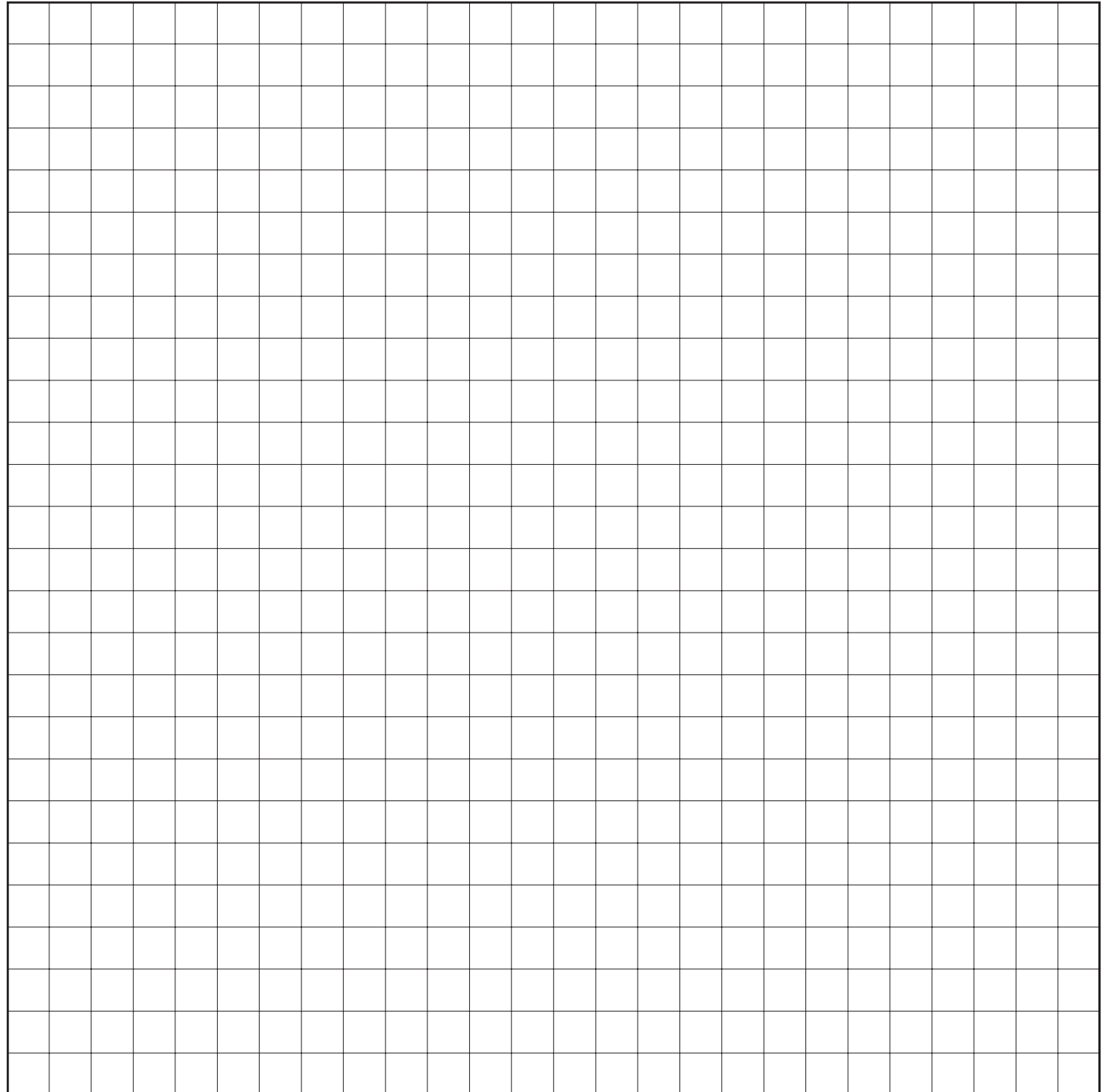
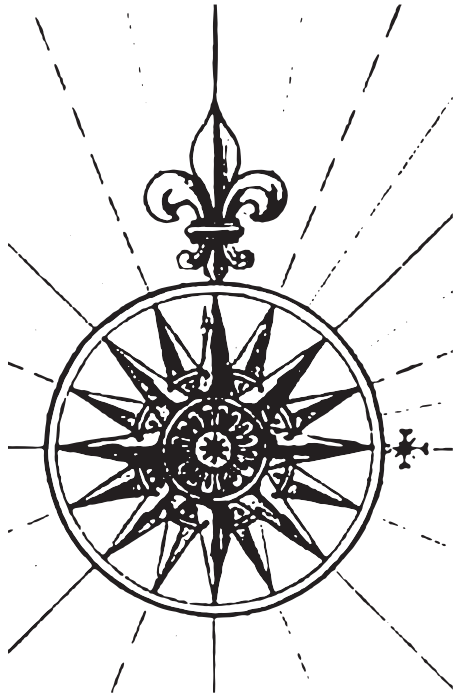
You may have heard that Christopher Columbus thought the Earth was flat—that's not true! The round shape of the Earth was known as early as the 6th century BC. When the Universe was just starting to be explored, one of the biggest misconceptions people held was that the planets all revolved around the Earth. Based on his observations, a man named Copernicus guessed that the planets, including the Earth, actually revolved around the Sun. At first, people were skeptical, but other scientists were able to prove his theory. We now know that the Sun is the center of our Solar System.

When we began exploring the Earth, sometimes our maps came out wrong. On some old maps, Australia is almost a rectangle on one end, Africa is shown to have a mountain range going through the middle of it, and California is a huge island! For many years, map-makers would draw strange sea creatures over parts of the ocean to illustrate animals they thought might live there, which made many people think that the sea was full of dangerous monsters. Even today, we are still making changes to our maps as we find out more about the Earth.

In science, mistakes are just as important as right answers. You can learn from mistakes. Write a paragraph about a time you learned from a mistake. What did you do wrong and what did you learn from it? How do you do things differently today?

MAKE A MAP

Making an accurate map isn't easy! Look at a picture of your home state and try to draw it by hand (no tracing!). Add labels for your state capital, at least three major cities, and your hometown. Mark the location of at least three major landforms and label them.



NATURAL RESOURCES


The Earth contains an abundance of natural materials that we use to survive, to make our lives easier, and also just for fun. Water, dirt, oil, rock, wind, and sunlight are all things that the Earth provides for us, and that we use every day.

We use our natural resources in three ways:

SURVIVAL: A resource needed for survival is one that we could not live without. For example, we need to drink water to stay alive.

CONVENIENCE: A resource that is convenient provides us with things that are nice to have, but we don't need. For instance, if we didn't have oil to fuel our cars, our lives would be more difficult, but we wouldn't be in danger.

RECREATION: A resource used for recreation is one that we use just for fun. We can go boating on water or use sand and grass to make a golf course.

 Name a way we can use each resource for each type of need. The first one has been done for you.

Water

SURVIVAL: Drink

CONVENIENCE: Shower/Bathe

RECREATION: Swim

Wood

SURVIVAL: _____

CONVENIENCE: _____

RECREATION: _____

Oil

SURVIVAL: _____

CONVENIENCE: _____

RECREATION: _____

Stone

SURVIVAL: _____

CONVENIENCE: _____

RECREATION: _____

Wind

SURVIVAL: _____

CONVENIENCE: _____

RECREATION: _____

Find a new way to use one of the natural resources listed above.

FACTORS AFFECTING SEED GERMINATION



What do plants need to grow? In this experiment, you'll explore one of the most important factors affecting seed germination by finding out whether the amount of water a seed receives changes how quickly it germinates.

A seed contains the beginnings of a new baby plant. To grow, this plant needs water. Water helps a plant with different processes inside the plant. It allows the plant to move nutrients from the soil into its cells.

Problem

How does the variable of moisture affect seed germination?

Materials

- Potting soil
- 12 bean seeds
- 4 clear plastic cups
- Plant mister
- Permanent marker
- Distilled water
- Notebook
- Pencil

Procedure

To set up the experiment, you'll prepare four different soil samples. Save a small amount of soil from each batch so you can use it later.

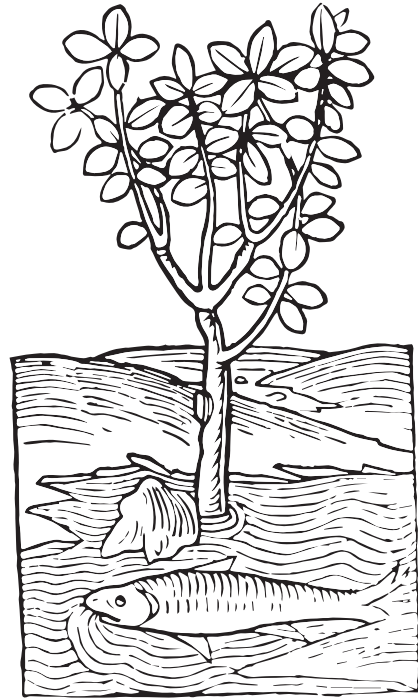
- 1 First, label one cup "Dry," another "Moist," another "Wet," and another "Soaked."
- 2 Divide the potting soil into four equal parts. One part can go into the cup labeled Dry.
- 3 Mist the second batch of potting soil with water until it is damp to the touch. Place this in the cup labeled "Moist."
- 4 Add water to the third batch of soil. It should be wet and slightly muddy to the touch. Place this batch of soil into the third cup.
- 5 Add a lot of water to the fourth batch of soil. It should be soaking wet: When you squeeze it in your hand, water should come out. Place this batch of soil into the fourth cup.
- 6 Plant four bean seeds in each cup. Place them gently on top of the soil near the edge of each cup. You should be able to see the seeds from the outside of each cup. Try to place them equal distances from each other. Cover them with $\frac{1}{4}$ inch of soil from the appropriate dry, moist, wet, or soaked pile.
- 7 Create a hypothesis, your best guess about what is going to happen. Will the seeds from the different cups germinate at the same rate? At different rates? Why?
- 8 Now, wait. Every day, look at the bean seeds. The seeds may begin to germinate. Use your notebook and pencil to take notes on what is going on with your bean plants from day to day.

Do some seeds germinate more quickly than others? Do some not germinate at all? Why?

HOW WE CAN TAKE CARE OF THE EARTH

There are lots of ways to conserve our natural resources and keep the Earth safe!

- 1 Use public transportation, ride your bike, or walk.** Some types of oil, when burned, give off amounts of carbon dioxide that cause the Earth to warm. Too much warmth on the Earth can be dangerous to us. The oil we use to fuel our cars contributes to this warming. Sharing a bus with other people or not using a car at all can help make the air cleaner and safer.
- 2 Plant trees.** Trees help clean the air by absorbing elements in it that may be harmful to us, and giving off oxygen, which we can breathe.
- 3 Use reusable bags.** Plastic grocery bags use a lot of energy and emissions to make, and they take a long time to break down in a landfill. Bring a cloth bag to the grocery store and ask the clerk to put your items in there instead.
- 4 Unplug appliances and turn off lights.** Even if they're turned off, electronics still use electricity when they're plugged in. Electricity is powered by fossil fuels, which can be harmful to the air in large amounts. Same goes for lights: if they're on, they're using energy! Make sure to turn off and unplug appliances when you're done using them.
- 5 Use a reusable water bottle.** Even if it's recyclable, it still takes energy and fuel to turn a plastic bottle into something new. Skip that step altogether by filling and refilling a metal or glass water bottle.
- 6 Only print what you need.** Paper is made from trees, and trees help keep the air clean and Earth beautiful. If you want to print something, think about whether you really need it on paper. If it's something that can be emailed or sent in an online message, do that instead.

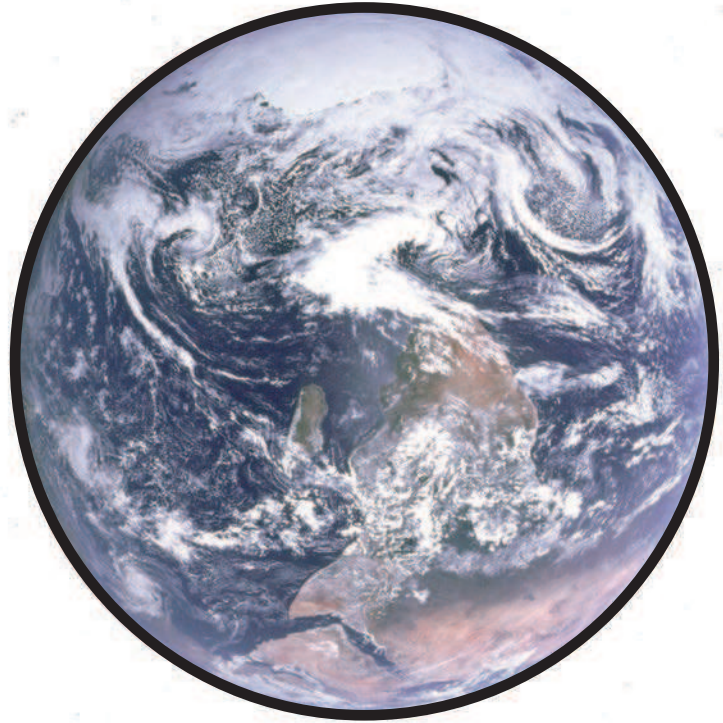


- 7 Recycle and compost!** If you must use a one-time use item, make sure to recycle it if you can. Recyclable packages have a little triangle with a number between 1 and 7 in the middle of it printed on the package. Most natural items, like food, dirty paper plants and even dryer lint, can even be composted. Check to see if your town or city has a composting program, or start a compost pile if you have a backyard.
- 8 Put your lunch in reusable containers.** Plastic and paper lunch bags usually aren't recyclable.
- 9 Buy used items.** It takes energy to make practically every new item. If there's something you want to buy, try to find it at a secondhand store before buying it brand new.
- 10 Use reusable utensils instead of plastic ones, and cloth napkins instead of paper.** Going on a picnic? Bring regular utensils from home and wash them when you get back. At home, try using cloth napkins—when they get dirty, throw them in with your laundry.

THE BIG, BLUE


MARBLE

This is a photo of the Earth, taken by the crew of the Apollo 17 mission to the Moon. It's titled "The Blue Marble." Can you guess why?



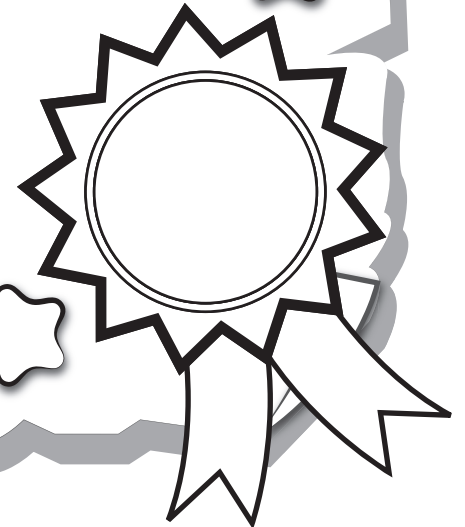
Question

Imagine you're an astronaut looking at the Earth from your spacecraft. What are you thinking? How do you feel about your home planet?



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Answer Sheets

Earth: You are Here

Introducing ... the Earth

Answer Sheet

INTRODUCING...THE EARTH

WORD SEARCH ANSWER SHEET

Word Search

EARTH
PLANET
MILKY WAY
SOLAR SYSTEM
UNIVERSE
LIFE
ATMOSPHERE
SUN
MOON

C	N	N	H	U	I	X	A	X	A	Y	P
A	P	O	Y	N	W	O	T	V	Y	A	L
H	O	O	K	I	Q	W	M	Z	B	W	A
J	T	M	D	V	F	C	O	F	D	Y	N
H	S	U	N	E	J	T	S	L	D	K	E
J	T	Y	R	R	J	G	P	V	L	L	T
X	F	R	H	S	G	E	H	R	H	I	I
G	X	L	A	E	R	U	E	N	B	M	P
Z	Q	E	Z	E	R	Z	R	E	F	I	L
Z	K	F	H	L	Z	X	E	E	E	W	E
M	E	T	S	Y	S	R	A	L	O	S	X
R	S	V	Q	Q	P	M	B	M	Z	M	U