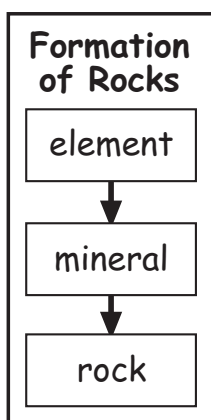


30—Earth Materials and Their Uses

A ¹The earth is made up of a variety of materials, such as rocks, minerals, and metals. ²People can use these resources in many ways—but first, they have to get them.

B ³We get many earth materials by digging into the earth's crust. ⁴The **earth's crust** is a thin layer of solid rock that makes up the earth's outer layer. ⁵It is about 20 miles (32 km) thick.

C ⁶**Rock** is made of one or more minerals stuck together. ⁷**Minerals** are solid, nonliving substances found in the earth's crust. ⁸A mineral is made of elements and compounds. ⁹For example, limestone is a mineral made up of calcium, carbon, and oxygen. ¹⁰An **element** is a basic substance made of only one kind of matter.



D ¹¹People use rocks to build things, such as stone walls. ¹²Rocks are also used to make other building materials, such as concrete.

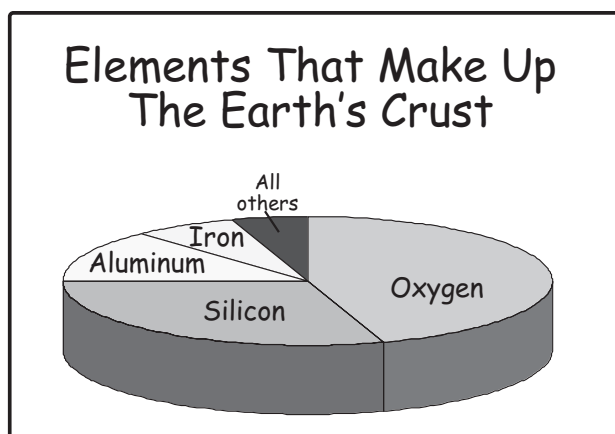
E ¹³Minerals have many uses. ¹⁴For example, table salt is used to make food taste better. ¹⁵Minerals such as diamonds and gemstones are used to make jewelry. ¹⁶Because they are so hard, diamonds are also used in drills or cutting machines. ¹⁷Coins used to be made from *pure* materials such as gold and silver. ¹⁸Each of these metals is

made of a single element. ¹⁹Can you give two examples of metals used to build things like bridges and automobiles?

F ²⁰People also use the earth as a source of energy. ²¹For example, the inside of the earth is so hot that its heat can be used to boil water. ²²Boiling water makes steam. ²³Steam is a force that can be used to produce electricity. ²⁴The energy in hot water can also be used to heat homes. ²⁵Some of the earth's minerals are also used as a source of energy. ²⁶For example, radioactive elements like uranium are used to produce nuclear energy. ²⁷Fossil fuels like fuel oil and coal also come from the earth.

G ²⁸The water that covers most of the surface of the earth is another natural resource. ²⁹We use the oceans in transporting goods and people by boat. ³⁰If necessary, we can remove the salt to make drinking water. ³¹We can even use the motion of ocean waves to produce electricity.

H ³²The circle graph below shows the major elements that make up the earth's crust. ³³About how much of the earth's crust is made up of oxygen?



1. For each statement, circle T or F for true or false. In each blank, write the number of the SENTENCE that gives the best evidence for your answer.
 - a. Diamonds are used in drills to make them more attractive. T F ____
 - b. An element can be broken down into compounds. T F ____
 - c. The motion of ocean waves produces a force. T F ____
2. What is the most likely meaning of *pure* as it is used in sentence 17?
 - a. unmixed c. dirty
 - b. mixed d. valuable
3. Sodium chloride is a mineral made up of two elements, sodium and chlorine. Therefore, sodium chloride is
 - a. an element.
 - b. an atom.
 - c. a compound.
 - d. a rock.
4. The metal copper is made up of only one kind of matter. Therefore, copper is
 - a. an element.
 - b. an atom.
 - c. a compound.
 - d. a rock.
5. Use the *Elements that Make Up the Earth's Crust* pie chart in the lesson to answer the following questions.
 - a. Which element is there most of in the earth's crust?

 How can you tell from the pie chart?

 - b. Which element is there less of, iron or aluminum?

 Why is this difficult to answer?

 - c. The earth's crust has over 90 elements. Why do you think the pie chart in the lesson shows only a few of these? Use a complete sentence to explain your answer.

6. Complete the flow chart below to show what makes up a rock, starting with its most complex part to its simplest. Use these terms:
 mineral
 compound
 rock
 element



33. Galileo's Vision by David White

A ¹It was a clear night in 1610 when Galileo Galilei looked through his telescope and saw the four closest moons of Jupiter.

²They were only dots in the sky, but they were there.

B ³It was quite a discovery. ⁴In fact, the moons Galileo saw were the first moons other than our own moon that anyone had ever seen.

C ⁵Now, Galileo didn't invent the telescope. ⁶Hans Lippershey of Holland did in 1608. ⁷He designed it so people could look at things far away. ⁸But Galileo was the first to use a telescope to look at stars and planets.

D ⁹Using the telescope, Galileo also discovered that our moon was not the perfect, mysterious sphere everyone thought it was. ¹⁰He proved that the moon was filled with craters. ¹¹He also proved that the light that seemed to be coming from the moon was actually a reflection of light coming from the sun.

E ¹²Galileo was also the first scientist to prove a theory by testing it and recording results. ¹³Until that time, scientists would prove their theories by making arguments without giving evidence.

F ¹⁴Galileo was the first to provide visual evidence in support of the theory that Earth revolves around the sun. ¹⁵A man named Copernicus of Poland had written in 1543 that Earth was not the center of the universe. ¹⁶He had said that the sun was the center of what we call the solar system and that Earth circled the sun. ¹⁷Not many people believed



him. ¹⁸Teachings until that time had placed Earth firmly at the center of the universe, with everything else revolving around it.

¹⁹Galileo, night after night, saw the moons of Jupiter at different points in the sky. ²⁰It was clear that they were circling Jupiter, not Earth. ²¹What Galileo saw helped prove Copernicus's theory.

G ²²Astronomy has come a long way since 1610. ²³We now know that Jupiter has at least 16 moons. ²⁴We know that our own solar system has nine planets. ²⁵We know that seven of those planets have moons.

²⁶We know that the universe contains other solar systems like ours. ²⁷We have telescopes searching the night sky for signs of life.

²⁸Thousands of people now do what one man started on a hill in Italy almost 400 years ago.

DIRECTIONS: Choose or write the best answer to each of the following questions using the evidence presented in the passage. When required, list specific sentence numbers or paragraph letters from the story to support your answer.

1. Which of these best explains why people before Galileo hadn't seen moons around Jupiter?
- A. They hadn't looked in the right place.
 - B. They hadn't turned the telescope toward the night sky.
 - C. They thought Jupiter didn't have moons.
 - D. They thought Earth was the center of the universe.

Give the number of the sentence that best supports your answer. ____

2. Which of these words best describes the process that Galileo introduced to scientific theory?
- A. visualization
 - B. determination
 - C. argumentation
 - D. experimentation

Give the number of the sentence that best supports your answer. ____

3. The author's purpose in writing this passage was probably
- A. to discuss modern astronomy.
 - B. to show how to use a telescope.
 - C. to prove Galileo's theories about the universe.
 - D. to show Galileo's contributions to science.
4. Scientists before Galileo proved theories by making arguments. This kind of proof can best be described as
- A. theoretical.
 - B. historical.
 - C. natural.
 - D. technical.

5. Compare the two scientific theories described in paragraph F.

6. Explain one way that Galileo changed the way people thought about the Moon.

Give the letter of the paragraph that best supports your answer. ____

7. Which of these statements about the passage is an opinion?
- A. The moon is filled with craters.
 - B. Galileo put the telescope to good use.
 - C. Galileo discovered four moons of Jupiter.
 - D. People didn't believe Copernicus's theory at first.