Think Consider everything you've learned so far about reading scientific texts. Use information in the cartoon and the *How and Why* column to add the events to the *What Happened* column of the chart. List the events in the order they occur in nature. These events answer the question: "What happened?"

What Happened	How and Why
Events That Created a Fossil	**How and Why a Fossil Is Created**
• A dead fish is covered with mud at the bottom of the ocean. • The mud hardens around the fish skeleton. • The fish skeleton slowly dissolves. Minerals fill in and harden where the skeleton was. • Millions of years later, the rock wears away and a person discovers the fossil in the shape of the fish skeleton.	Over millions of years, the fish skeleton dissolves and is replaced by other minerals. They harden in the shape of the skeleton. This creates a fossil. Later, erosion wears away the rock and soil to uncover the fossil.

Talk Share the events you added to the chart with a partner.

- Did you agree on the events and their order?
- How did the details in the chart help you understand more about the causes and effects of the events being shown?

Academic Talk

Use these words and phrases to talk about the text.

- **scientific text**
- **causes**
- **effects**
- **events**

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Read

Genre: Science Article

A POWERFUL ROCK

by Patrick Pierce

1 Coal may look like an ordinary black rock. But inside, it contains powerful energy that can be used for heat and electricity. Coal is made from plant matter that was buried far below the Earth's surface for millions of years. Being buried so deeply and for so long put the plant matter under intense heat and pressure. The heat and pressure caused the chemical and physical characteristics of the plant matter to change. Eventually, the plant matter turned into coal.

2 Coal must be mined, or dug up from below the ground. After it is mined, the coal travels to a machine that cleans it. This process removes dirt, rocks, and other unwanted materials. Next, heavy machines crush the coal until it becomes a fine powder. Finally, the coal is burned to make steam. Special machines called turbines use this steam to create electricity.

3 Today, generators fueled by coal supply much of the world's energy. But the processes used to mine coal and convert it into fuel can pollute our air, land, and water. When coal is burned, harmful chemicals are released into the air. These chemicals get carried through the air by the wind and fall in the raindrops. This is called acid rain. It can make plants and animals very sick.

4 Engineers are developing new technologies to reduce the potential air pollution from coal. These promising solutions may help us get the most from this powerful rock while protecting our precious planet.

Close Reader Habits

As you read, **circle** details that describe how coal forms. Then **underline** details that explain its uses.

Explore **What information in "A Powerful Rock" helps you understand how coal is formed and how it is used today?**

Look for the parts of the text that answer *what*, *how*, and *why* questions.

Think

1 Complete the chart below by adding the descriptions of what happens. Then explain how or why it happens.

What Happens	How and Why It Happens
How Coal Is Formed	
Plant matter from millions of years ago is changed into coal.	**The heat and pressure from being buried made the plant matter change. The chemical and physical characteristics changed, making coal.**
How Coal Is Used	
Coal is mined and burned to make steam, which makes energy.	Coal is used to produce energy that creates electricity.
Using coal harms the environment.	**The mining and burning of coal creates pollution.**

Talk

2 Explain why the author describes coal as a "powerful rock." Describe **two** benefits and **two** problems created by people's use of coal.

Write

3 **Short Response** Explain how people process and use this "powerful rock." Include at least **one** benefit and **one** problem caused by people's use of coal. Include details to support your response. Use the space provided on page 58 to write your answer.

HINT Find details about benefits and problems, such as "supply energy" and "harmful chemicals."

Gold

by Carl Gelb

1 People have valued gold for thousands of years. Because of the metal's durability, gold ornaments, statues, and jewelry look as brilliant today as when the artists of ancient Egypt and other cultures crafted them thousands of years ago. Gold is one of nature's true wonders.

2 **Properties:** Gold is an element. It cannot be broken down into simpler substances. Gold is also very malleable, which means it is easily flattened into a thin sheet. Gold is also ductile, which means it can be pulled into a wire. For these reasons, gold is useful in making jewelry. One ounce of gold can become 187 square feet of gold leaf or one mile of gold wire. Gold also conducts heat and electricity very well.

3 **Alloys:** Pure gold is very soft. Because it's so soft, gold is often mixed with other metals to make a mixture, or alloy, that is stronger than gold alone. Adding silver, copper, and zinc to gold produces the color we associate with jewelry.

4 **Today's Uses:** In the past, gold was mainly used for jewelry, statues, and other decorations. But today we use gold for more than just its beauty. It is an excellent conductor of electricity. This means that electricity flows through it easily. As a conductor, gold coats electrical parts inside our cell phones and computers. It helps speed the flow of electricity. Thin films of gold also reflect radiation on satellites, the sun visors of space suits, and the windows of skyscrapers. Gold's uses are many and important!

Computer Microchips ▶

Close Reader Habits

What was gold used for in the past, and what is it used for today? Reread the article. **Underline** details that tell how people have used gold in the past and the present.

Think Use what you learned from reading "Gold" to respond to the following questions.

In science texts, the cause of what happens often appears near words such as *because* and *reasons*.

1 The following question has two parts. First, answer Part A. Then answer Part B.

Part A

Which statement **best** explains why gold is used for making jewelry?

A Gold cannot be broken down into a simpler substance.

B Gold can be made into a mile of gold wire.

C Gold is durable and easily flattened, stretched, and shaped.

D Gold is a good conductor of heat and electricity.

Part B

Read paragraph 2. Underline **two** sentences that **best** support your answer to Part A.

Properties: Gold is an element. It cannot be broken down into simpler substances. Gold is also very malleable, which means it is easily flattened into a thin sheet. Gold is also ductile, which means it can be pulled into a wire. For these reasons, gold is useful in making jewelry. One ounce of gold can become 187 square feet of gold leaf or one mile of gold wire. Gold also conducts heat and electricity very well.

Talk

2 Explain why people have valued gold for thousands of years. Use the chart on page 59 to organize your thoughts about people's use of gold in the past and the present.

Write

3 **Short Response** Use the information in your chart to explain what makes gold useful and why people valued gold in the past and today. Include at least **two** details from the passage to support your answer. Use the space provided on page 59 to write your response.

HINT Think about how people's use of gold today is similar to and different from its use in the past.

Think

- Have students work with a partner to complete item 1. Draw attention to the boldface words **best** in Part A and **two** and **best** in Part B.

TIP Explain to students that paragraph 2 has a clue that signals why gold is used for jewelry. Tell them to find the clue and look at the surrounding text to try to determine the causes.

Answer Analysis

When students have finished, discuss correct and incorrect responses.

1 **Part A**

The correct choice is C. Gold is good for making jewelry because it is easy to shape.

- **A, B,** and **D** describe characteristics of gold but not ones desirable for jewelry making.

Part B

Students should underline sentences 3 and 4. Sentence 5 (*For these reasons, gold is useful in making jewelry*) shows that the two preceding sentences best support the answer to Part A. *DOK 3*

● Monitor Understanding

● Integrating Standards

Write **Use the space below to write your answer to the question on page 55.**

A POWERFUL ROCK

3 **Short Response** Explain how people process and use this "powerful rock." Include at least **one** benefit and **one** problem caused by people's use of coal. Include details to support your response.

HINT Find details about benefits and problems, such as "supply energy" and "harmful chemicals."

Sample response: People dig up the coal. Then they clean it and crush it so it can be burned. Burning coal gives people electricity. This is a benefit. Burning coal also causes pollution by putting bad chemicals into the air. This is a problem.

Don't forget to check your writing.

Check Your Writing

- ☐ Did you read the prompt carefully?
- ☐ Did you put the prompt in your own words?
- ☐ Did you use the best evidence from the text to support your ideas?
- ☐ Are your ideas clearly organized?
- ☐ Did you write in clear and complete sentences?
- ☐ Did you check your spelling and punctuation?

Gold

Talk **2** **Use the chart below to organize your ideas.**

What Happens	How and Why It Happens

Write **Use the space below to write your answer to the question on page 57.**

3 **Short Response** Use the information in your chart to explain what makes gold useful and why people valued gold in the past and today. Include at least **two** details from the passage to support your answer.

HINT Think about how people's use of gold today is similar to and different from its use in the past.

Sample response: In the past, people mostly used gold to make jewelry, statues, and other decorations. People liked gold because of its beauty. Thousands of years ago, artists in ancient Egypt made gold jewelry and statues. Today, people still use gold for jewelry. They also use gold for many other important purposes. For example, gold is used to conduct electricity in computers.

Think Use what you learned from reading the science article to respond to the following questions.

1 The box below lists four benefits to your body from minerals in food.

builds strong bones and teeth
helps muscles and the nervous system work properly
transports oxygen from the lungs to the rest of the body
helps the immune system

Complete the table below by writing each benefit in the correct box.

Mineral	Why Your Body Needs the Mineral
zinc	helps the immune system
calcium	builds strong bones and teeth
potassium	helps muscles and the nervous system work properly
iron	transports oxygen from the lungs to the rest of the body

2 Read the sentence from the passage.

The body needs iron to transport oxygen from your lungs to the rest of your body.

What does the root *trans* mean in the word transport?

A many
B all
C across
D against

Think

- Use the Monitor Understanding suggestions to support students in completing items 1–3.

● Monitor Understanding

Answer Analysis

When students have finished, discuss correct and incorrect responses.

1 **See the answers on the student book page.** Remind students that this item simulates drag-drop items they may see on computer-based assessments.
DOK 2 RI.4.3

2 **The correct choice is C.** *Trans* describes the type of action used to *port*, or "carry," the oxygen across the body.

- **A, B,** and **D** do not describe actions involved in helping oxygen move from the lungs to the rest of the body.

DOK 2 L.4.4b

Independent Practice

3 Part A

The correct choice is B. The passage states that minerals from the macromineral and trace categories are needed to maintain health in all parts of the body.

- **A** is incorrect because the passage does not state that macrominerals are more important, only more plentiful.
- **C** is about iron, whereas calcium—a macromineral, not a trace mineral—is more important for bone health.
- **D** contradicts the text because the passage states that a supplement is optional.

Part B

The correct choices are D, E, and F. Students should note that the three minerals are macrominerals and trace minerals, and all are necessary to overall health.

- **A** is a general statement about all minerals, not a statement about macrominerals and trace minerals.
- **B** and **C** say what macrominerals and trace minerals are, not why they are needed.

DOK 3 **RI.4.3**

3 The following question has two parts. First, answer Part A. Then answer Part B.

Part A

What conclusion about macrominerals and trace minerals is supported by the passage?

A Macrominerals are more important because they exist in larger quantities than trace minerals.

B Macrominerals and trace minerals are needed for a healthy heart, blood and tissues, and immune system.

C Trace minerals like iron are more important for keeping your bones healthy than macrominerals are.

D Macrominerals and trace minerals must come from food and also from supplements.

Part B

Which **three** sentences from the passage **best** support your answer in Part A?

A "Just like vitamins, minerals help your body grow, develop, and stay healthy."

B "The two kinds of minerals are: macrominerals and trace minerals. Macro means "large" in Greek (and your body needs larger amounts of macrominerals than trace minerals)."

C "Scientists aren't even sure how much of these minerals you need each day."

D "Calcium is the top macromineral when it comes to your bones."

E "The body needs iron to transport oxygen from your lungs to the rest of your body."

F "They do, and potassium helps make sure the amount of water is just right."

Write

4 **Short Response** What are the two main types of minerals? Identify examples of each type, and explain how our bodies get them. Use details from the article and the food chart in your response.

Sample response: The two kinds of minerals are macrominerals and trace minerals. Our bodies need both kinds of minerals to stay healthy. Macrominerals such as calcium are minerals that our bodies needs in large amounts. Trace minerals are minerals that our bodies need in small amounts. Zinc and iron are trace minerals. We can get these minerals by eating healthy foods.

Learning Target

You've learned how to think carefully about information that answers *what*, *how*, and *why* questions in science texts. Explain how this can help you develop a deeper understanding of a text and the world around you.

Responses will vary, but students should demonstrate an understanding of the importance of identifying and analyzing the main idea and key details that answer *what*, *how*, and *why* questions in scientific texts.