

Mc Graw Hill Education

Nonders

Weekly Concept Patterns

Essential Question Where can you find patterns in nature?

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Seeing a Zuril 201

Though each thing in nature is unique, the repetition of shapes, colors, lines, and behaviors shows us that nature works in patterns.

- A geographic formation such as this salt marsh is often created over time. Wind and water, for example, create patterns like cut-outs in the landscape.
- These pictures of a leaf, coral, and a honeycomb suggest that things on Earth have a pattern.









Write words you have learned about patterns in nature. Then talk about one pattern in nature

you have seen.



Vocabulary

Use the picture and sentences to talk with a partner about each word.



When I turned on the gas stove, the flame made contact with the metal pot. What happens when your hand comes

into contact with something hot?



When storms erode the beach, they carry sand away from the shore. Why does the beach get smaller when storms erode it?



The marching band played in <mark>formation</mark> during halftime.

Does formation mean that you make something or destroy it?



I knew it had rained when I saw drops of **moisture** on the leaves.

What is an antonym for moisture?



Tiny **particles** of sand floated in the light shining across the dunes.

What is a synonym for particles?

repetition



I do each exercise in a repetition of ten, and hope to increase it to twenty.

What is a skill you have learned better through repetition?



My little sister built a structure with blocks.

Did you ever build a structure, such as a castle or fort?



The boy's face was visible through the apartment window.

What is visible from your window?





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Essential Question

Where can you find patterns in nature?

Read about patterns you can find in rocks and rock formations.

Rock Solid

"Solid as a rock" is a saying often used to describe something that's reliable, that doesn't change. But, in fact, rocks do change. The effects of water, wind, and temperature over long periods of time slowly transform one type of rock into another type of rock. These same forces also shape aweinspiring landscapes and sketch designs on rock. Nature's patterns are visible in some rocks as small as pebbles and in wonders as vast as the Grand Canyon.

The photograph across these pages shows one example of nature's art. This structure of rock, known as the Wave formation, is made of sandstone. It is sand turned to rock over a long period of time.

Igneous Rocks

Igneous rocks are one type of rock. They are formed from hot, liquid rock called magma. Magma exists far below the Earth's surface, but it sometimes escapes to the surface through cracks, such as the mouths of volcanoes. Then, we call it lava.

This molten rock, or lava, is composed of minerals. As the minerals slowly cool, they form crystals. Eventually, the once fiery liquid hardens into a solid substance.

There are many kinds of igneous rock. Their textures and colors come from their crystallized minerals. You may be familiar with granite, which feels rough and comes in many colors. Another variety of igneous rock is obsidian, which is smooth and often black. Granite

Obsidian

Sedimentary Rocks

Igneous rocks do not stay the same forever. Water and wind **erode** them, carrying away **particles** of broken rock and depositing them elsewhere. These particles may be left on a beach or riverbank, in a desert or the sea.

Gradually, the particles collect in layers. The **contact** between the particles and the weight of the layers squeeze out any pockets of **moisture** or air. Pressed together, the particles form a new material called sedimentary rock. It is formed from many different sorts of sediment. It can include rocks and sand, as well as biological matter, such as plants, bones, and shells.

Limestone

Marble

Sandstone

Just as there are different kinds of igneous rock, there are different kinds of sedimentary rock. Sandstone is formed from sand. Limestone is composed of bones and shells.

Rock Formations

Over time, a layer can be created entirely of one kind of sedimentary rock. Geologists who study rocks call a layer made of the same material and at about the same time a *stratum*. Another stratum of a different kind can be deposited on top of the first one. The plural for stratum is strata.

Many strata of different kinds of rock can accumulate. Each one will press down on those that came before it. Scientists learn a lot by studying the chronology of layers. The oldest layer will be at the bottom, the youngest at the top.

These layers of sedimentary rock can create dazzling patterns. Each layer will have its own texture and colors. Moreover, water and wind will continue to do their work.

The Rock Cycle

Still, rocks continue to change. There is a third type of rock below the earth's surface, called metamorphic rock. These rocks are pressed down upon by the layers of rock above them. At the same time, they are heated by the magma beneath them. Eventually, the heat will cause some metamorphic rock to melt and become magma.

As the magma slowly cools, it will turn back into igneous rock. The **repetition** of this process is called the rock cycle. The rock cycle is a pattern—a pattern of change that repeats and continues. It transforms liquid rock into a solid substance. It builds cliffs from sand and bones. And it returns rock to liquid form.



Make Connections

Talk about the patterns you can find in sedimentary rocks. Where do you see these patterns? **ESSENTIAL QUESTION**

Compare the patterns of change in rocks with other patterns you have seen. TEXT TO SELF

Ask and Answer Questions

One way to be sure you understand a science text is to ask and answer questions about the information. You can ask a question such as, *Why does this happen?* Then look for information in the text to help you answer the question.



Find Text Evidence

You might ask *How do rocks change?* when you read the first paragraph of "Patterns of Change" on page 195. As you read, you can look for answers to your question.

page 195

Rock Solid

"Solid as a rock" is a saying often used to describe something that's reliable, that doesn't change. But, in fact, rocks do change. The effects of water, wind, and temperature over long periods of time slowly transform one type of rock into another type of rock. These same forces also shape aweinspiring landscapes and sketch designs on rock. Nature's patterns are visible in some rocks as small as pebbles and in wonders as vast as the Grand Canyon.

The photograph across these pages shows one example of nature's art. This structure of rock, known as the Wave formation, is made of sandstone. It is sand turned to rock over a long period of time. The text explains that water, wind, and temperature over long periods of time can change one type of rock into another type. They can also shape landscapes and sketch designs on rock.

Your Turn



Ask and answer a question about the information in the section "Igneous Rocks" on page 195. As you read, use the strategy Ask and Answer Questions.

Main Idea and Key Details

Most texts have an overall **main idea**. This is what the writer most wants you to know about a topic. To find the **main idea**, identify **key details**. Then decide what all the key details have in common.



Find Text Evidence

After I read "Sedimentary Rocks" on page 196, I see that the key details are about how different particles form sedimentary rocks. From these details, I can find the main idea.

Main Idea

Particles such as sand or bones and shells form different sedimentary rocks.

Detail

Wind and water carry away rock particles.

Detail

Particles collect in layers and are pressed together.

Detail

Sedimentary rocks are made from the pressed particles.





Reread "Rock Formations" on page 196. Use key details to find the main idea of this section.

Go Digital! Use the interactive graphic organizer

Expository Text

The selection "Patterns of Change" is expository text.

Expository text:

- · Explains a topic with reasons and evidence
- Supports reasons and evidence with facts, examples, and concrete details
- · May include text features, such as diagrams or time lines

Find Text Evidence

I can tell "Patterns of Change" is expository text. It provides evidence and gives reasons why patterns occur, supporting these with facts and concrete details. A diagram illustrates information.



Diagram A diagram helps readers visualize information. Read the title, callouts, and labels. Then study the way information is arranged, paying attention to the direction in which arrows point.

Your Turn



With a partner, describe the rock cycle. Begin with magma or lava. Following the arrows, explain how the molten rock changes.

Greek Roots

If you know the meaning of a word's root, you can use it as a clue to figure out the meaning of an unfamiliar word. Some roots from ancient Greek are *geo*, which means "earth"; *logy*, which means "study"; *chrono*, which means "time"; *bio*, which means "life"; and *morph*, which means "form."



Find Text Evidence

I'm not sure what geologists means on page 196 of "Patterns of Change." I know that geo means "earth" and logy means "study." The context clue who study rocks also helps me figure out that geologists means "someone who studies the earth."

Over time, a layer can be created entirely of one kind of sedimentary rock. Geologists who study rocks call a layer made of the same material and at about the same time a *stratum*.

Your Turn

COLLABORATE

Use what you know about Greek roots, along with other context clues, to figure out the meaning of the following words.

biological, page 196 chronology, page 196 metamorphic, page 197

GESS Write to Sources

Write About the Text



Pages 194-197



I answered the question: How does the flow chart of the rock cycle help us to better understand the text?

Student Model: Informative Text

understand the text by using visuals to

explain the rock cycle. The arrows show

the process of how rocks go through

different stages, and how those stages

are continuously repeated.

The process begins with broken bits

of rock. As these bits get squeezed,

Strong Opening

I wrote a topic sentence that clearly states the main idea of my response.

Grammar

A helping verb helps the main verb show an action or make a statement.

Grammar Handbook

See page 460.

adius Images/Getty Images

they cement into sedimentary rock. This rock is then heated into metamorphic rock. Next, the rock gets melted by magma. Then the magma cools and forms igneous rock. The process repeats itself. In conclusion, the diagram helps the reader make

sense of a challenging text.

Relevant Evidence

I included facts and details from the text that clearly support my response.

Transitions

I used a transition to link my final thought to the rest of my writing.

Your Turn

How does the author help us to understand what *stratum* means?

Go Digital! Write your response online. Use your editing checklist.