Section 6

The Rock Cycle

Reading Preview

Key Concepts

- What is the rock cycle?

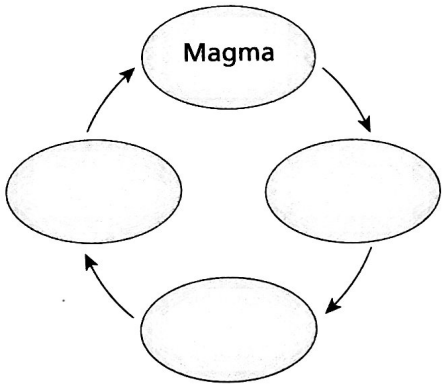
Key Term

- rock cycle

Target Reading Skill

Sequencing As you read, make a cycle diagram that shows the stages in the rock cycle. Write each stage of the rock cycle in a separate circle in your diagram.

Rock Cycle



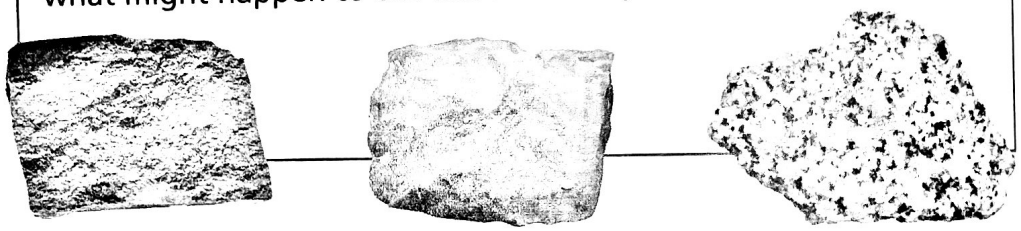
Lab zone **Discover Activity**

Which Rock Came First?

1. Referring to the photos below, make sketches of quartzite, granite, and sandstone on three index cards.
2. Observe the color and texture of each rock. Look for similarities and differences.
3. To which major group does each rock belong?

Think It Over

Developing Hypotheses How are quartzite, granite, and sandstone related? Arrange your cards in the order in which these three rocks formed. Given enough time in Earth's crust, what might happen to the third rock in your series?



Sandstone **Quartzite** **Granite**

Earth's rocks are not as unchanging as they seem. **Forces deep inside Earth and at the surface produce a slow cycle that builds, destroys, and changes the rocks in the crust.** The **rock cycle** is a series of processes on Earth's surface and in the crust and mantle that slowly change rocks from one kind to another.

A Cycle of Many Pathways

As shown in Figure 19, the rock cycle can follow many different pathways. To take one pathway as an example, you can follow the rock of Stone Mountain, Georgia, through the rock cycle.

Beginning the Rock Cycle In the case of Stone Mountain, the rock cycle began millions of years ago. First, a huge mass of granite formed deep beneath Earth's surface. Then the forces of mountain building slowly pushed the granite upward. Over millions of years, water and weather began to wear away the granite of Stone Mountain, forming sediment. Today, particles of granite sediment still break off the mountain and become sand. Streams carry the sand to the ocean.

FIGURE 19

The Rock Cycle

Igneous, sedimentary, and metamorphic rocks change continuously through the rock cycle.
Interpreting Diagrams *What process leads to the formation of sediment?*

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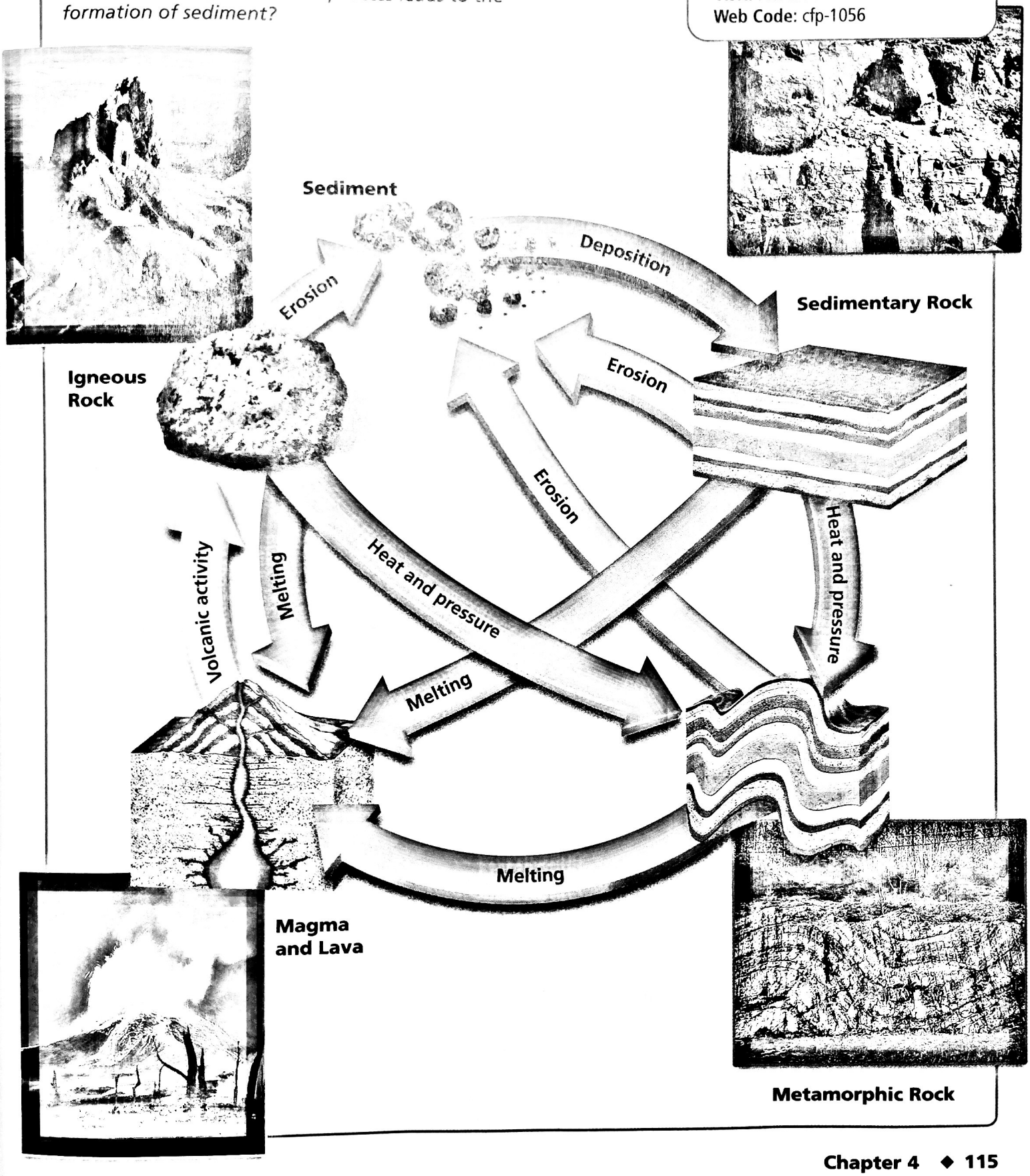

FIGURE 20
Stone Mountain
Stone Mountain, near Atlanta, Georgia, rises 210 meters above the surrounding land.

Continuing the Rock Cycle Over millions of years, layers of sandy sediment will pile up on the ocean floor. Slowly, the sediment will be compacted by its own weight. Dissolved calcite in the ocean water will cement the particles together. Eventually, the quartz that once formed the granite of Stone Mountain will become sandstone, a sedimentary rock.

More and more sediment will pile up on the sandstone. As sandstone becomes deeply buried, pressure on the rocks will increase. The rock will become hot. Pressure will compact the particles in the sandstone until no spaces are left between them. Silica, the main ingredient in quartz, will replace the calcite as the cement holding the rock together. The rock's texture will change from gritty to smooth. After millions of years, the sandstone will have changed into the metamorphic rock quartzite.

The Future of the Rock Cycle What will happen next? You could wait millions of years to find out how the quartzite completes the rock cycle, or you can trace alternative pathways in Figure 19.

Reading Checkpoint **What effect do heat and pressure deep inside Earth have on sandstone?**

Section 6 Assessment

Target Reading Skill Sequencing Review your cycle diagram about the rock cycle with a partner. Add any necessary information.

Reviewing Key Concepts

1. **a. Defining** Write a definition of the rock cycle in your own words.
   b. Explaining What must happen in order for any rock in the rock cycle to become a sedimentary rock?
   c. Sequencing Begin with igneous rock and explain how it could change through two more steps in the rock cycle.

Writing in Science

Rock Legend Pick one type of rock and write a possible "biography" of the rock as it moves through the rock cycle. Your story should state the type of rock, how the rock formed, and how it might change.