

# The Rock Cycle

## Reading Preview

### Key Concepts

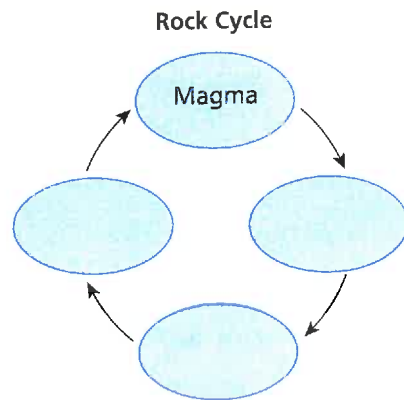
- What is the rock cycle?
- What is the role of plate tectonics in the rock cycle?

### 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.



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

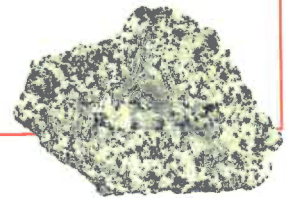
**Developing Hypotheses** How are quartzite, granite, and sandstone related? Arrange your cards in the order in which these three rocks formed. Given enough time in Earth's crust, what might happen to the third rock in your series?



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

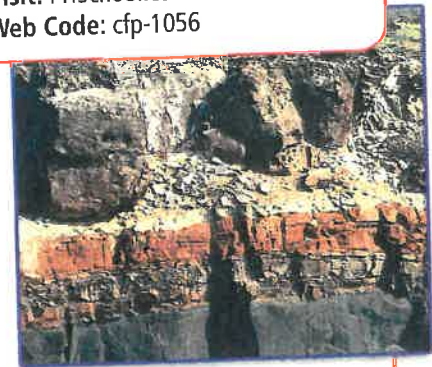
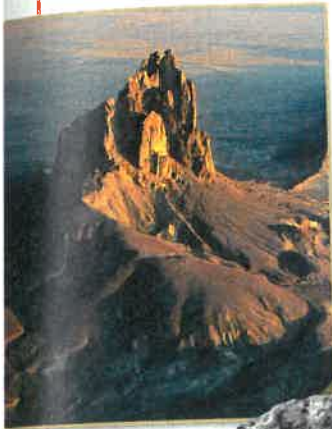
Here's one possible pathway through the rock cycle, shown in Figure 19. The igneous rock granite formed beneath the surface. Then, the forces of mountain building slowly pushed the granite upward, forming a mountain. Slowly, water and wind wore away the granite. These granite particles became sand, carried by streams to the ocean. Over millions of years, layers of sandy sediment piled up on the ocean floor. Slowly, the sediment changed to sandstone, a sedimentary rock. Over time, the sandstone became deeply buried. Heat and pressure changed the rock's texture from gritty to smooth. The sandstone changed into the metamorphic rock quartzite. But metamorphic rock does not end the rock cycle, which continues for millions of years.

**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?

**active art**

For: Rock Cycle activity  
 Visit: PHSchool.com  
 Web Code: cfp-1056



**Igneous Rock**

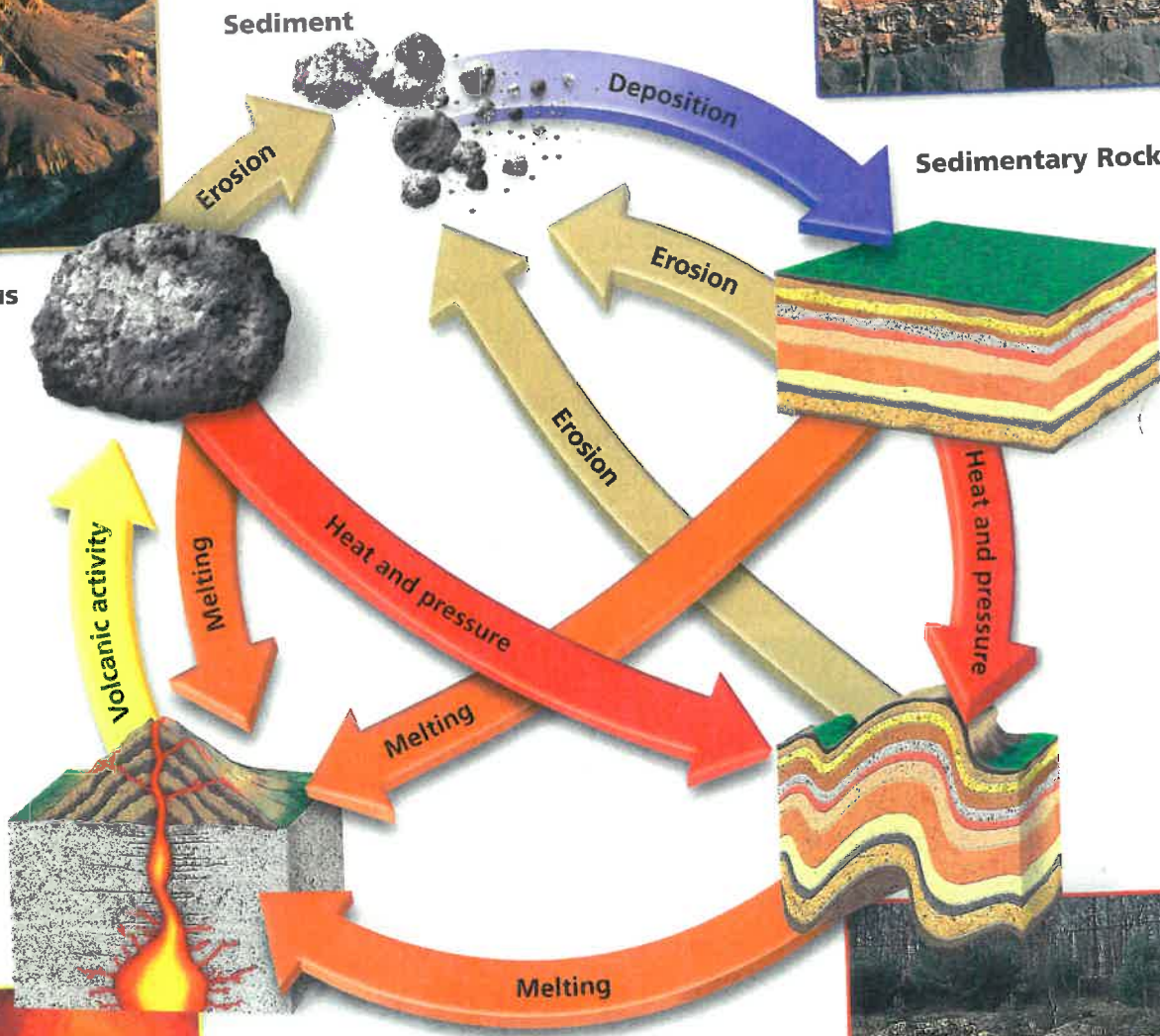
**Sedimentary Rock**



**Magma and Lava**



**Metamorphic Rock**



## The Rock Cycle and Plate Tectonics

The changes of the rock cycle are closely related to plate tectonics. **Plate movements start the rock cycle by helping to form magma, the source of igneous rocks.** Plate movements also cause faulting, folding, and other motions of the crust that help to form sedimentary and metamorphic rocks.



FIGURE 20

### Moving Up in the World

This fossil trilobite lived on an ocean floor about 500 million years ago. As plate tectonics moved pieces of Earth's crust, the rock containing this fossil became part of a mountain.

**Igneous Rocks** Where oceanic plates move apart, magma formed from melted mantle rock moves upward and fills the gap with new igneous rock. Where an oceanic plate is subducted beneath a continental plate, magma forms and rises. The result is a volcano made of igneous rock. A collision of continental plates may push rocks so deep that they melt and form magma. This magma slowly cools and hardens to form igneous rock.


**Sedimentary and Metamorphic Rocks** The collision of continental plates produces faults, folds, and uplift of the crust. Eventually, the collision could push up a mountain range. Then, erosion begins. The mountains eventually are worn away, leading to the formation of sedimentary rock.

A collision between continental plates can also push rocks down deep into the mantle. There, heat and pressure could change the rocks to metamorphic rock. And so the rock cycle continues, for hundreds of millions of years.



How can plate movements help to form metamorphic rock?

## 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

- a. **Defining** Write a definition of the rock cycle in your own words.

b. **Sequencing** Begin with igneous rock and explain how it could change through two more steps in the rock cycle.
- a. **Reviewing** How do plate movements help to form igneous rocks?

b. **Relating Cause and Effect** How can the collision of plates lead to the formation of sedimentary rock?

c. **Predicting** What would be likely to happen to the rock cycle if Earth's interior cooled so much that plate motions stopped?

## 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.