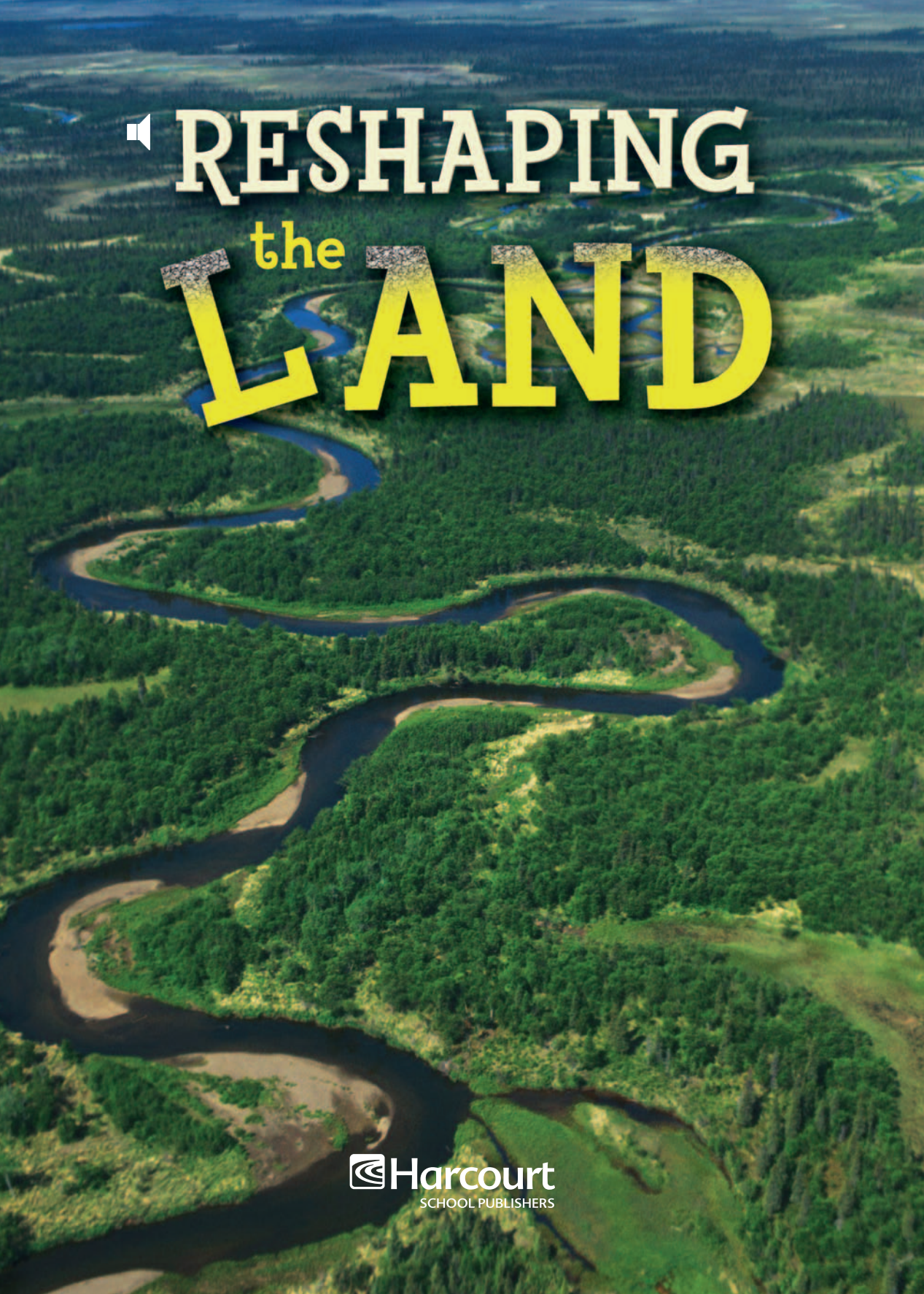
RESHAPING
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RESHAPING the LAND

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Moving Water Shapes Earth

Rivers change the surface of Earth. A river shapes the land around it. Valleys that are narrow and steep are made by quickly flowing water. The water wears away the soil and rock.

Valleys with older rivers are wider and less steep than newer rivers. The floors of the older rivers are flatter.

Rivers carry soil and rock. The dropping of bits of rock and soil by a river as it flows is called **deposition**. Deltas at the ends of rivers and plains along riverbanks are formed by deposition.

Landforms are also changed by ocean waves that hit cliffs along the shore. Waves move sand from one part of the coastline to another.

The Mississippi Delta was formed by deposition that took place over years and years.

Water shapes the land by causing erosion. In the process of erosion, materials carried by moving water are dropped in new locations. For example, a flood from a hurricane might erode barrier islands, or small islands along a shore. Next, the floodwater might carry the sand from those islands and deposit it in a river delta. Ocean waves can eat away at rock formations along the shore. In time, the pieces of rock that were worn away can be deposited on a nearby beach.

Focus Skill **CAUSE AND EFFECT** **How are valleys formed?**

The foundation of this house has been eroded. Soon, this house and the ones beyond it may fall into the ocean below them.

Moving Ice Shapes Earth

In cold climates where snow piles up from one year to another, the snow turns to ice. Sometimes the ice begins to move. It becomes a **glacier,** or a large moving block of ice. Alpine, or mountain, glaciers cause valleys to widen.

Glaciers also move in large sheets. Sheets of ice covered much of Earth thousands of years ago. They moved over the land and changed its surface.

Fast Fact

The ice sheet in Antarctica is over 13 million square kilometers (7,800,000 square mi). Its thickest point is over 4.5 kilometers (2.7 mi). The Antarctic ice sheet holds 70 percent of the fresh water on Earth.

Alpine glaciers, ice sheets, and other forms of ice can be found in Antarctica.

The Great Lakes are among the landforms the glaciers carved. During the Ice Ages, glaciers scraped deeply into the land where the lakes are now. When the glaciers melted, the water was left behind. In other places, the glaciers left behind hills of the rocks, sand, and clay that had been trapped in the ice.

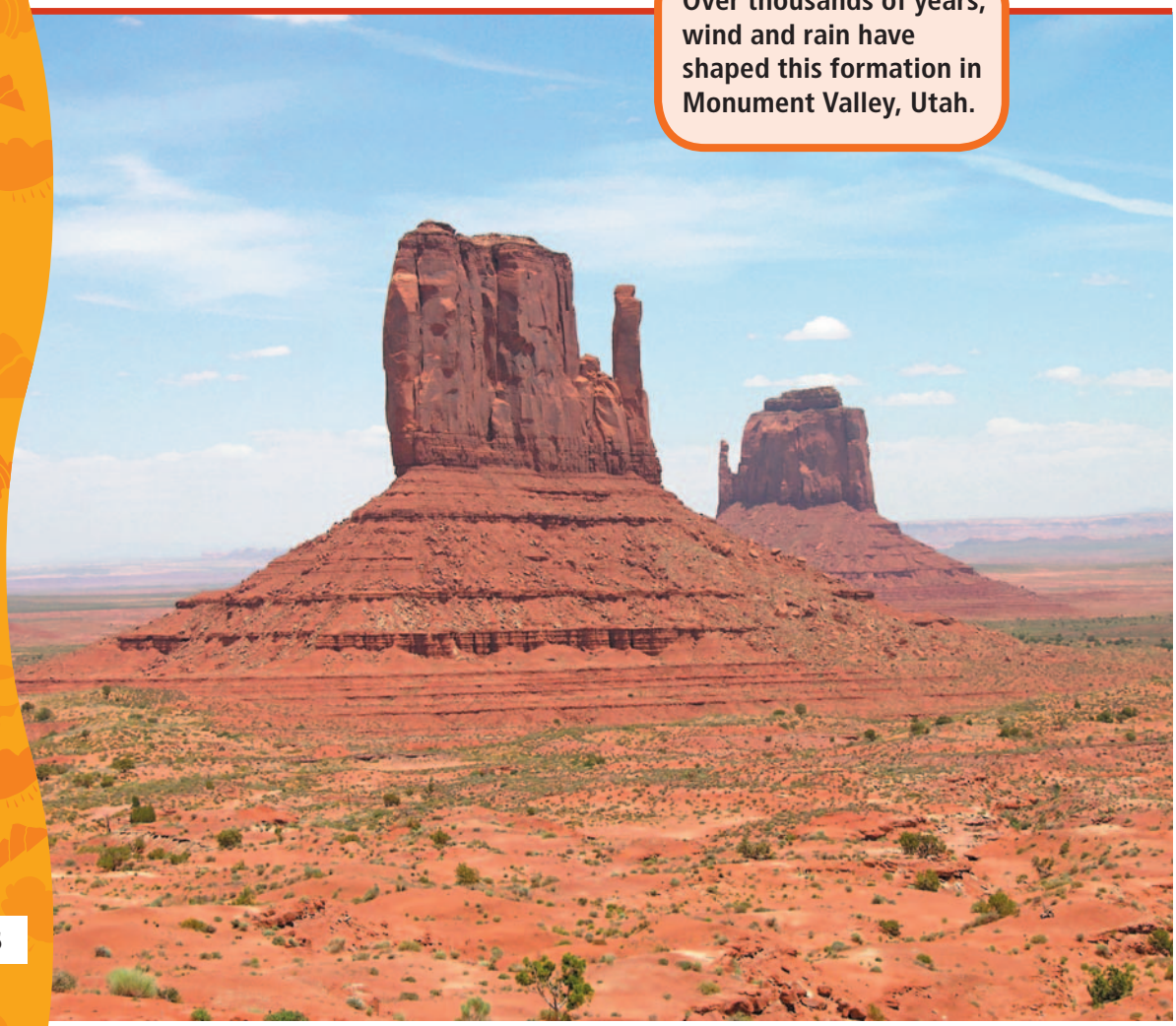
Focus Skill **DRAW CONCLUSIONS** **How can ice scrape something as hard as rock?**

These rock formations are called glacial grooves. They formed when the land that is now Ohio was under glaciers.

Wind Shapes Earth

The action of wind has formed many interesting landforms. In places such as the deserts of the southwest, the rock is somewhat soft. The wind picks up pieces of sand and soil from the dry ground and blows it against the rocks. Over many years, the wind shapes the rocks into forms that look like arches, tables, and columns.

Wind also shapes large areas of inland dunes in deserts, such as those in Africa. There, the sand piles up like mountains in dunes that shift from year to year.



Over thousands of years, wind and rain have shaped this formation in Monument Valley, Utah.

As the wind blows across a beach, the plants on the dunes slow it down. The sand falls to the ground, adding to the size of the dunes..

These tall dunes in Arizona were shaped by the wind.

In some instances, wind can be a helpful force in shaping land. For example, winds shape beach sand into dunes. Beach dunes form where plants and rocks slow down the ocean breezes, causing the sand to drop to the ground.

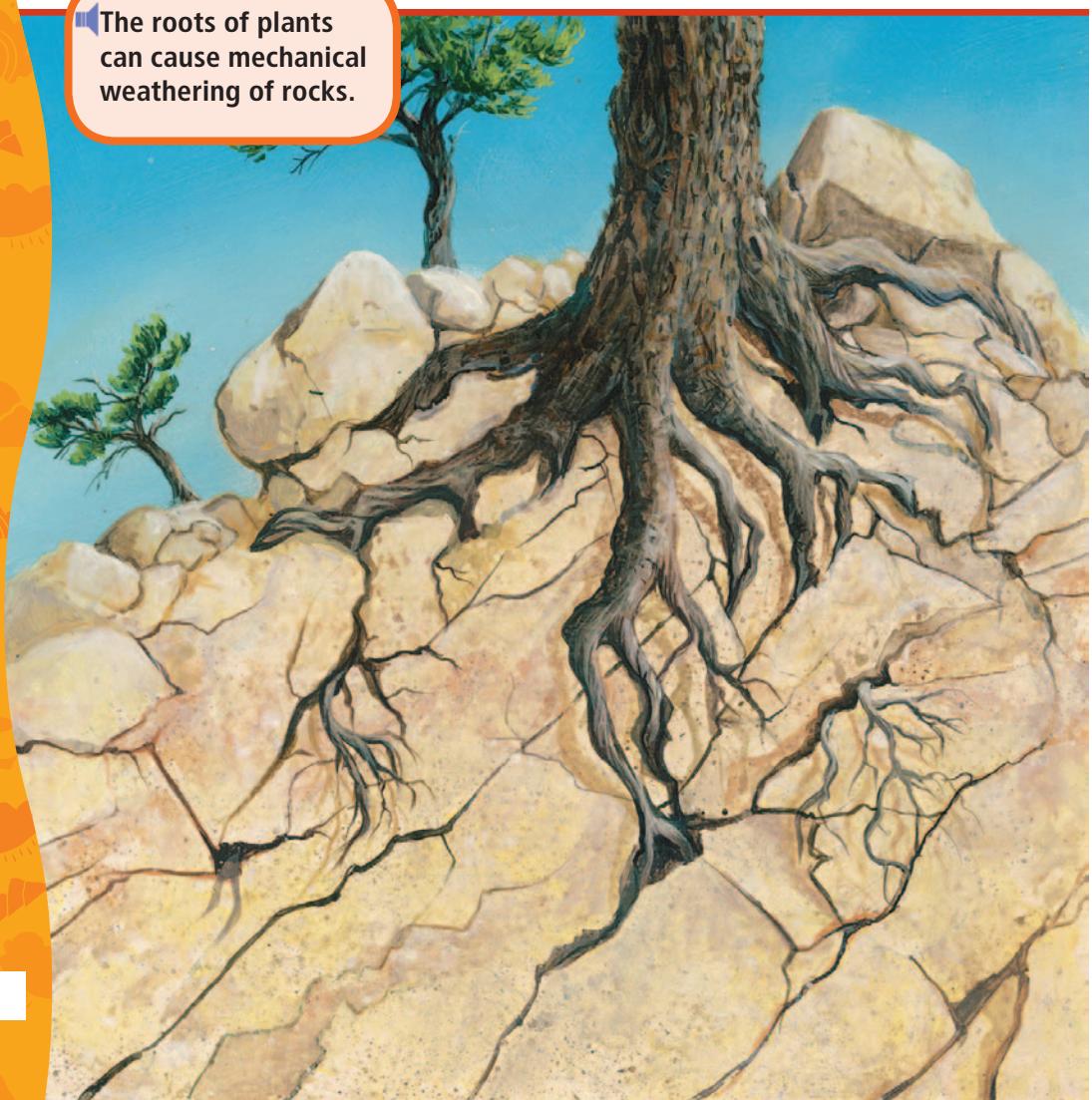
However, wind can be a harmful force, too. In the 1930s, the North American prairie had a number of droughts. Farming practices were also poor. As a result, millions of acres of soil were blown away by the wind.

Focus Skill

MAIN IDEA AND DETAILS **How does sand being carried by wind get back to the ground?**

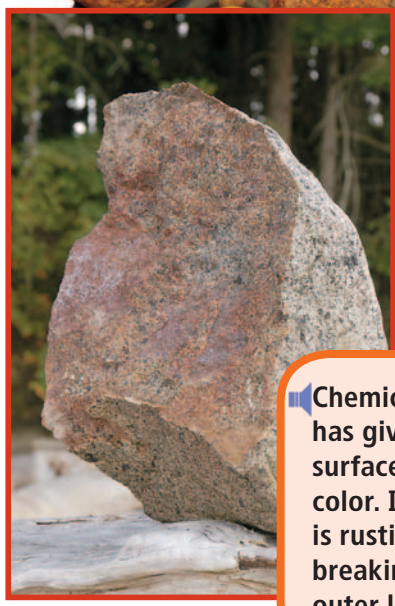
Weathering Shapes Earth

Earth's landforms are always changing. One cause of change is weathering, or the process of breaking rock into silt, sand, clay, and other tiny particles. Water cuts canyons and valleys. It crashes in waves against beaches. In rivers, it flows across rocks and stones and makes them smooth. Even the roots of plants that grow into rock help weather the rock. These are examples of **mechanical weathering**, or the breaking up of rock by physical processes. With mechanical weathering, rocks may break, but they keep their properties.



The roots of plants can cause mechanical weathering of rocks.

These river rocks are weathered. As water flowed over them, they tumbled against other stones and lost their rough edges.



Chemical weathering has given this rock's surface a brown color. Iron in the rock is rusting and is breaking down the outer layer.

Another kind of weathering is **chemical weathering**, in which rocks break up, but their properties are changed by chemicals. An example of this is acid rain, which dissolves some kinds of rock. Another example is rusting in iron-bearing rocks.

Some kinds of weathering are very helpful. It is necessary for bedrock, or solid rock below the soil, to weather. In this way, new soil is formed.

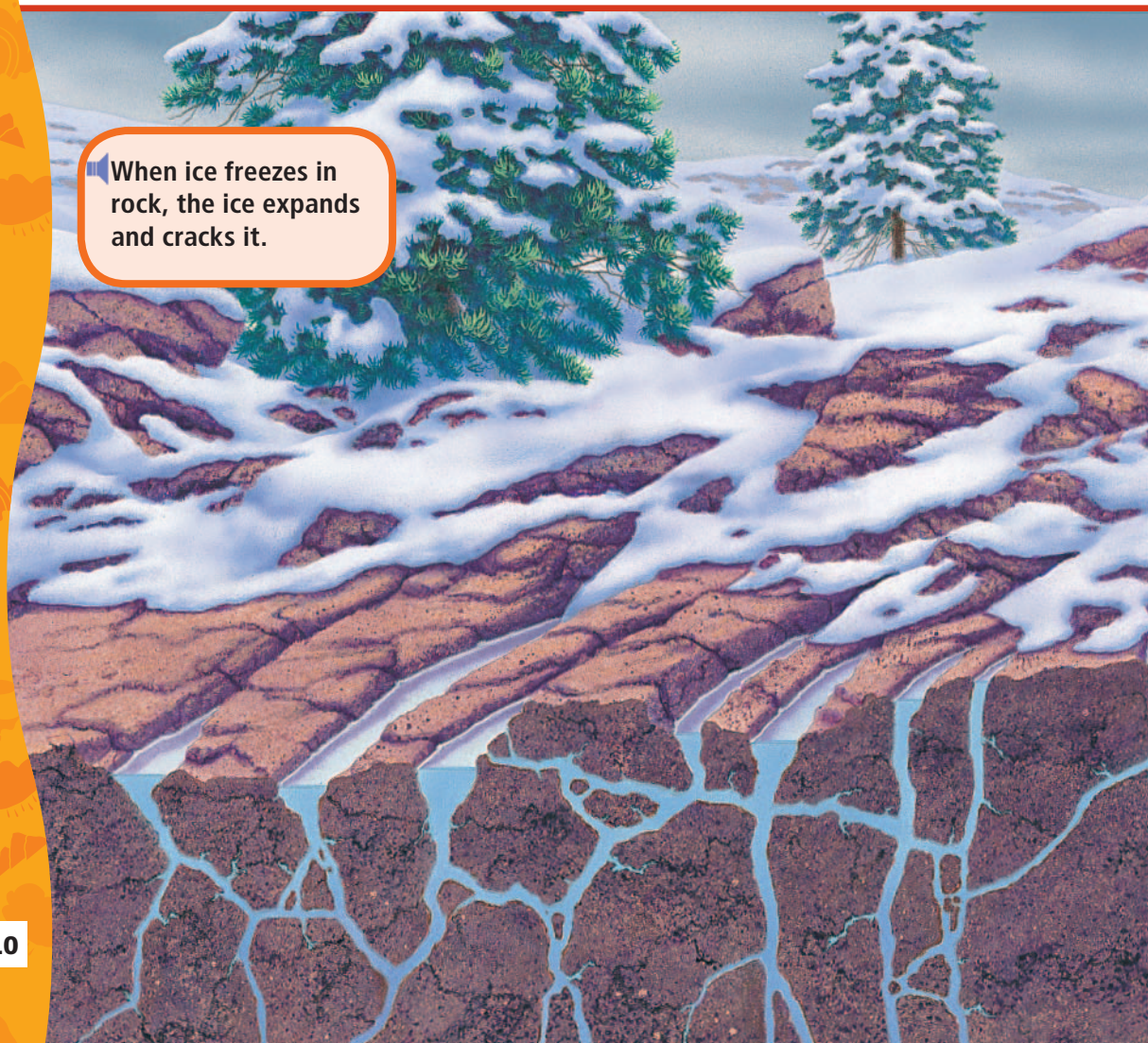
Focus Skill

COMPARE AND CONTRAST **How is mechanical weathering different from chemical weathering? How is it the same?**

Freezing and Thawing Shape Earth

Water is a powerful thing. What is it about the freezing and thawing of water that is so powerful?

Water expands when it freezes. When it rains on rocks, the rain seeps into the tiny cracks in the rocks. If the rain freezes, the water inside the rock freezes too. As the



When ice freezes in rock, the ice expands and cracks it.

water freezes, it expands. This forces the cracks apart a little more than they already were. When the ice thaws, the cracks remain. When it rains again, the process repeats–until finally the rock splits.

Frozen water is also hard, and glaciers are very heavy. Because of this, the rocks and pebbles trapped below the ice have great force. This causes the glacier to act like sandpaper, scraping the ground below them.

Focus Skill **CAUSE AND EFFECT** **How can rainwater cause rocks to crack?**

Summary

Powerful forces cause Earth's landforms to change. Moving water forms valleys and canyons and cuts deep riverbeds. Moving ice in glaciers cuts lakebeds, valleys, and grooves. The wind also shapes Earth by carving soft rock into shapes, and it builds beaches and dunes. Weathering is the breaking down of rock into particles. The different kinds of weathering are mechanical weathering and chemical weathering. Freezing and thawing help rocks weather. Water freezes in the cracks of rocks and expands the cracks.

Glossary

chemical weathering (kem•ih•kuhl weth•er•ing) Process in which rocks break up, and their properties are also changed by chemicals (8)

deposition (dep•ih•ZISH•uhn) The dropping of bits of rock and soil by a river as it flows (10)

glacier (GLAY•sher) A large, moving block of ice (3, 11)

mechanical weathering (muh•kan•ih•kuhl weth•er•ing) the breaking up of rock by physical processes (8)

Think and Write

1. How does weathering help make new soil?
2. **DRAW CONCLUSIONS** Look at pages 2–5 and 8–11 as a whole. What can you conclude is one of the main things that shapes Earth?
3. **CAUSE AND EFFECT** What happens to eroded materials at the mouth of the Mississippi River? Why does this happen?
4. **Expository Writing** Try to describe fossil footprints to a young child. Compare different kinds of footprints. Explain to the child what we can learn from fossil footprints.

Hands-On Activity

Make a flip book of one of the changes described in this Reader. Try to show the change or process from beginning to end. Present your flip book to the class. See if others can describe what is happening in the pictures.

School-Home Connection

Find some loose soil or rocks that could easily be changed by moving water. Take a photograph or draw a picture of the soil. Wait a few weeks. Draw another picture. Discuss the changes you notice with people in your family.