



Look at the rocks in the picture. Every day, ocean waves pound against them. Over time, these rocks will get smaller because of **weathering** and **erosion**.

Weathering happens when rocks break down into smaller and smaller pieces. **Erosion** moves these small pieces from one place to another.

weathering – how rocks break down and change

erosion – the movement of small rocks and other particles from one place to another

4 *Earth's Changing Surface: The Rock Cycle*

Weathering and **erosion** are caused by forces. Gravity, wind, water, and ice break down rocks or move small pieces of rock around. This changes Earth's surface.



▲ Gravity pulls things together. Earth's gravity can pull rocks down a hill.



▲ Wind carries small pieces of rock, such as sand, that can break down rocks.



▲ Water slowly wears down rocks. It can then carry smaller pieces of rock away.



▲ Glaciers are huge masses of ice. As they move, they wear down rocks and move them.

KEY IDEA Earth's surface changes because of forces such as gravity, wind, water, and ice.

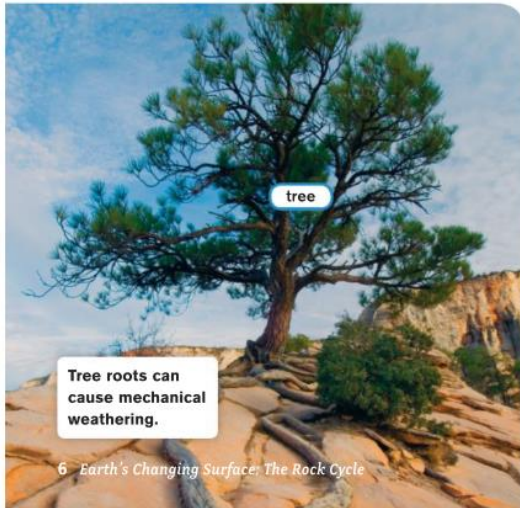


Different Kinds of Weathering

Weathering can change rocks in different ways. **Mechanical weathering** changes the physical size of rocks. It does not change the composition, or chemical make up, of rocks.

Have you ever seen a tree growing in a rock? The tree's roots grow into small cracks in the rock. As the roots grow larger, they push on the rock. This can make the rock split. This is **mechanical weathering**.

mechanical weathering – the breaking down of a rock into smaller pieces without changing its composition



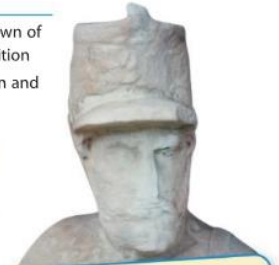
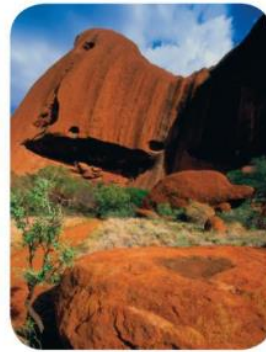
Chemical weathering breaks down rocks by changing the composition of the rocks. For example, sometimes **rust** forms in a rock. This happens when oxygen from the air combines with a mineral called iron.

Rust weakens the rock. The rock can then split into smaller pieces. This is an example of **chemical weathering**. The rock is broken down because of changes in the composition of the rock.

chemical weathering – the breaking down of a rock because of changes in its composition

rust – a material that forms when oxygen and iron combine

KEY IDEA Weathering breaks down rocks in different ways.



BY THE WAY...

When harmful gases in the air combine with water, acid rain forms. Acid rain causes chemical weathering. This statue is being worn away by acid rain.

◀ Rust gives these rocks their red color.

Weathering Produces Soil

Over a long time, the tiny pieces of rock that result from weathering begin to form soil. Soil is a material in the top layer of Earth's crust.

Soil contains tiny pieces of weathered rock, air, water, and humus. Humus forms from the remains of dead plants and animals. Living things can be found in soil, too.

The drawings on this page show how soil forms. It's a process that takes a very long time.

soil – a material in the top layer of Earth's crust

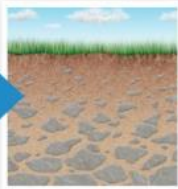
humus – a part of soil that forms from dead plants and animals

KEY IDEA Soil contains weathered rocks, air, water, and humus.

Soil Formation



▲ Rocks begin to break up.



▲ Weathered rocks mix with humus, air, and water.



▲ Living things help make the soil better.

YOUR TURN

COMMUNICATE

Make a chart like the one below. Fill in the blanks. Write or draw an example of each type of weathering.

Weathering Process	Example
Mechanical weathering changes rocks by <input type="text" value="-- Select --"/>	<input type="text"/>
Chemical weathering changes rocks by <input type="text" value="-- Select --"/>	<input type="text"/>

MAKE CONNECTIONS

Spring rains can loosen weathered rocks and soil on a mountain. Why do you think drivers on mountain roads have to be extra careful at this time?



USE THE LANGUAGE OF SCIENCE

What happens in chemical weathering?

Chemical weathering breaks down rocks by changing the composition of the rocks.



Choose from the words: Physical size / composition

Earth's Changing Surface: The Rock Cycle

Chapter 1: Breaking Down Rocks

GREEN LEVEL
Student Book,
pages 4-8

USE KEY WORDS

Look at the Key Words on page 23 of your book.

Answer these questions about the Key Words in Chapter 1.

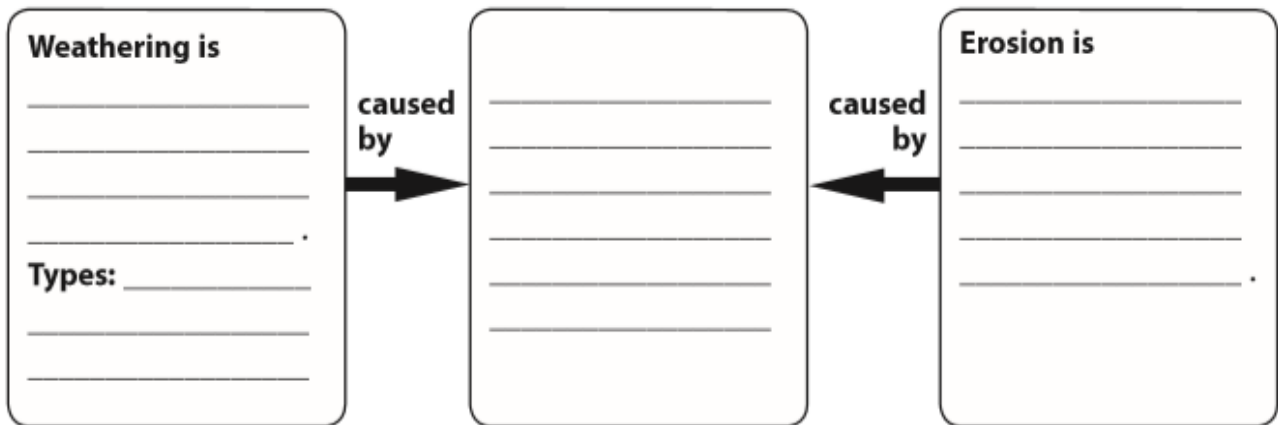
1. _____ **weathering** occurs when a rock breaks down because of changes in its composition.
2. _____ **weathering** occurs when a rock breaks down because of physical changes in its size.
3. **Weathering** produces tiny pieces of rock that become part of _____.
4. The part of **soil** that forms from dead plants and animals is _____.
5. The movement of rock and **soil** from place to place is _____.

KEY WORDS

chemical weathering
erosion
humus
mechanical weathering
soil
weathering

ORGANIZE IDEAS

As you read Chapter 1, complete the concept map.



STRATEGY FOCUS: SYNTHESIZE

Look at the photos and reread the captions on page 5. Choose an idea from one of the captions and think about what you already know about it. Write one sentence that includes most of the information.