Name _____ Date _____

Chapter 2 Section 4 (pages 42–45) *Reading Study Guide*

External Forces Shaping the Earth

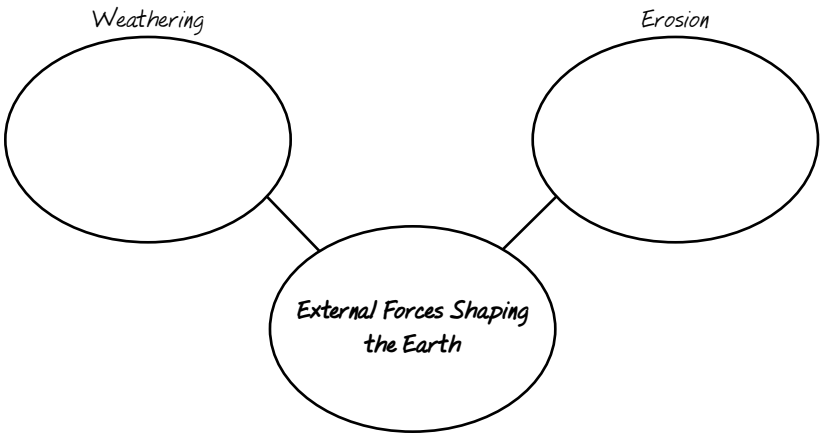
BEFORE YOU READ

In the last section, you read about the forces that move and shape the earth from the inside.

In this section, you will learn about external forces that can alter landscapes and create the soil needed for plant life.

AS YOU READ

Use this graphic organizer to take notes on details of the external forces that shape the earth.



PLACES & TERMS

weathering physical or chemical processes that change the characteristics of rock on or near the earth's surface

sediment small pieces of rock

mechanical weathering process that breaks down rock

chemical weathering process that changes rock into a new substance

erosion weathered material moved by wind, water, ice, or gravity

delta landform created when sediment is deposited as a river enters the ocean

loess wind-blown silt and clay sediment that produces very fertile soil

glacier a large, long-lasting mass of ice

glaciation the changing of landforms by the movement of glaciers

moraine a ridge of rocks left behind by a glacier

humus organic matter in the soil

Weathering

MECHANICAL WEATHERING (page 42)

***What** is weathering?*

Weathering refers to physical and chemical processes that change the characteristics of rock on or near the earth's surface. Weathering creates smaller and smaller pieces of rock called **sediment**. Examples of sediment are mud, sand, or silt, which is very fine particles of rock.

Processes that break rock into smaller pieces are called **mechanical weathering**. All sorts of agents can break apart rocks. Some examples are ice or frost and plant growth. Human activities such as drilling and blasting in a mine are also mechanical weathering processes.

1. What is sediment?

_____

CHEMICAL WEATHERING (page 43)

***How** do rocks decompose?*

Chemical weathering occurs when rock is changed into a new substance. This happens because of elements in the air or water and the minerals in the rock interact.

Decomposition, or breakdown, can happen in several ways. Some minerals react to oxygen in the air and begin to crumble. Sometimes minerals are combined with water or carbon dioxide to form weak acids. The acids break down the rock.

Climate has a great affect on rocks. Climates that are warm and moist will produce more chemical weathering than cool, dry areas will. Rocks in cold and dry or hot and dry areas generally experience greater mechanical weathering.

2. How does climate affect rock decomposition?

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Erosion

WATER EROSION (pages 43–44)

***What** is erosion?*

Erosion occurs when weathered material is moved by wind, water, ice, or gravity. Glaciers, waves, stream flow, or blowing winds are erosion agents. Erosion reshapes landforms, coastal regions, and riverbeds and banks.

There are three kinds of water erosion. One happens when water flows in a stream or river. Another form of water erosion is abrasion. This is the grinding away of rock by transported particles in the water. A third eroding action of water occurs when the water dissolves chemical elements in the rock.

Land cut by a stream gets deeper and wider. As the water slows, it drops the sediment it is carrying. When a river enters the ocean, the sediment is deposited into a fan-like landform called a **delta**.

Wave action along coastlines also changes the land. Sediment deposited by waves may build up sandbars or islands.

3. What are three kinds of water erosion?

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WIND EROSION (page 44)

***How** does wind erosion change the land?*

In many ways, wind erosion is similar to water erosion. Wind transports sediment and deposits it in other locations. Depending on the type of wind-born sediment, new landforms may be produced. Deposits of **loess**, wind-blown silt and clay sediment that produce very fertile soil, are found many feet deep in some areas of the world.

4. What is loess?

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GLACIAL EROSION (page 44)

***What** is glaciation?*

A **glacier** is a large, long-lasting mass of ice. Glaciers form in mountainous areas and in regions that are regularly covered with heavy snowfall and ice.

Glaciation is the changing of landforms by slowly moving glaciers. Massive glaciers cut U-shaped valleys in the land.

On top or within the ice are other rocks carried by the glacier. When the glacier melts, these rocks are left behind. Rocks left behind by a glacier may form a ridge or a hill called a **moraine**.

5. Where do glaciers form?

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Building Soil (page 45)

***What** is soil?*

Soil is the loose mixture of weathered rock, organic matter, air, and water that supports plant growth. Organic matter in the soil helps to support the growth of plants by providing needed plant food. Water and air share space in the soil. When it rains, pore-like spaces fill with water.

Soil's fertility—its ability to nurture plants—is affected by several things. They include the texture of the soil, the amount of organic material (called **humus**), and the amount of air and water in the soil.

Five factors affect soil:

- **Parent material** The chemical composition affects fertility.
- **Relief** Steeper slopes erode easily and produce soil slowly.
- **Organisms** Small animals such as worms and ants help loosen soil. Bacteria helps material decompose; this supplies food for plants.
- **Climate** Hot and cold climates produce different soils. The same is true for wet and dry climates.
- **Time** The amount of time to produce soil varies.

6. What are the five soil factors geographers study?

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