

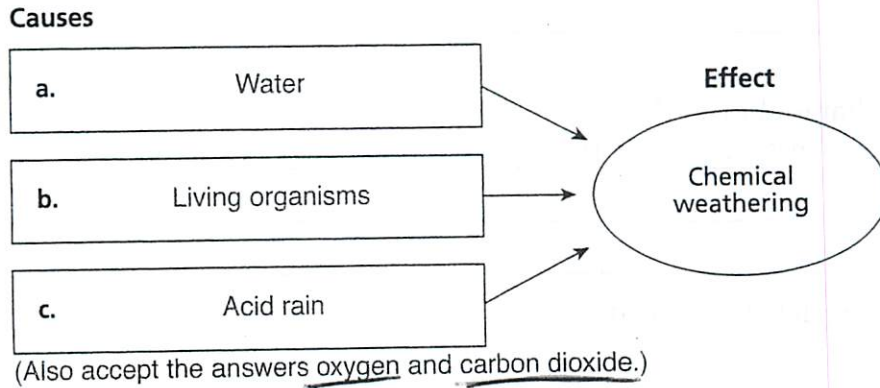
Weathering and Soil Formation ▪ *Guided Reading and Study*

Rocks and Weathering (pp. 176–183)

This section describes how rocks are broken down by forces of weathering. The section also describes factors that determine how quickly weathering occurs.

Use Target Reading Skills

As you read, identify the causes of chemical weathering. Write them in the graphic organizer below. Accept all logical answers.



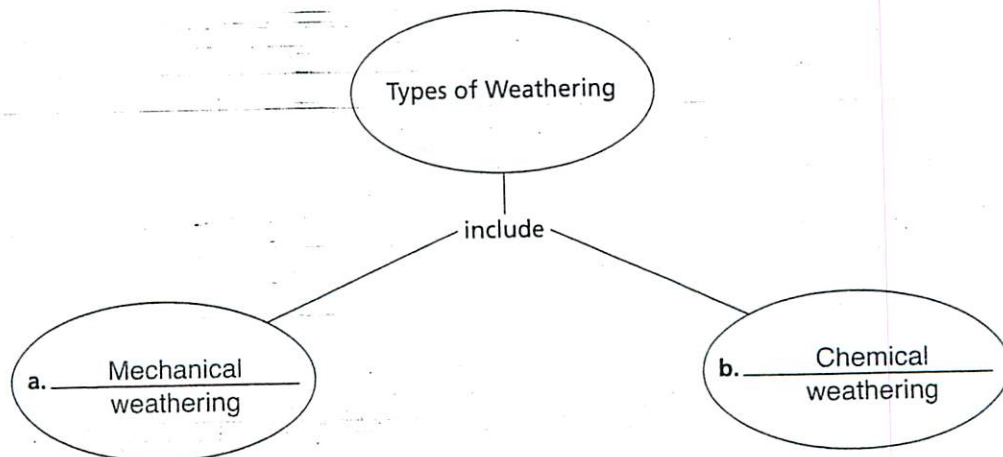
Weathering and Erosion (p. 177)

Match the process with its description.

- Process**
- b. 1. weathering
- a. 2. erosion

- Description**
- a. Movement of rock particles by wind, water, ice, or gravity
- b. Breaking down of rock and other substances at Earth's surface

3. Complete the concept map.



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Rocks and Weathering (continued)

Mechanical Weathering (pp. 178–179)

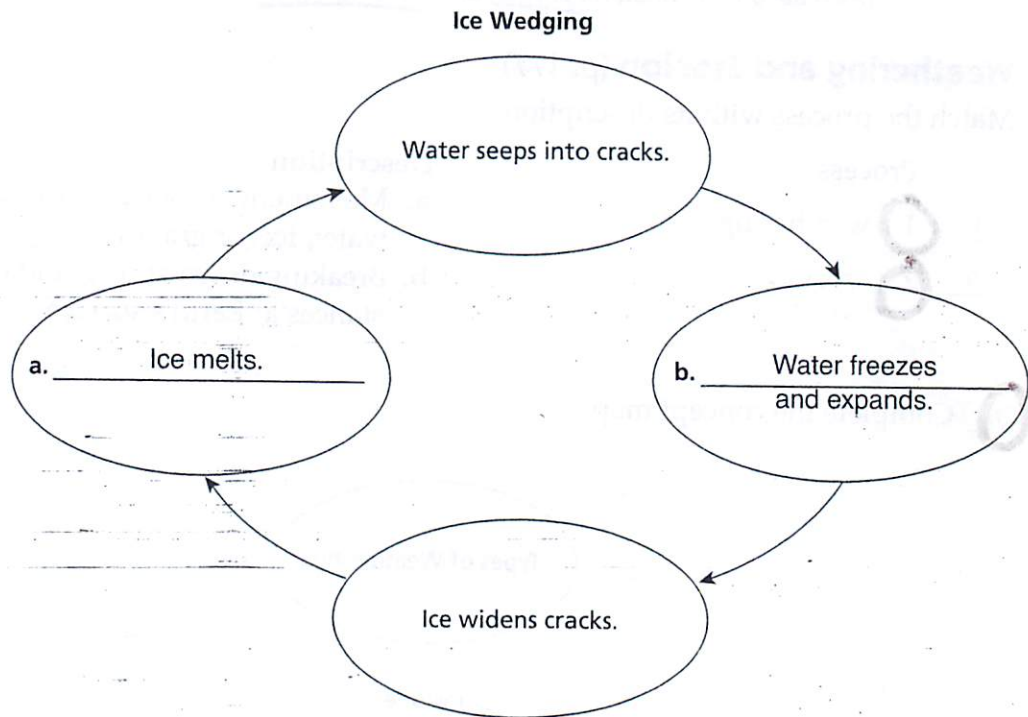
4. The type of weathering in which rock is physically broken into smaller pieces is called _____ mechanical _____ weathering.

5. List the forces of mechanical weathering.

- a. _____ freezing and thawing
- b. _____ release of pressure
- c. _____ growth of plants
- d. _____ actions of animals
- e. _____ abrasion

6. What is abrasion?
Abrasion is the grinding away of rock by rock particles carried by water, ice, wind, or gravity.

7. Complete the cycle diagram.



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8. Would the process in the cycle diagram in Question 7 work in areas near Earth's equator? Explain.
No; at the equator, water does not freeze.

Chemical Weathering (pp. 180-181)

9. The process that breaks down rock through chemical changes is _____ chemical _____ weathering.

10. List the agents of chemical weathering.

- a. _____ water _____
- b. _____ oxygen _____
- c. _____ carbon dioxide _____
- d. _____ living organisms _____
- e. _____ acid rain _____

11. Is the following sentence true or false? Chemical weathering produces rock particles with ~~the same~~ ^{different} mineral makeup as the rock they came from. _____ false _____

Match the cause of chemical weathering with the statement that is true about it.

Cause	Statement
c. <u>12.</u> water	a. It causes iron to rust.
a. <u>13.</u> oxygen	b. It is caused by pollution.
d. <u>14.</u> carbon dioxide	c. It is the most important cause.
e. <u>15.</u> living organisms	d. It forms carbonic acid.
b. <u>16.</u> acid rain	e. Lichens are one example.

17. Is the following sentence true or false? Water weathers rock by gradually dissolving it. _____ true _____

18. Oxygen weathers rock through a process called _____ oxidation _____.

19. List two kinds of rock that are easily weathered by carbonic acid.

- a. _____ marble _____
- b. _____ limestone _____

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Rocks and Weathering (continued)

20. How do plants dissolve rock?
Plants dissolve rock by producing weak acids around their roots.

Rate of Weathering (pp. 182-183)

21. The most important factors that determine the rate of weathering are type of rock and _____ climate _____.

22. Is the following sentence true or false? The minerals that make up a rock determine how fast it weathers. _____ true _____

23. A rock that is full of tiny, connected air spaces is said to be _____ permeable _____.

24. Why does a permeable rock weather chemically at a fast rate?
As water seeps through the spaces in the rock, it removes dissolved material formed by weathering.

25. Why does chemical weathering occur more quickly in a hot climate?
It occurs more quickly because chemical reactions occur faster at higher temperatures.

How Soil Forms (pp. 186–192)

This section explains how soil forms. The section also describes several features of soil, the living things found in soil, and the types of soil found in the United States.

Use Target Reading Skills

After reading the section, write a definition of each key term in your own words below.

soil: _____ Check students' definitions for accuracy.

bedrock: _____

humus: _____

fertility: _____

loam: _____

soil horizon: _____

topsoil: _____

subsoil: _____

litter: _____

decomposer: _____

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How Soil Forms (continued)

What Is Soil? (pp. 186-187)

1. The loose, weathered material on Earth's surface in which plants can grow is _____ soil _____.
2. The solid layer of rock beneath the soil is called _____ bedrock _____.
3. What is soil composed of?
Soil is composed of rock particles, minerals, decayed organic material, water, and air.

4. List the three types of weathered rock particles found in soil.

- a. _____ sand _____ b. _____ silt _____
c. _____ clay _____

5. The decayed organic material in soil is called _____ humus _____.

6. Circle the letter of the choice that lists soil particles from largest to smallest.

- a. sand, gravel, clay, silt
b. gravel, sand, silt, clay
c. gravel, silt, sand, clay
d. gravel, sand, clay, silt

7. Soil that is made up of about equal parts of clay, sand, and silt is called _____ loam _____.

8. How does soil form?
Soil forms as rock is broken down by weathering and mixes with other materials on _____
the surface.

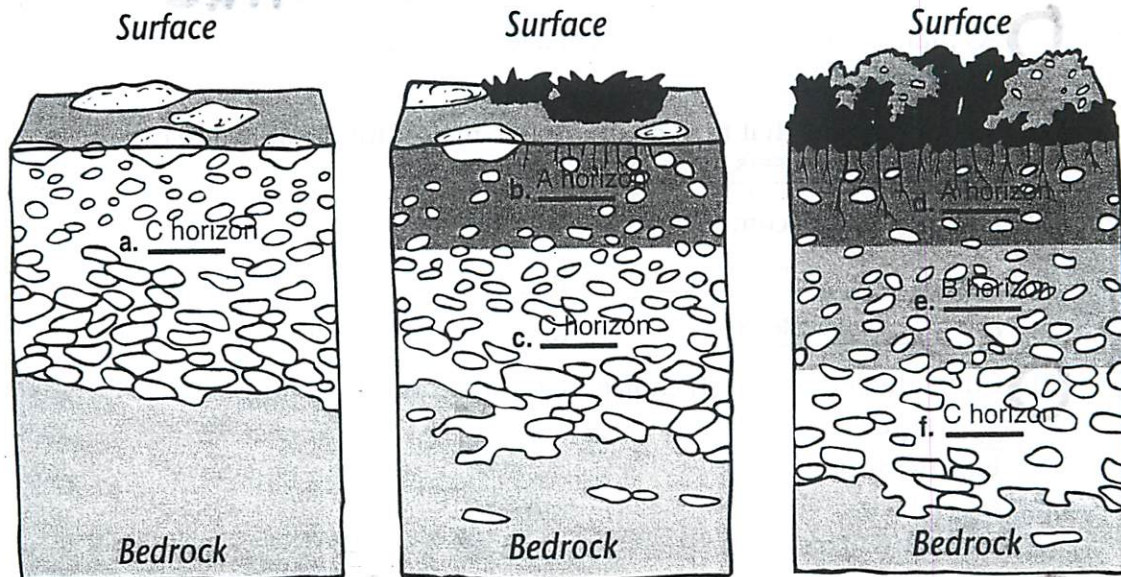
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The Process of Soil Formation (p. 188)

Match the soil horizon with its makeup.

Soil Horizon	Makeup
a <u>9</u> A	a. Topsoil
c <u>10</u> B	b. Weathered rock particles
b <u>11</u> C	c. Subsoil

12. Label each of the soil horizons shown in the three drawings as A, B, or C horizon.



13. Circle the letter of each sentence that is true about the rate of soil formation.

- a. It is faster in areas that are cold.
- b. It is slower in areas that are dry.
- c. It is faster with limestone than granite.
- d. It is unaffected by the type of rock being weathered.

Soil Types (p. 189)

14. Circle the letter of each factor that scientists use to classify the different types of soil into groups.

- a. climate
- b. plant types
- c. soil composition
- d. size of animal populations

15. Is the following sentence true or false? The soil type of northeastern United States and Canada is ~~southern~~ forest soils.

~~false~~ true ~~northern~~

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How Soil Forms (continued)

Living Organisms in Soil (pp. 190–192)

16. How do soil organisms improve soil?
Some soil organisms mix the soil and make spaces in it for air and water. Other soil organisms make humus, the material that makes soil fertile.
17. Is the following sentence true or false? ^{Plants} ~~Animals~~ contribute most of the organic remains that form humus. ~~false~~ **true**
18. As plants shed leaves, they form a loose layer called
litter.
19. Soil organisms that turn dead organic matter into humus are called
decomposers.
20. List four soil decomposers.
- | | |
|-------------------|----------------|
| a. _____ fungi | b. _____ mites |
| c. _____ bacteria | d. _____ worms |
21. Circle the letter of each choice that is an example of fungi.
- a. molds
 - b. mushrooms
 - c. bacteria
 - d. earthworms
22. Is the following sentence true or false? Earthworms do most of the work of mixing humus with other materials in soil. _____ true
23. How can burrowing mammals improve soil?
They can break up hard compacted soil, mix humus through soil, add nitrogen and organic material to soil, and aerate soil.

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Soil Conservation (pp. 194–197)

This section explains why soil is valuable. The section also explains how soil can be damaged or lost, as well as how it can be conserved.

Use Target Reading Skills

Look at the figure of the Dust Bowl in your textbook, and in the graphic organizer below, write two questions you have about the visuals. As you read about soil conservation, write the answers to your questions.

Q. Where was the Dust Bowl?

A. The Dust Bowl was in western Oklahoma and parts of the surrounding states.

Q. What caused the Dust Bowl?

A. Farming practices exposed the soil so that in times of drought the topsoil quickly dried out, turned to dust, and blew away.

Introduction (p. 194)

1. The thick mass of tough roots at the surface of the soil is called sod.

The Value of Soil (p. 195)

2. Is the following sentence true or false? Natural resources are anything made by humans. ~~false~~ **true**

3. Why is soil one of Earth's most valuable resources?

Soil is so valuable because everything that lives on land depends directly or indirectly on soil.

4. Is the following sentence true or false? Soil can be found wherever weathering occurs. true

Weathering and Soil Formation ▪ *Guided Reading and Study***Soil Conservation** *(continued)*

5. Circle the letter of each sentence that is true about soil.
- a. Soil is a nonrenewable resource.
 - b.** Soil formation takes a long time.
 - c. Fertile soil is plentiful.
 - d. Half of Earth has soils that are good for farming.

Soil Damage and Loss (pp. 195–196)

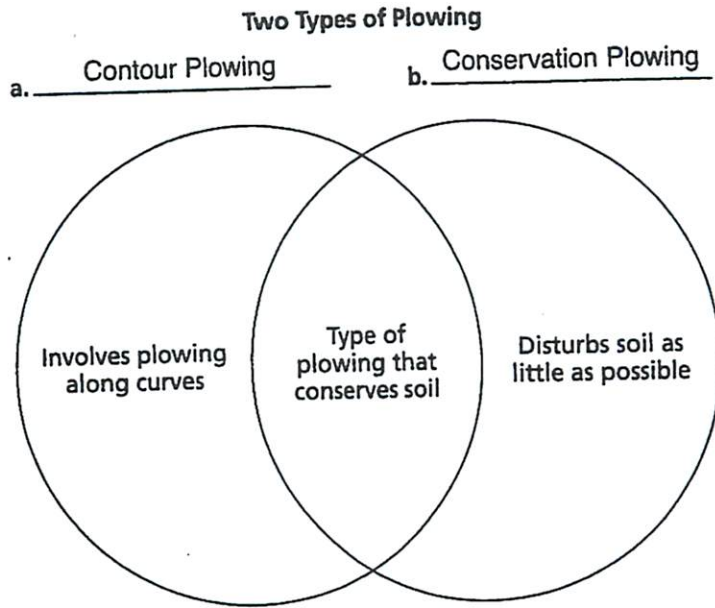
6. How can soil be damaged?
Soil can be damaged by becoming exhausted or losing its fertility.
-
7. How can soil be lost?
Soil can be lost through the effects of water and wind.
-
8. How can plants protect soil from water erosion?
Plants break the force of falling rain, and plant roots hold the soil together.
-
9. Circle the letter of each sentence that is true about the Great Plains.
- a.** The Great Plains have fertile soil.
 - b.** Rainfall decreases from east to west across the Great Plains.
 - c. The Great Plains begin at the Appalachian Mountains.
 - d. The Great Plains have never been farmed or used for ranches.
10. Circle the letter of each state that was part of the Dust Bowl.
- a.** Oklahoma
 - b.** Kansas
 - c.** Texas
 - d. Missouri
11. Why did the Dust Bowl occur?
Plowing removed the grass and exposed the soil. Then drought dried out the topsoil, which turned to dust and blew away.
-
12. Why did the Dust Bowl lead to the adoption of modern methods of saving the soil?
It taught people the value of soil and convinced the government to help farmers better care for soil.
-

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Soil Conservation (p. 197)

13. The management of soil to prevent its destruction is referred to as soil conservation.

14. Complete the Venn diagram.



15. How do the two types of plowing in the diagram help conserve soil?
In contour plowing, rows running across a slope slow runoff and washing away of soil.
In conservation plowing, disturbing soil as little as possible leaves it covered so that moisture is retained and the soil stays in place.
