

Directed Reading

Section: Rates of Weathering

1. Describe the general time frame for the processes of mechanical and chemical weathering.

2. What is the average rate at which carbonation dissolves limestone?

3. At the average rate, how long would it take to dissolve a layer of limestone that is 150 m thick?

4. List three important factors that determine the rate at which rock weathers.

DIFFERENTIAL WEATHERING

5. Define *differential weathering*.

6. Explain how mechanical and chemical weathering affects rocks that are rich in quartz.

Directed Reading *continued*

ROCK COMPOSITION

Use the terms from the list below to complete the sentences that follow. Each term may be used only once. Some terms may not be used.

- | | | |
|-----------|---------------|--------|
| silicates | weathering | sand |
| calcite | clay and sand | grains |
| rocks | carbonation | |

7. Limestone and other sedimentary rocks that contain _____ weather most rapidly.
8. Limestone weathers rapidly because it undergoes _____.
9. Other sedimentary rocks are affected mainly by mechanical _____.
10. The rates at which these sedimentary rocks weather depend mostly on the material that holds the sediment _____ together.
11. Shales that are not firmly cemented may break up to form _____.
12. Conglomerates and sandstones that are strongly cemented by _____ resist weathering longer than some igneous rocks do.

AMOUNT OF EXPOSURE

13. List two important factors related to exposure that determine the rate of weathering of a rock.
- _____
- _____
14. What is a rock's surface area?
- _____
- _____
15. What effect does breaking a rock into smaller pieces have on its surface area, and how does this affect weathering?
- _____
- _____
- _____

Directed Reading *continued*

16. Describe the natural zones of weakness within a rock.

17. How does the water that enters cracks in rock mechanically weather those rocks?

18. How does chemical weathering affect cracked rocks?

CLIMATE

19. In general, what type of climate allows the fastest type of weathering? Explain your answer.

20. In what other type of climate is weathering fairly quick? Explain your answer.

21. Why is the rate of weathering slowest in hot, dry climates?

22. Explain how weathering has affected Cleopatra's Needle, both in Egypt and in New York City.

Directed Reading *continued*

TOPOGRAPHY AND ELEVATION

- _____ 23. Topography, which influences the rate of weathering, is
- a. the fertility and flatness of the land surface.
 - b. the moisture and temperature of the land surface.
 - c. the elevation and slope of the land surface.
 - d. the hotness and dryness of the land surface.
- _____ 24. Because temperatures are generally cold at high elevations, what is more common at high elevations than at low?
- a. ice wedging
 - b. carbonation
 - c. oxidation
 - d. silicates
- _____ 25. What happens to weathered rock fragments on steep slopes?
- a. They are more exposed to chemical weathering.
 - b. They become more firmly attached to the slopes.
 - c. They are carried away by animals and humans.
 - d. They are pulled downhill by gravity and washed out by heavy rain.
- _____ 26. New surfaces of mountains are continually exposed to weathering as a result of
- a. the constant rain and winds.
 - b. the dryness of the mountain climate.
 - c. the removal of surface rocks.
 - d. the actions of animals and humans.

HUMAN ACTIVITIES

27. In general, how do the human activities of mining and construction affect rocks?

28. How does mining contribute to the weathering of rock?

29. How does construction contribute to the weathering of rock?

Directed Reading *continued*

30. What are two recreational activities that can speed up weathering by exposing new rock surfaces?

PLANT AND ANIMAL ACTIVITIES

31. How do the roots of plants aid in the weathering of rocks?

32. Describe two ways in which animals can contribute to the weathering of rocks.
