

Directed Reading

Section: Ice Ages

1. Where are continental glaciers mainly located today?

2. A long period of climatic cooling during which continents are glaciated repeatedly is called a(n) _____.

3. When did the earliest known ice age begin?

4. When did the most recent ice age begin?

5. When did the last advance of the most recent ice age's ice sheets reach its peak?

6. What conditions probably exist at the beginning of an ice age?

GLACIAL AND INTERGLACIAL PERIODS

_____ 7. What happens to continental glaciers during an ice age?

- a. They stay where they are.
- b. They advance once and retreat once.
- c. They advance and retreat several times.
- d. No one knows.

_____ 8. During an ice age, ice sheets advance

- a. during colder periods.
- b. during warmer periods.
- c. all the time.
- d. when the ice sheets begin to melt.

Directed Reading *continued*

- _____ 9. During an ice age, ice sheets retreat
- a. all the time.
 - b. during warmer periods.
 - c. in a northerly direction.
 - d. during colder periods.
- _____ 10. A period of cooler climate that is characterized by the advancement of glaciers is called
- a. an ice age.
 - b. an interglacial period.
 - c. a glacial period.
 - d. global warming.
- _____ 11. A period of warmer climate that is characterized by the retreat of glaciers is called
- a. an ice age.
 - b. an interglacial period.
 - c. a glacial period.
 - d. global warming.
12. Is Earth currently experiencing a glacial period or an interglacial period?

13. How much of Earth's surface was covered by glaciers during the last glacial period?

14. During the last glacial period, in what regions of the world did most glaciation take place?

15. Why did the coastlines of the continents extend farther during the last glacial period than they do today? Explain your answer.

16. What parts of North America were buried beneath ice during the last glacial period?

Directed Reading *continued*

17. What type of glaciers covered parts of the western United States during the last glacial period?

18. How and from where did glaciers advance in the western United States?

19. Where was the great continental ice sheet in North America centered?

20. During the last glacial period, a continental ice sheet was centered on what is now the Baltic Sea. What parts of Europe did it cover?

21. In which mountain ranges of Europe and Asia did long alpine glaciers form?

22. What parts of the Southern Hemisphere were buried beneath mountainous ice fields and alpine glaciers during the last glacial period?

23. How do we know where glaciers existed during the last glacial period?

Directed Reading *continued*.

CAUSES OF GLACIATION

24. How could movement of tectonic plates lead to ice ages?

25. Which of the following observations led Serbian scientist Milutin Milankovitch to propose his theory about glacial periods?

- a. Glaciers form in warm regions of the world.
- b. There has only been one ice age.
- c. Climate change occurs in cycles.
- d. Earth is presently in a glacial period.

26. What did Milankovitch think the cycles of glaciation could be linked to?

- a. the buildup of greenhouse gases in Earth's atmosphere
- b. cycles in Earth's movement relative to the sun
- c. cycles of lunar energy released by the moon
- d. periods of volcanic activity on Earth

27. The Milankovitch theory states that

- a. cyclical changes in Earth's orbit and in the tilt of Earth's axis over long periods cause climatic changes.
- b. random changes in Earth's orbit and in the tilt of Earth's axis may cause ice ages.
- c. cyclical changes in Earth's orbit indicate that the next glacial period will begin in about 3,000 years.
- d. cyclical changes in sunspot activity increase and decrease the amount of solar energy that reaches Earth.

28. According to the Milankovitch theory, in what measure of time do the cycles that cause glaciation occur?

- a. days and months
- b. decades
- c. thousands of years
- d. millions of years

Directed Reading *continued*

- _____ 29. How many periodic changes occur that affect the way Earth moves around the sun?
- a. two
 - b. three
 - c. four
 - d. five
- _____ 30. What is the shape of Earth's orbit around the sun called?
- a. tilt
 - b. precession
 - c. eccentricity
 - d. circular
- _____ 31. Every 100,000 years, the shape of Earth's orbit changes from
- a. entirely circular to slightly elongated.
 - b. perfectly elongated to slightly circular.
 - c. perfectly circular to a little less than circular and back again.
 - d. nearly circular to elongated and back to nearly circular.
- _____ 32. How long is the cycle during which the tilt of Earth's axis varies?
- a. 15,000 years
 - b. 31,000 years
 - c. 37,000 years
 - d. 41,000 years
- _____ 33. How much does the tilt of Earth's axis vary during this period?
- a. between about 22.2° and 24.5°
 - b. between about 24.5° and 27.5°
 - c. between about 25.1° and 25.9°
 - d. between about 26° and 30°
- _____ 34. The circular motion that causes Earth's axis to change its position, or wobble, is called
- a. eccentricity.
 - b. precession.
 - c. tilt.
 - d. elongation.
- _____ 35. As Earth wobbles on its axis, how long does it take for the axis to trace a complete circle?
- a. 22,500 years
 - b. 25,700 years
 - c. 27,300 years
 - d. 41,000 years

Directed Reading *continued*

- _____ 36. Milankovitch calculated how changes in eccentricity, tilt, and precession might affect
- a. the distribution of solar energy that reaches Earth's surface.
 - b. the distribution of lunar energy between Earth and the moon.
 - c. the amount of precipitation on Earth.
 - d. the orbit of the moon over the next century.
- _____ 37. Changes in the distribution of solar energy on Earth
- a. cause crevasses to form in glaciers.
 - b. result in the formation of moraines.
 - c. affect global temperatures, which may cause glaciation.
 - d. probably have no impact on global temperatures.
38. Evidence of past glaciation is found in the _____ of marine organisms from the order Foraminifera.
39. Formation of the shells of Foraminifera is affected by the _____ of ocean water.
40. Temperature of ocean water affects how much _____ the ocean water dissolves.
41. The amount of oxygen in ocean water affects how _____ form their shells.
42. Under what conditions did Foraminifera coil their shells to the right or left?
- _____
- _____
- _____
43. Where are Foraminifera shells found?
- _____
- _____
- _____

Directed Reading *continued*

44. How does the study of marine sediments relate to the Milankovitch theory?

45. Explain how other scientific explanations about the causes of glaciation differ from the Milankovitch theory.

46. Describe two scientific explanations that suggest glacial periods are related to changes in the amount of solar energy reaching Earth's surface.
