

Directed Reading

(27.1) ODD

Section: Formation of the Solar System

1. The sun and all the planets and other bodies that revolve around it make up the _____.
2. The primary bodies that orbit the sun are called _____.
3. In 1796, the French mathematician Pierre-Simon, marquis de Laplace, advanced the _____ to explain the origins of the solar system.

THE NEBULAR HYPOTHESIS

- _____ 4. Laplace's hypothesis states that the sun and the planets condensed at about the same time out of a rotating cloud of dust and gas called a
 - a. planet.
 - b. nebula.
 - c. supernova.
 - d. solar system.
- _____ 5. The rotating cloud of dust and gas from which our solar system is thought to have formed is called the
 - a. solar nebula.
 - b. gas giant.
 - c. sun.
 - d. nova.
- _____ 6. Energy from collisions and pressure from gravity caused the center of the solar nebula to become
 - a. hotter and less dense.
 - b. cooler and denser.
 - c. cooler and less dense.
 - d. hotter and denser.
- _____ 7. Which of the following formed when the temperature at the center of the nebula reached about 10,000,000 °C and hydrogen fusion began?
 - a. Mars
 - b. Earth
 - c. the sun
 - d. the moon

Directed Reading *continued*

- _____ 8. How much of the matter that was contained in the solar nebula makes up the sun?
- a. 5%
 - b. about 99%
 - c. 25%
 - d. about 75%

FORMATION OF THE PLANETS

- _____ 9. Small bodies from which a planet originated in the early development of the solar system are called
- a. atmospheres.
 - b. planetesimals.
 - c. suns.
 - d. moons.
- _____ 10. Some planetesimals joined together through collisions and through the force of gravity to form larger bodies called
- a. protoplanets.
 - b. sunspots.
 - c. protons.
 - d. nebulas.
- _____ 11. The smaller bodies that orbit the planets are called
- a. solar nebulas.
 - b. moons.
 - c. planetesimals.
 - d. suns.

12. Why are Mercury, Venus, Earth, and Mars called the *inner* planets?

13. Why did the inner planets lose their less dense gases?

14. How do the surfaces of the inner planets compare with the surface of Earth today?

15. How do the inner planets differ from the outer planets?

Directed Reading *continued*

16. Jupiter, Saturn, Uranus, and Neptune are referred to as the _____ planets.

17. How was the formation of the outer planets affected by their distance from the sun?

18. List three reasons why the outer planets are referred to as *gas giants*.

19. Compare Jupiter and Earth in terms of density and radius.

20. Which planets are sometimes called ice giants?

21. Describe Pluto and its orbit.

22. Which category of solar system bodies is Pluto in?

FORMATION OF SOLID EARTH

- _____ 23. When Earth formed, its high temperature was NOT due to
- a. heat produced when planetesimals collided with one another.
 - b. heat generated when the increasing weight of its outer layers compressed its inner layers.
 - c. the conversion of moving radioactive particles into heat.
 - d. an irregular orbit that brought it closer to the sun.

Directed Reading *continued*

- _____ 24. Dense materials, such as molten iron, sank to Earth's center. Less dense materials were forced to Earth's outer layers in a process called
- distinction.
 - differentiation.
 - distribution.
 - delineation.
- _____ 25. Which of the following did NOT form as one of Earth's layers when differentiation occurred?
- the core
 - the mantle
 - the atmosphere
 - the crust
- _____ 26. Which of the following elements is NOT present in large amounts in Earth's three layers?
- gold
 - iron
 - silica
 - magnesium
- _____ 27. Earth's surface continued to change as a result of
- increasing radiation.
 - colliding planetesimals.
 - the heat in Earth's interior.
 - hydrogen fusion.

FORMATION OF EARTH'S ATMOSPHERE

- _____ 28. The original atmosphere of Earth consisted of
- oxygen and nitrogen.
 - hydrogen and helium.
 - nitrogen and helium.
 - hydrogen and oxygen.
- _____ 29. Hydrogen and helium
- were probably blown away by the solar wind.
 - probably sank to Earth's surface.
 - probably drifted to form the moon.
 - were probably absorbed by ozone.
- _____ 30. Earth's early atmosphere continued to form when volcanic eruptions released gases in a process called
- outgassing.
 - atmospheric composition.
 - air generation.
 - layering.
- _____ 31. The molecule that contains three oxygen atoms and collects in Earth's upper atmosphere is called
- oxygen.
 - argon.
 - ozone.
 - carbon dioxide.

Directed Reading *continued*

32. Some of Earth's early organisms, such as cyanobacteria and early green plants, used _____ during photosynthesis.

33. Which byproduct of photosynthesis was released into the atmosphere?

34. When did the chemical composition of Earth's atmosphere reach what it is today?

35. What is the present chemical composition of Earth's atmosphere?

FORMATION OF EARTH'S OCEANS

36. Comet collisions may have contributed a significant amount of _____ to Earth's surface.

37. How did Earth's first oceans form?

38. Earth's first ocean was probably made of _____ water.

39. The concentration of certain _____ in the oceans increased as rainwater dissolved rocks on land and carried these dissolved solids into the oceans.

40. When ocean water evaporated, chemicals in the oceans combined to form _____.

41. Earth's atmosphere and surface cooled because ocean water dissolved much of the _____ in the atmosphere.