

Chapter 25 The Solar System

## Section 25.5 The Origin of the Solar System

(pages 818–820)

*This section explains a theory of how the solar system originated. It also describes how this theory explains the composition and size of the planets.*

### Reading Strategy (page 818)

**Identifying Main Ideas** As you read, write the main idea for each topic. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

| Theories on the Origin of the Solar System |           |
|--|-----------|
| Topic                                      | Main Idea |
| The Nebular Theory                         |           |
| Formation of the protoplanetary disk       |           |
| Planetesimals and protoplanets             |           |
| Composition and size of the planets        |           |

### The Nebular Theory (pages 818–819)

- The generally accepted explanation for the formation of the solar system is called the \_\_\_\_\_.
- Circle the letter of each sentence that is true about the nebular theory.
  - The solar nebula formed from the remnants of previous stars.
  - The explosion of a nearby star likely caused the solar nebula to start to contract.
  - As the solar nebula contracted, it began to spin more slowly.
  - The solar system formed from a rotating cloud of dust and gas.
- Describe a solar nebula. \_\_\_\_\_  
\_\_\_\_\_
- A large, spherical cloud of dust and gas in space is called a(n) \_\_\_\_\_.
- Is the following sentence true or false? Most planets and moons are revolving now in the direction that the protoplanetary disk was spinning. \_\_\_\_\_

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6. Circle the letter of each sentence that is true about the formation of the protoplanetary disk.
  - a. The disk was densest in the center and thinner toward the edges.
  - b. At the center of the disk, nuclear reactions fused hydrogen and helium and the sun was formed.
  - c. The temperature at the center of the disk was extremely low.
  - d. Nearly all of the mass of the solar nebula became concentrated near the outer edge of the disk.
7. Asteroid-like bodies that combined to form planets were called \_\_\_\_\_.
8. The process by which planetesimals grew is called \_\_\_\_\_.
9. Put the following events about the formation of planetesimals and protoplanets in correct order. Number the events 1–5 in the order that they occurred.
  - \_\_\_\_\_ Balls of gas and dust collided and grew larger.
  - \_\_\_\_\_ Planetesimals became large enough to exert gravity on nearby objects.
  - \_\_\_\_\_ Planetesimals grew by accretion.
  - \_\_\_\_\_ Protoplanets joined to form the current planets in a series of collisions.
  - \_\_\_\_\_ Planetesimals grew into protoplanets.

**Composition and Size of the Planets (page 820)**

10. At \_\_\_\_\_ pressures, such as those found in space, cooling materials can change from a gas directly into a solid.
11. Ice-forming materials \_\_\_\_\_ at temperatures between 500 K and 1200 K.
12. Why are the terrestrial planets relatively small and rocky? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
13. Circle the letter of each sentence that is true about the formation of the gas giants.
  - a. The gravity of the gas giants decreased as they grew larger.
  - b. Ice-forming material could condense in the outer solar system.
  - c. The planets grew large and were able to capture hydrogen and helium from nearby space.
  - d. Less material was available for the gas giants to form than was available for the terrestrial planets.
14. Is the following sentence true or false? Scientists have found planets in orbit around distant stars that provide support for the nebular theory.  
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