Name _____ Class _____

SECTION 16-4 SECTION SUMMARY

# Characteristics of the Outer Planets

**Guide for Reading**

- **What are the main characteristics of the gas giant planets?**
- **How are Pluto and Charon different from the other outer planets?**

**The first four outer planets—Jupiter, Saturn, Uranus, and Neptune—are much larger than Earth, and do not have solid surfaces.** Because these four planets are all so large, they are also called the **gas giants.** The fifth planet, Pluto, is small and solid like the terrestrial planets.

Because the gas giants have so much mass, they have a stronger gravitational force than the terrestrial planets. This prevents their gases from escaping. The composition of their atmospheres is about 75 percent, on average, hydrogen, 24 percent helium, and 1 percent other elements by mass. None of the giant planets has a solid surface, and astronomers think that each has a partly solid core.

Jupiter is the most massive planet in the solar system. Its atmosphere appears as colorful bands of thick clouds with a Great Red Spot that is many times bigger than Earth. The Great Red Spot is an area of swirling clouds that appears to be an ongoing storm. Astromoners have discovered many small moons revolving around Jupiter.

Saturn is the second-largest planet in the solar system. If you include its rings, it has a larger overall diameter than Jupiter. Saturn is the least dense planet in the solar system. The hundreds of rings around Saturn are made of chunks of ice and rock, each in orbit around Saturn. Rings have also been discovered around the other gas giants. Saturn has 19 moons.

The English astronomer William Herschel discovered Uranus in 1781. It is about four times the diameter of Earth and is twice as far from the sun as Saturn. Uranus looks bluish because of traces of methane gas in its atmosphere. Uranus's axis is 90° off vertical. It rotates from top to bottom. Astronomers have discovered many moons around Uranus.

Neptune was discovered in 1846 when astronomers noticed that Uranus was not quite following the orbit they had predicted. They hypothesized that the gravity of an unseen planet was affecting Uranus's orbit. This planet was Neptune. Neptune is 30 times Earth's distance from the sun. Its atmosphere contains visible clouds. Astronomers have discovered 8 moons revolving around Neptune.

Clyde Tombaugh discovered Pluto in 1930 while searching for a large object that might be affecting Neptune's orbit. Pluto has a single moon, Charon. **Pluto and Charon have solid surfaces and masses much less than that of Earth.** Since Charon is more than half the size of Pluto, astronomers often consider them to be a double planet. Pluto and Charon revolve around the sun only once every 248 Earth years.

Name _____ Date _____ Class _____

SECTION 16-4 REVIEW AND REINFORCE

# Characteristics of the Outer Planets

## ◆ Understanding Main Ideas

*Answer the following questions in the spaces provided.*

1. What are the five outer planets?

2. Which planets are the gas giants?

3. What are the two main differences between Pluto and the gas giants?

4. Why doesn't the gas on a gas giant escape into space, as it has on Mercury?

5. What other object in the solar system has a composition similar to that of the gas giants?

6. What planet is by far the most massive of all the planets that revolve around the sun?

7. What are Saturn's rings made of?

8. Why did astronomers know where to look to discover Neptune?

9. Why do astronomers sometimes consider Pluto and its moon, Charon, to be a double planet?

## ◆ Building Vocabulary

*Write a definition for the following term in the space provided.*

10. gas giant