Chp 4-Review Questions. Exploring Our Evolving Solar System

1. What are the two agreed upon defining characteristics of a planet?
2. Compare the characteristics of a terrestrial planet to that of a Jovian planet.
3. In what ways are the largest moons similar to the terrestrial planets? In what ways are they different? Which moons are largest?
4. What is meant by the average density of a planet? Do all the planets orbit the Sun in the same direction? Are all of the orbits circular?
5. What is an asteroid? What is a trans-Neptunian object? In what ways are these minor members of the solar system like or unlike the planets?
6. What are the asteroid belt, the Kuiper belt, and the Oort cloud? Where are they located? How do the objects found in these three regions compare?
7. In what ways is Pluto similar to a terrestrial planet? In what ways is it different?
8. What is the connection between comets and the Kuiper belt? What is the connection between comets and the Oort cloud?
9. Imagine a trans-Neptunian object with roughly the same mass as Earth but located 50 AU from the Sun. (a) What do you think this object would be made of? Explain your reasoning. (b) On the basis of this speculation, assume a reasonable density for this object and calculate its diameter. How many times bigger or smaller than Earth would it be?
10. What is the nebular hypothesis?
11. What is a protosun? What causes it to shine? Into what does it evolve?
12. What are proplyds? What do they tell us about the plausibility of our model of the solar system's origin?
13. (a) What is meant by accretion? (b) Why are the terrestrial planets denser at their centers than at their surfaces?
14. Explain how our current understanding of the formation of the solar system can account for the following characteristics of the solar system: (a) All planetary orbits lie in nearly the same plane. (b) All planetary orbits are nearly circular. (c) The planets orbit the Sun in the same direction in which the Sun itself rotates.
15. Explain why most of the moons of Jupiter orbit that planet in the same direction that Jupiter rotates.
16. What are the differences between radial velocity and the transit method of extrasolar planet detection?

Chp 4-Discussion Questions. Exploring Our Evolving Solar System

1. Propose an explanation of why the Jovian planets are orbited by terrestrial-like moons.
2. Suppose that a planetary system is now forming around some protostar in the sky. In what ways might this planetary system turn out to be similar to or different from our own solar system? Explain your reasoning.
3. Suppose astronomers discovered a planetary system in which the planets orbit a star along randomly inclined orbits. How might a theory for the formation of that planetary system differ from that for our own?

Chp 4-Collaborative Group Exercises. Exploring Our Evolving Solar System

1. Imagine that scientists are proposing to send a robotic lander to visit Jupiter's Callisto. Create a 100-word written proposal describing why you would most like to send a robotic lander to another one

of the Galilean moons. Explain why your group found it to be the most interesting and why the government should allocate the money for your alternative project. In your proposal, be sure to demonstrate your knowledge of Callisto and at least one other moon.

2. Find objects in the room or among your possessions that can be used to create a reasonably accurate scale model of the planets of our solar system. Try finding a small object to represent Mercury first.