Film

The new Solar System: Part II

Objectives
• The basic theory on the origin and evolution of the solar system;
• The major members of the solar system, their names, sizes, positions, and distinctive surface features;
• The missions that have explored the solar system.

Part I covers the origin and evolution of the solar system and the terrestrial planets (Mercury, Venus, Mars), the Moon, and the Asteroid Belt.

Part II covers Jupiter, Saturn, Uranus, Neptune, Pluto, comets, and the Kuiper Belt.

Questions
1. What is Jupiter made of?

2. Which planet has the “great red spot”? Which has the “great dark spot”?

3. Which planetary bodies have active volcano?

4. What is the name of the largest moon in the solar system? Which planet does it belong to?

5. What is the name of the second largest moon in the solar system? Which planet does it belong to?

6. Can a moon be larger than a planet?

7. What is the most cratered object ever discovered in the solar system?

8. In the solar system, only one moon has a sizable atmosphere. Which one is it?

9. What is the most windy planet in the solar system?

10. How many comets are there?

11. What is the first mission that explored the giant planets?

12. What is the fate of our Sun? How is it going to affect the fate of Earth and us?
Advanced Questions
1. What is the Earth made of? How do we know? How did the Earth acquire this composition?
2. What is the internal structure of the Earth like?
   How do we know?
   What processes have led to such a structure?
   What about other planets and moons?

Keys
1. mainly H and He.
2. Jupiter has the great red spot. Neptune has the great dark spot.
3. Earth and Io have active volcanoes. Neptune’s Triton has cryovolcanism.
4. Ganymede, Jupiter
5. Titan, Saturn
6. Yes. Ganymede and Titan are larger than Mercury. Many moons in the solar system are larger than Pluto.
   However, a moon cannot be larger than the planet it belongs to.
7. Callisto, the fourth moon of Jupiter
8. Titan. It has a nitrogen (N₂)-rich atmosphere that is 50% thicker than the Earth’s atmosphere.
   That is one of the reasons that we are searching for life there.
9. Neptune. Wind speed is as much as 1500 mph.
10. On the order of a trillions ($10^{12}$, one thousand billion, or one million million).
11. Voyager 1 and 2.
12. Our Sun will become a red giant in about 5 billions years. We will be wiped out long before then unless we manage to move to another habitable place in the Universe.