



THE STAR★WITNESS

Supplemental Educational Support Materials for Special Feature: “Dawn Spacecraft Will Go Asteroid-Hopping”

Discussion questions

Q1.

What are asteroids? Why do you think there are so many of them?

Answer:

Asteroids are budding planets that stopped growing because of Jupiter’s powerful gravity. These objects could not hold themselves together because the Sun and Jupiter were playing a gravitational tug-of-war with them. The Sun was tugging in one direction and Jupiter in another. Jupiter and the Sun’s powerful gravity, therefore, made it impossible for material to form one clump to make a planet. At least 100,000 asteroids orbit the Sun in the asteroid belt. Some are larger than others.

Q2.

Identify at least two things that make the Dawn mission unique.

Answer:

The Dawn mission is unique in several ways:

- This marks the first time that NASA has targeted two different objects, Ceres and Vesta, to study during the same mission. Vesta is an asteroid and Ceres is an asteroid and a dwarf planet. Both objects are in the asteroid belt.
- The solar-electric engine that powers the spacecraft has never been used for scientific exploration.
- This is the first mission that will get close-up views of a dwarf planet.

Q3.

**How is the physical makeup of Vesta different from the physical makeup of Ceres?
Why do you think they are different?**

Answer:

Vesta is shaped like a mushroom and its surface shows evidence of lava flows. The asteroid also has a deep crater near its south pole. Ceres is round, has a thin, dusty outer crust, and may even have water locked beneath its surface. You may agree with astronomers who think the pair must have formed differently. You may even have developed another idea to account for the differences between these asteroids. Scientists are hoping the Dawn mission will answer these and other questions.

Continued ...

Vocabulary words

Asteroid

A small solar system object composed mostly of rock. Many of these objects orbit the Sun between Mars and Jupiter. Their sizes range anywhere from 10 meters in diameter to less than 1,000 kilometers. The largest known asteroid, Ceres, has a diameter of 926 kilometers (579 miles).

Asteroid belt

A region of space between Mars and Jupiter where the great majority of asteroids are found.

Dwarf planet

A celestial body within the solar system that shares the characteristics of planets. It orbits the Sun, is not a moon, and has a spherical or nearly spherical shape. Unlike a planet, however, a dwarf planet has not cleared away any loose cosmic rubble from its orbit. Dwarf planets include Ceres, Pluto, and Eris.

Gas giant

A large planet with a small, rocky core and a deep atmosphere composed mostly of hydrogen and helium. Our solar system contains four gas giants: Jupiter, Saturn, Uranus, and Neptune. This group is also known as Jovian planets.

Rocky planet

A planet located in the inner solar system and made up mostly of rock. The rocky planets are Mercury, Venus, Earth, and Mars. This group is also known as terrestrial planets.

Southern hemisphere

Half of a spherical or roughly spherical body; for example, the Southern Hemisphere of Earth is the half below the equator.