THE STAR WITNESS

Supplemental Educational Support Materials

for Special Feature: "New Moons for Pluto!"

Discussion questions

Q1.
Why is it hard for scientists to study Pluto?

Answer:
Pluto is extremely small and extremely far from Earth. No spacecraft has ever visited Pluto.

Q2.
Why do you think scientists planned the May 2005 Hubble observation?

Answer:
The scientists were looking for new moons around Pluto in preparation for the New Horizons mission, launched in January 2006. New Horizons will be the first spacecraft to visit Pluto and make close-up observations of it.

Q3.
Why do you think scientists planned the February 2006 Hubble observation?

Answer:
Scientists planned this observation to try to confirm their May 2005 discovery of two previously unobserved objects near Pluto. They thought the two objects might be two additional moons of Pluto. When a moon is "confirmed," astronomers have validated that the object is in orbit around a larger body and the astronomical community accepts that it is a moon.

Q4.
Why do you think it will take such a long time for the New Horizons spacecraft to reach Pluto and the Kuiper Belt?

Answer:
Pluto is farther from the Sun than any of the planets. It is nearly 40 times farther from the Sun than is Earth. The New Horizons spacecraft will travel faster than any previous spacecraft, but it also must travel farther to reach its target. For more information about the New Horizons mission, visit ***http://pluto.jhuapl.edu/education/students.html.***

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Q5.
How has the Hubble Space Telescope contributed to our understanding of Pluto?

Answer:
The Hubble telescope has provided our best glimpses of Pluto's surface, to date. The maps that resulted from Hubble's observations showed that Pluto's surface was more complex than astronomers thought. In addition, astronomers using the Hubble telescope spotted Pluto's two new moons and, later, confirmed their existence. Other telescopes have studied the area where the new moons orbit Pluto but never saw the moons. It took Hubble's keen "eye" to spy them.

Q6.
Scientists have found other objects in the Kuiper Belt. Many of them have a moon. Do you think these objects may have more than one moon?

Answer:
You may think other Kuiper Belt objects, like Pluto, may have more than one moon. Or, you may think Pluto is different from the other objects in the Kuiper Belt. Scientists feel that the recent discovery of more moons around Pluto implies that there are probably other Kuiper Belt objects with many moons.

Vocabulary words

Astronomer
A scientist who studies the universe and the celestial bodies residing in it, including their composition, history, location, and motion. Many of the scientists at the Space Telescope Science Institute are astronomers. Astronomers from all over the world use the Hubble Space Telescope.

Gravity (Gravitational force)
The attractive force between all masses in the universe. All objects that have mass possess a gravitational force that attracts all other masses. The more massive the object, the stronger the gravitational force. The closer objects are to each other, the stronger the gravitational attraction.

Kuiper Belt
A region in our outer solar system where many "short-period" comets originate. The orbits of short-period comets are less than 200 years. This region begins near Neptune's orbit at 30 astronomical units (AU) and extends to about 50 AU away from the Sun. An astronomical unit is the average distance between Earth and the Sun. The Kuiper Belt may have as many as 100 million comets.

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Observation
In science, an observation is a fact or occurrence that is noted and recorded. The Hubble Space Telescope is a tool astronomers use to make observations of celestial objects.

Orbit
The act of traveling around a celestial body; or the path followed by an object moving in the gravitational field of a celestial body. For example, the planets travel around, or orbit, the Sun because the Sun's gravitational field keeps them in their paths, or orbits.