



THE STAR★WITNESS

Supplemental Educational Support Materials for Special Feature: "Birthday Wishes for Hubble"

Discussion questions

Q1.

The Hubble Space Telescope is a well-known observatory that has made many interesting discoveries over the past 17 years. Ask your teacher to tell you how his or her view of the universe has changed over the past 17 years.

Answer:

Your teacher may describe the telescope's launch on April 24, 1990, or the first servicing mission in December 1993, or the first time a Hubble image appeared in your teacher's textbooks.

Q2.

Which of the discoveries discussed in the story is the most interesting to you? Explain why it is interesting.

Answer:

Your interests will determine your answer. You may pick a discovery within the solar system, such as Pluto's new moons. You may choose something in our Milky Way galaxy, such as the discovery of Jupiter-sized planets or observations of planetary nebulae. You may choose go beyond our galaxy to the discovery of dark energy or to the observations of galaxies that astronomers used to calculate the age of the universe.

Q3.

Look at the image of the Carina Nebula. What questions would you ask an astronomer about the features in the image?

Answer:

Possible questions you might want to ask an astronomer:

- How big is the nebula?
- How far is it from Earth?
- What do the colors mean? Are they real colors?
- If I could see the nebula through a telescope, would it look like the image?
- Why does the nebula glow?
- What makes some areas dark and others light?
- Do astronomers know why the nebula has funny shapes?
Do they know what those shapes may be?

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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.

Celestial

Of or relating to the sky or visible objects in the sky, such as the Moon, Sun, planets, comets, asteroids, stars, and galaxies.

Dark energy

A mysterious force that seems to work opposite to that of gravity and makes the universe expand at a faster pace.

Earth-orbiting

Traveling around Earth, in the path followed by an object moving in the gravitational field of Earth. For example, the telescope travels around, or orbits, Earth because Earth's gravitational field keeps the telescope in its path, or orbit.

Galaxy

A collection of stars, gas, and dust bound together by gravity. The smallest galaxies may contain only a few hundred thousand stars, while the largest galaxies have thousands of billions of stars. The Milky Way Galaxy contains our solar system.

Gigabyte

A measure of computer data storage capacity equal to approximately a billion bytes. In computer language, a byte of information represents a letter or number. So, a billion bytes is equal to a billion letters.

Milky Way galaxy

A spiral galaxy that is the home of Earth. The Milky Way contains more than 100 billion stars and has a diameter of 100,000 light-years.

Nebula

A cloud of gas and dust located between stars and/or surrounding stars. Nebulae are often places where stars form.

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Observation

The act of noticing or perceiving something. In science, observations refer to noting or recording a fact or occurrence. The Hubble Space Telescope is a tool astronomers use to make observations of celestial objects.

Planetary nebula

A well-defined shell of gas cast off by a dying, Sun-like star. The material glows from the energy given off by the central hot star it surrounds.

Supernova

The explosive death of a large star whose energy production causes its expanding gases to glow extraordinarily brightly for weeks or months.

Terabyte

A measure of computer data storage capacity equal to approximately a thousand billion bytes (or a thousand gigabytes). In computer language, a byte of information represents a letter or number. So, a thousand billion bytes is equal to a thousand billion letters.