



THE STAR★WITNESS

Supplemental Educational Support Materials for Special Feature: “No Spring Picnic on Neptune”

Discussion questions

Q1. Describe Neptune's springtime weather.

Answer:

Take your parka. Neptune's springtime weather brings blustery storms, temperatures of minus 400 degrees Fahrenheit at the cloud tops, and fierce winds that sometimes gust to 900 miles per hour. What is remarkable is that Neptune — the farthest and coldest of the major planets — exhibits any evidence of seasonal change. After all, the Sun is 900 times dimmer that it is on Earth.

Q2. What causes seasonal changes on Neptune?

Answer:

Seasons on Neptune occur for the same reasons as on Earth. The seasonal changes on both planets occur because their axes tilt slightly. Earth is inclined 23.5 degrees. Neptune is tipped at an even greater angle: 29 degrees. As both planets circle the Sun, one hemisphere is always tipped toward the Sun; the other is tilted away from the Sun. When the southern hemisphere tips toward the Sun, it receives more sunlight than the northern hemisphere. That means it's summer in the south and winter in the north. The opposite is true when the northern hemisphere is tilted toward the Sun. The north receives more sunlight, which means it's summertime.

Q3. How long are Neptune's seasons?

Answer:

Unlike Earth, Neptune's seasons last for years, not months. A single season on the planet, which takes almost 165 years to orbit the Sun, can last more than 40 years.

Q4. Do other planets have seasons? Based on your knowledge of what causes seasons, decide whether the planets shown in the graphic titled “Are other planets tilted?” might have seasons.

Answer:

Seasonal changes may occur during a planet's trip around the Sun if the planet's axis tilts enough to allow some areas of the surface to heat more than other areas.

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Of the planets shown, the ones with enough tilt to cause seasons are Earth, Mars, Saturn, Neptune and Pluto. These planets would be expected to show seasonal changes. However, a planet without an atmosphere, like Pluto, would not show seasons.

Uranus is tilted so that it almost lies on its side, but it will still show seasons as it travels around the Sun. First, one pole points toward the Sun (and the other points away), and then the other pole points toward the Sun (and the first points away).

Mercury is not tilted, so it would not have seasons. Jupiter's tilt is very slight — not enough to cause seasonal changes.

Venus' axis is almost flipped upside down (see graphic). It does not have seasons. Even if Venus had a tilt that could give it seasons, its thick atmosphere would hide any variation in sunlight, so Venus would not show seasonal changes.

Vocabulary words

Atmosphere

The layer of gases surrounding the surface of a planet, moon, or star.

Axis (*pl.*, axes)

An imaginary line through the center of an object. The object rotates around this line.

Hemisphere

Half of a spherical or roughly spherical body; for example, the northern and southern halves of the Earth, above and below the equator.

Observation(s)

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.