The Problem with Pluto: Educator Guide

Overview

When the International Astronomical Union (IAU) met on August 24, 2006, astronomers voted to reclassify Pluto from a planet to a dwarf planet. Explore the new definition of a planet and the downsizing of the solar system to eight “true” planets — changes that have sparked public debate as well as new understandings of the nature of science.

Learn too why Pluto has been at the center of controversy ever since it was first recognized in 1930. As technology advanced, Pluto’s position in the scientific community declined.

Suggested Classroom Activities

Discussion: Well before the 2006 vote, the validity of Pluto’s planethood was being questioned. Ask: What made scientists question Pluto’s planethood?

Simulation: Hold a mock IAU congress to simulate debate of the original proposal for recognition of 12 planets, adding Ceres, Xena (Eris), and Charon. Also have students simulate the vote on the revised proposal to demote Pluto to dwarf planet status.

Discuss: At the 2006 IAU meeting, astronomers redefined a planet as follows:

- It has enough mass to become round.
- It orbits around the Sun.
- It is the dominant object at its own orbital distance from the Sun.

How and why did the definition of a planet change? Why doesn’t Pluto fit the new definition? What does the current redefinition of planets show about the solar system? About science?


Debate: Have students summarize information from the video about the Kuiper Belt, the broad band of icy asteroids in the far regions of the solar system, and debate whether the many large orbiting bodies of the Kuiper Belt should be considered planets.

Photography: Show photos of Pluto from the Hubble Space Telescope on the NASA Web site, http://www.nasa.gov/home/, and have students list its characteristics (cold, icy, etc.). Ask why so little is
known about Pluto. Make sure students understand that only the strongest telescopes can view it because it is very small and distant.

**Visual Aid:** Show students a visual depicting Pluto’s oval orbit and its involvement with Neptune and other celestial bodies in the Kuiper Belt, including its own moon, Charon. Discuss why Pluto’s orbit disqualifies it from the current definition of a planet. (An example of a visual aid may be accessed at www.nasa.gov/ceps/etp/pluto/pluto_orbit.html.)

**Glossary:** Have students make a glossary defining terms including the following: planet, solar system, elliptical, orbit, moon, comet, Kuiper Belt, asteroid, inner planets, and outer planets.

**Discussion:** Ask students: Why do definitions of the solar system change? How are scientists’ views of the solar system changing? Is the solar system changing, or is scientists’ ability to understand it changing? Do you think the definition of planet will change again?

**Polling:** Take a poll of students on whether or not Pluto should be considered a planet, and encourage students to poll other students and adults outside of class and compile the results.

**Posters:** Encourage students to design attractive and persuasive posters either for or against Pluto being called a planet.

**Brainstorming:** Mnemonic Device: Have students brainstorm to create a new mnemonic device for remembering the names of the eight planets. They may know earlier mnemonics for the nine planets, such as “My Very Educated Mother Just Served Us Nine Pickles.”

**Researching Web Sites:** Have students investigate more about Pluto and see whether the following Web sites have up-to-date information about Pluto:

- www.nsta.org
- www.nasa.gov
- http://quest.arc.nasa.gov
- www.seds.org
- www.sln.org

**Letter Writing:** Ask students: If Pluto is no longer a planet, is it important to learn about it? Tell students about the New Horizons spacecraft investigating Pluto, which was launched in January 2006 and is expected to reach Pluto in 2015. Have groups of students draft letters to their representative in congress, supporting or opposing continuation of the program.

**History:** Summarize the history of the discovery of Pluto. Ask: Do you think Pluto should have been designated a planet? Demoted earlier? Why?

**Case Study:** Provide the facts about the discovery of UB313, nicknamed Xena but now officially named Eris, which is an orbiting body larger than Pluto. Tell students that Michael Brown, a Caltech astronomer,
observed the object in 2005 and said, “I may go down in history as the guy who killed Pluto.” Discuss the role of Eris in Pluto’s downfall.

**Mythology**: Invite students to research the naming of Pluto and Charon, as well as myths about Pluto, the Greek god of the underworld, and Charon, the ferryman to the underworld.

**Biography**: Assign students to read a biographical article about Percival Lowell, Clyde Tombaugh, V. M. Slipher, or Michael Brown and report on the scientist’s life and his work related to Pluto.

**Predicting**: Encourage students to imagine what will happen to scientists’ view of the solar system in coming years. Have students write headlines for news reports in the year 2030.

**Academic Standards**

Students develop abilities related to the following national standards:

- **Historical Understanding**
  Understands and knows how to analyze chronological relationships and patterns
  Understands the historical perspective

- **Language Arts**
  Uses reading skills and strategies to understand and interpret a variety of informational texts
  Uses viewing skills and strategies to understand and interpret visual media

- **Science**
  Understands the content and structure of the universe
  Understands the nature of scientific knowledge

**National Science Education Standards**

For national science education standards that address teaching, content, and assessment, visit www.nap.edu/html/nses.

This lesson plan addresses the following national standards:

- Earth and Space Science
- Science and Technology
- Science as Inquiry

(This document was adapted from a Discussion Guide originally developed by Discovery Education.)