



The Problem with Pluto - Teacher's Notes

Students are asked to read the following text twice. The first time is to gain meaning and the second to select information, which will support or reject the proposition that **"PLUTO IS A PLANET"**. Teachers may wish to lead students through the first reading.

On the second reading they may use two different highlighters or coloured pencils to mark statements that support Pluto as a planet in one colour and statements to reject Pluto as a planet in another. They then review their work and make their decision based on information available at this time.

Poor Pluto?



*Image of Pluto from the New Horizons
space mission*

If you asked your grandparents about the Solar System, they would tell you that it consisted of nine planets orbiting the Sun. These were Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Pluto.

Before it was first observed by Clyde Tombaugh in 1930, the location of Pluto had already been predicted by astronomers and mathematicians. Pluto lies in the Kuiper Belt in the outer reaches of the Solar System. It was named after the Roman god of the underworld. Being the farthest planet from the Sun its orbit takes 249 years and is strongly elliptical. It is about two-thirds the size of the Moon, its diameter of 2,302km is less than the width of Australia and it is spherical. It consists of a rocky core surrounded by frozen water, methane and carbon monoxide. Pluto orbits the Sun, has three moons and an atmosphere and even has polar ice caps. It is not much different from other planets.

As technology improved and probes travelled further into space, more small bodies were found in the Kuiper Belt and beyond that in the Oort Cloud. In the Kuiper Belt, Eris was found, in 2006, followed by Sedna, Makemake and





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Quaoar. In total twelve significant bodies have been found. So far all are smaller than Pluto.

These discoveries were problematic. If something as small as Pluto could be called a planet, should all the others be planets too? What about Ceres the largest asteroid in the Asteroid Belt. Should it be declared a planet too? This problem was discussed at the 2006 International Astronomical Union (IAU) Conference. Although 2,700 astronomers attended the conference only one tenth attended the discussion and participated in subsequent voting.

It was decided that to be classified a planet:

1. ***A body needs to orbit the Sun.*** All the eight planets, Pluto and the other bodies in the Kuiper Belt and the asteroid Ceres orbit the Sun.
2. ***A body needs to be large enough so its gravitational force pulls it into a spherical shape.*** Pluto and Ceres are spherical. Most asteroids are very much smaller and irregular in shape. Comets have long tails.
3. ***A body needs to be larger than a typical asteroid.*** The IAU decided that Ceres (diameter 945km), and Pluto (diameter 2,302km) were too small to be considered planets.
4. ***A body needs to have enough gravitational force to clear other bodies from its orbital path.*** After a planet forms its gravitational force either pulls in smaller bodies into itself or slings them out into space. Until Pluto or Eris crash into all the other objects that share their orbit and either absorb or deflect them they cannot be considered a planet. Ceres is one of many asteroids in the Asteroid Belt.

After voting, the IAU declared that Pluto and Ceres were not planets but "dwarf planets".

Many astronomers disagree with these decisions and signed petitions to





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change this reclassification.

What is your opinion? How would you, as a scientist, vote and why?



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