

What's a Planet and Why is Pluto Not in the Planet Club Anymore?

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In 2006, the International Astronomical Union, the “U.N.” of astronomy, voted to make Pluto a “dwarf planet” instead of a regular planet. There was considerable controversy among astronomers and the public. You may wonder why Pluto’s status changed and whether any of the other planets might lose their designation next. Here’s the full story.

To understand what happened, we must actually go back to the late 1700’s, when a number of astronomers thought that there was something odd to the spacing of the planets orbiting the Sun. They thought Mars and Jupiter were too far apart and that there should be a planet between them. A group of German astronomers organized themselves into a Missing Planet Bureau and undertook a detailed search of likely locations for such a planet.

In 1801, an Italian astronomer named Giuseppe Piazzi beat them to the punch when he found a dim object between Mars and Jupiter. He named it Ceres, after the patron goddess of Sicily, where he lived. The disappointed Germans kept looking and in 1802 found another dim object, which was soon called Pallas. A third one was found in 1804 (called Juno) and a fourth in 1807 (called Vesta). By 1890 more than 300 of these objects had been discovered and it was clear that they were not

planets in the traditional sense.

When astronomers realized that Ceres had many “relatives” in roughly the same region of the solar system, they began calling them all asteroids or minor planets. The name was appropriate because these objects were all significantly smaller than any of the regular planets. But as you can see in the table at the bottom, for a while, school-kids had to memorize Ceres, Juno, Pallas, and Vesta as full-fledged members of our planetary system. Today, when tens of thousands of minor planets have been discovered (most residing in an “asteroid belt” between Mars and Pluto), not even the meanest of teachers would require students of astronomy to learn all their names.

We bring up this history because it is directly related to the story of Pluto. In 1846, Neptune, the fourth of the giant planets beyond the asteroid belt, was discovered — thirty times farther from the Sun than our Earth. With 8 planets known, the thoughts of astronomers soon turned to the region beyond Neptune. Were any more distant worlds out there, waiting to be found?

In 1930, a systematic search revealed what seemed to be a 9th planet, although measurements eventually showed it to be much smaller than Jupiter, Saturn, Uranus, and Neptune. In many ways the new world more nearly resembled Triton, a moon of Neptune’s, than any of the planets in the outer solar system. Nevertheless, because the newly found body orbited the Sun like a planet and was the only one in its distant orbit, it was classified as a planet and soon named Pluto, after the god of outer darkness in Roman mythology.

So things stood for 65 years. Although Pluto’s orbit was more elongated than the other planets’ (and even crossed the orbit of Neptune — not the kind of thing you would expect a well-mannered planet to do), it seemed alone in its region of space, much as Ceres had seemed before the other asteroids were discovered. But then, starting in 1995, astronomers with better instruments began to find Pluto’s nearby relatives. Soon, they



Giuseppe Piazzi

had discovered several worlds almost as big as Pluto, and in 2003 they identified an object which has turned out to be bigger than Pluto. (That world is now called Eris, after the ancient goddess of discord.) At the time we write this, in late 2009, over a thousand objects are known to orbit the Sun beyond Neptune. Once again we can't imagine torturing school children by adding even a dozen of the biggest ones to the list of planets. The region where these bodies orbit is now called the Kuiper (pronounced Chi-per) Belt, after one of the astronomers who hypothesized its existence.

To honor and distinguish the largest members of the Kuiper Belt — objects such as Pluto and Eris — the International Astronomical Union in 2006 recommended that they be called “dwarf planets” — much as asteroids are called “minor planets.” The eventual definition of a planet was changed to require two things: a world big enough for gravity to make it round, and a world that has cleared out its neighborhood of everything except its own moons.

Anything that is round, but has a swarm of similar objects around it is then called a dwarf planet. Among the asteroids, Ceres turns out to be big enough to be round, and so it now enjoys the designation of dwarf planet too.



Eris, artist's concept

While some people mourned the passing of Pluto from mainstream planet to this new classification, other Pluto fans thought it was pretty cool to be the first member of a whole new belt in the solar system. Having heard the whole story, what do you think?

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A Brief History of the Number of Planets Being Taught

Time Period	Number of Planets	Explanation
Most of human history	7	Sun, Moon, Mercury, Venus, Mars, Jupiter, Saturn
After the work of Copernicus, Kepler & Galileo	6	Mercury, Venus, Earth, Mars, Jupiter, Saturn
1781-1801	7	Uranus added
1801-1802	8	Ceres added
1802-1804	9	Pallas added
1804-1807	10	Juno added
1807-1846	11	Vesta added
1846-1850's	12+	Neptune added (other asteroids discovered)
1850's-1930	8	All asteroids become minor planets
1930-2004	9	Pluto added
2004-2006	10?	Eris announced and its category debated
2006 on	8	Pluto and Eris become dwarf planets

NOTE: In 2008, Makemake and Haumea, two other bigger worlds in the Kuiper Belt, were officially added to the list of dwarf planets beyond Neptune. As new round worlds are discovered in that distant realm, other dwarf planets may well be added to our catalog.