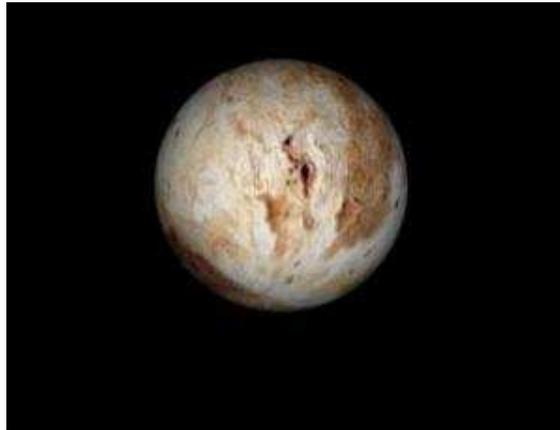


Is Pluto a planet after all?

- 27 July 2009 by [Stephen Battersby](#)

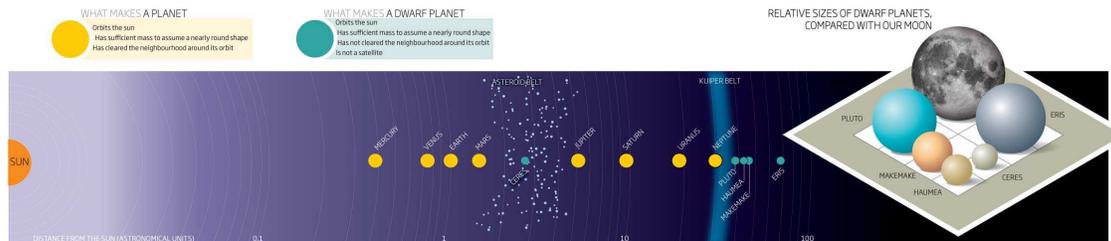


HOW many planets are in the [solar system](#)? The official answer is eight - unless you happen to live in Illinois. Earlier this year, defiant Illinois state governors [declared that Pluto](#) had been unfairly demoted by the [International Astronomical Union](#), the authority that sets the rules on all matters planetary.

Three years ago, the IAU decided to draw up the first scientific definition of the term planet. After days of stormy arguments at its general assembly in Prague, the delegates voted for a definition that excluded [Pluto](#), [downgrading it to the new category of dwarf planet](#).

Pluto - planet or dwarf planet?

According to the International Astronomical Union's present definitions, the solar system has eight planets and five dwarf planets



The decision caused [outrage among many members of the public who had grown up with nine planets](#), and among some astronomers who pointed out that only 4 per cent of the IAU's 10,000 members took part in the vote. The governors of Illinois saw the decision as a snub to Pluto's discoverer, Clyde Tombaugh, who was born in the state.

Next week the IAU's [general assembly will convene for the first time since Pluto was axed from the list of planets](#). Surprisingly, IAU chief Karel van der Hucht does not expect anyone to challenge the ruling made in Prague, but Pluto fans can take heart: resistance remains strong.

If Pluto is reinstated, it will probably be thanks to discovery rather than debate. [Mark Sykes of the Planetary Science Institute in Tucson](#), Arizona, believes that revelations within and beyond our solar system over the coming years will make the IAU's controversial definition of a planet untenable (see [diagram](#)). "We are in the midst of a conceptual revolution," he says. "We are shaking off the last vestiges of the mythological view of planets as special objects in the sky - and the idea that there has to be a small number of them because they're special."

Sykes believes that missions currently en route to Pluto and the [asteroid](#) Ceres, which orbits the [sun](#) between Mars and [Jupiter](#), will reveal these dwarf planets as active and intricate worlds. Meanwhile, astronomers may find distant objects as large as Earth which the IAU would not define as planets.

Sykes is among those who prefer a simple and inclusive definition of planet status: if an object is big enough for its own gravity to squeeze it into a rounded shape, then call it a planet. That would make a planet of Pluto again, as well as Ceres and a growing number of other bodies (see [diagram](#)).

The IAU had originally proposed something similar, but in Prague one faction objected. They pointed out that Pluto is really just a piece of debris, merely one of a swarm of icy objects out beyond [Neptune](#) called the Kuiper belt. The objectors complained that under the simple definition, many Kuiper belt objects would achieve planet status and they persuaded the meeting to add the condition that a planet must have either thrown out or sucked up any nearby junk, or in their words, "cleared the neighbourhood around its orbit". Only the eight planets from [Mercury](#) to Neptune meet that condition.

It is also the sticking point. "It is a horrible mistake," says Alan Stern of the Southwest Research Institute in Boulder, Colorado, who leads NASA's [New Horizons mission to Pluto](#). "Any definition that allows a planet in one location but not another is unworkable. Take Earth. Move it to Pluto's orbit, and it will be instantly disqualified as a planet."

While Earth's gravity is easily strong enough to have cleared the debris from our relatively small neighbourhood, two factors mean that it would fail to do the [job](#) if placed at Pluto's distance: the outer solar system is vast, and everything moves much more slowly out there. According to Sykes, 4.5 billion years would not be nearly long enough for a small and sluggish Earth to sweep those great expanses clean.

Strange worlds

Some astronomers believe that puzzling formations in the Kuiper belt betray the so-far hidden presence of an object bigger than Mars - surely worthy to be called a planet, says Sykes. If they are right, that icy world would mock the IAU's definition, he believes, because it would not clear the neighbourhood around its orbit.

This is disputed by Gonzalo Tancredi of the University of Uruguay in Montevideo, who was among the victorious faction in Prague. He says that a Mars-sized object could drill a tube-like space through the Kuiper belt. But would that be sufficient to have "cleared the neighbourhood"? The two sides disagree. So why not take it up at next week's IAU meeting? Stern believes that it would only worsen the mess. "The IAU is the wrong place to pursue it. They're very good at taking something easy and making it hard." Instead, he says that the word planet should evolve naturally. "In science there is no police force. People decide what's right, and usage solves the problem."

Pluto fans may not have too long to wait for a change of heart. In 2015 we will finally see the disputed icy ball up close. When NASA's New Horizons mission reaches Pluto, Stern expects it to reveal a complex landscape and an active atmosphere. We already know that its atmosphere expands and contracts over the seasons and is stirred by large-scale electromagnetic waves, both revealed by observing how Pluto's atmosphere bends light when it passes in front of stars.

Then there is NASA's [Dawn mission](#), due to arrive at Ceres in the same year. The spectrum of infrared light from Ceres [suggests that parts of the surface are covered in clay](#), which could be a sign of ongoing geological activity. Clays are created on Earth by hot water flowing through rock. Sykes expects to find that Ceres has active geology, driven by a churning mantle of ice. "We're going to find worlds - things that don't look like asteroids," says Sykes.

Could that change people's attitudes? It will all come down to psychology, says [Jack Lissauer of NASA's Ames Research Center in Moffett Field](#), California. "There is no fundamental argument that one can give on either side of the issue, and because there's not a clear winner there is a lot of controversy."

While Lissauer is not a great fan of the IAU definition, neither is he keen on the alternative. "Being round isn't a very good criterion by itself. There will be a lot of intermediate cases; objects that are sort of round."

Maybe now is the worst time to be looking for a firm definition of the word, with the speed of discoveries accelerating. Outside the solar system, other controversies are developing. What qualifies an exoplanet as a "super-Earth", for example? And at the heavyweight end of the scale, is there a clear dividing line between gas giant planets and brown dwarf stars?

Meanwhile, in our backyard, Sykes has a truly radical suggestion. Taking the simple definition of roundness to its logical conclusion, should we think about reclassifying the moon and other big satellites as planets? "We have stars orbiting other stars. Why not planets orbiting planets?" he asks.

It seems unlikely, but who knows? Maybe the battle for Pluto will have a surprising outcome, and the moon will become a planet again - just as it was for the ancient Greeks.

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<http://www.newscientist.com/article/mg20327181.600-is-pluto-a-planet-after-all.html>