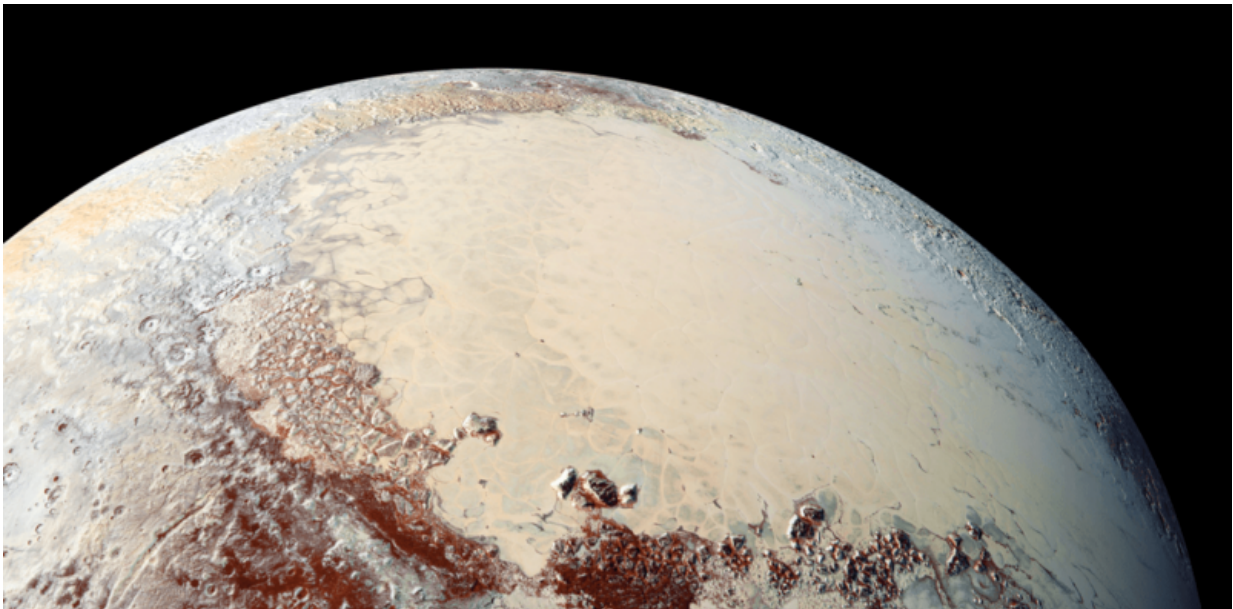


# Planet or dwarf planet—all worlds are worth investigating

March 20 2017, by Tanya Hill

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Pluto is a dwarf planet but that doesn't make it any less worthy of our attention.  
Credit: NASA/JHUAPL/SwRI

Pluto's status as a "dwarf planet" is once again stirring debate. This comes as some planetary scientists are trying to have [Pluto reclassified as a planet](#) – a wish that's not likely to come true.

Pluto has been known as a [dwarf planet](#) for more than a decade. Back in August 2006 [astronomers voted to shake up the solar system](#), and the

number of planets dropped from nine to eight. Pluto was the one cast aside.

There was some outcry that Pluto had been destroyed in an instant and was no longer important, and the reverberations were most keenly felt across America.

After all, Pluto was "their planet", discovered in 1930 through the meticulous observations of American astronomer [Clyde Tombaugh at the Lowell Observatory](#) in Arizona.

At the time of the vote, NASA's [New Horizons spacecraft](#) was only seven months into its nine-year journey to Pluto. There was concern that when it finally arrived, would people even care about a dwarf planet?

For many [astronomers](#), the demotion of Pluto was a defining moment. It wasn't a gesture of destruction and it wasn't aimed specifically at Pluto. What it signalled was a major leap forward.

In that moment the world's astronomers acknowledged significant progress in our understanding of the solar system, an achievement to be proud of – even if everyone was not entirely happy.



Earth became a planet too, once the ‘wanderers’ were understood. Credit: NASA/Reid Wiseman

## What's in a name?

The first step to understanding a group of objects is to classify them. We group like with like to examine the aligned characteristics or any significant differences between groups. With this insight comes a deeper understanding of how things work, form or evolve.

The planets were originally grouped together because the [ancient Greeks](#) saw them as "the wanderers", travelling across the sky. Five bright objects – Mercury, Venus, Mars, Jupiter and Saturn – may have looked like stars, but while stars stayed fixed within their constellations, these planets moved independently from them.

The cause of this planetary motion was eventually established by the Polish astronomer [Nicolaus Copernicus](#) in the 16th century, bringing with it a new revelation. Planets were more than wanderers, they were objects in orbit about the sun and with this understanding Earth became a planet too.

## Defining a planet in the 21st century

More than 400 years and many discoveries later, a new storm began brewing in our understanding of the solar system.

Since 1992, astronomers had begun to find [objects orbiting the sun](#) out in the realm of Pluto. Were they planets too?



Astronomers raise their yellow cards and Pluto becomes a dwarf planet. Credit: Martin George

Conversely, [Pluto](#) was a bit of an oddball. It was smaller than several moons of other planets, and it had a highly inclined orbit that made it stand out from the others. Was it truly a planet or was it part of a much larger family of objects?

With the discovery of [Eris](#) (originally known by its designation 2003 UB313) in 2003, a decision could no longer be avoided. Eris was about the size of Pluto and certainly more massive. Was Eris a planet? And if not, where did that leave Pluto?

Astronomers have a forum for such deliberations via the International Astronomical Union ([IAU](#)). Representing astronomers worldwide, the IAU is the recognised authority responsible for naming and classifying planetary bodies and their satellites.

The IAU formed a [Planet Definition Committee](#) to consider the scientific, cultural and historical issues at hand. A draft proposal was put forward, and during the 2006 IAU General Assembly in Prague, with the world's astronomers gathered together, the Committee's proposal was vigorously debated.

A revised proposal was presented to the IAU membership on the final day of the General Assembly and [was passed with a large majority](#).





The Milky Way and its neighbouring dwarf galaxies, the Large and Small Magellanic Clouds seen in the lower left. Credit: ESO/C. Malin

For the first time, [a planet was formally recognised](#) as being "a celestial body that":

*(a) is in orbit around the sun*

*(b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape*

*has cleared the neighbourhood around its orbit.*

Since Pluto had not "cleared the neighbourhood around its orbit", it was

not a planet but would be recognised as a "dwarf planet".

A colleague of mine, Martin George, director of the [Launceston Planetarium](#), was there when the vote was taken and captured the excitement and the nuance of the event.

*There was quite a buzz in the room and we knew we were about to make history. Did everyone agree on the exact wording? Perhaps not. However, I think it would have been worse to see media headlines reading 'Astronomers cannot decide what a planet is'.*



The dwarf planets compared to Earth. Credit: NASA

## Size matters and location too

The distinction of planet and dwarf planet brings a consistency to how objects are named across the universe. On the grand scale, there are galaxies and there are dwarf galaxies.

Within our Milky Way Galaxy, the sun is a yellow dwarf star that in billions of years will evolve to become a red giant before ending its life as a white dwarf.

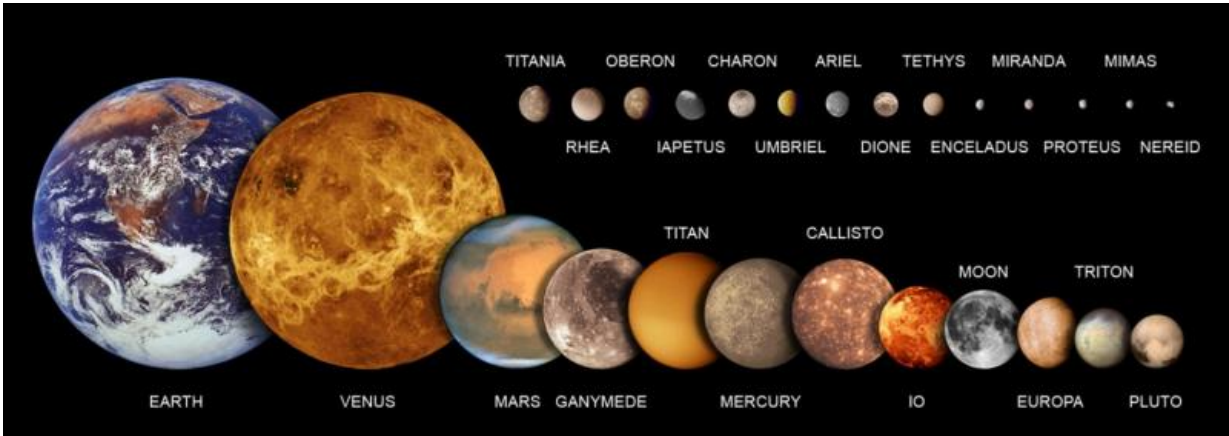
These distinctions among galaxies and stars helps astronomers interpret and understand them, tracing their evolution.

Planets and [dwarf planets](#) are distinct because of their size and their location in the solar system. It provides a way to examine how planets and dwarf planets may have originated and evolved differently.

## Planetary resemblance

At present, the IAU has officially recognised five dwarf planets. They are [Pluto](#), [Eris](#), [Makemake](#) and [Haumea](#), which orbit the sun beyond Neptune, and [Ceres](#), which is the only object in the asteroid belt massive enough to be spherical.





There are many solar system objects smaller than Earth. Credit: primefac

Detractors and also supporters of the standing planet definition can point to problems with it. For instance, it only applies to objects orbiting the sun. But what about exoplanets? And what is meant by "cleared its neighbourhood"? If Earth was located farther away from the sun, would it be able to clear its orbit?

But, as astrophysicist Ethan Seigal explains, [minor qualifications to the planet definition](#) can bring it in line with exoplanets and allows the definition to work with renewed clarity.

Whereas the latest proposal to reinstate Pluto, advocates a geophysical definition of planet. Namely, that a planet should be large enough to be round, but not so big that it is a star. This broad definition casts the net wide, and not only Pluto, but also the moon and more than 100 other solar system objects would become planets.

Now wouldn't that be a leap backwards in regards to structuring and understanding our solar system? How much of it is driven by the notion that nothing but a planet is worth exploration?

There's a plethora of "[not-planets](#)" in our solar system that are worlds worthy of attention. This includes the fiery volcanoes of [Io](#), the icy geysers of [Enceladus](#), the reddish surface of [Makemake](#), the crazy spin of [Haumea](#) and the mystery of hundreds of worlds unknown orbiting beyond Neptune.

So let the official word on planets and dwarf [planets](#) be as passed in 2006 and let our exploration of the [solar system](#) continue to amaze us.

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