Planetary Wonderings

September Focus: Planets, Dwarf Planets, and Small Solar System Bodies, Oh, My!

by Mary-Frances Bartels, NASA Solar System Ambassador

"Honey, I Shrunk the Solar System" was the title of a recent e-mail I received from NASA's Jet Propulsion Laboratory. It gave information on Pluto's "demotion" as a planet at the recent International Astronomical Union meeting in the Czech Republic on August 24. The IAU's decisions were covered in many standard news outlets and even made the front page of the "Columbus Dispatch" that day. This month I will briefly explain and highlight the IAU's resolutions.

So, what lead to Pluto's "demotion?" The problem stems from the fact that, until August, there was never any real scientific definition for the word *planet*. In fact, this dilemma had plagued astronomers for more than 200 years. Most people today were taught that there are nine planets — Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. Just prior to the IAU's meeting there was a proposal to expand the number of planets to 12, adding the asteroid Ceres, Pluto's moon Charon, and a distant object named Xena. What the general public might not realize is that at one time the number of planets was 23, and that did not even include Pluto! In the early nineteenth century, individual asteroids were being discovered, named, and considered planets. Just as then, it is now. Continued exploration of the solar system and discovery of new, often much further, objects, forced scientists to take a hard look at how to classify all that was being found.

The IAU devised three classifications for solar system objects — planets, dwarf planets, and small solar system bodies.

A *planet*, which includes all the "classical planets" except Pluto, must:

- orbit the sun
- be massive enough that its own gravity pulls it into a nearly round shape
- be dominant enough to clear away objects in its neighborhood (this includes it having an orbit that does NOT cross the orbit of another's — Pluto's orbit crosses that of Neptune)

NASA has sent numerous spacecraft to all of these planets. Recent missions include Mars Reconnaissance Orbiter (Mars), MESSENGER (Mercury), and Cassini-Huygens (Saturn).

A *dwarf planet*, which includes Pluto, Ceres, and Xena, must:

- orbit the sun (same as a planet)
- have a nearly round shape (same as a planet)
- have **not** cleared the neighborhood around its orbit
- not be a satellite

NASA presently has two missions to dwarf planets. New Horizons was launched in January and is headed to Pluto. Dawn is slated to visit asteroids Ceres and Vesta, and should be launched next year. It will be the first time a spacecraft will orbit two planetary bodies on a single voyage.

All other objects, except satellites orbiting the sun, shall be referred to collectively as *small solar system bodies*. These include comets, most asteroids and trans-Neptunian objects (TNO's are objects in the solar system that orbit the sun at a greater average distance than

Neptune), and other small objects. Recent NASA missions to small solar system bodies include Stardust (Comet Wild 2), NEAR Shoemaker (first mission to orbit and land on an asteroid — 433 Eros), and Deep Impact (Comet 9P/Tempel 1).

I hope this explanation has helped clear up any confusion related to the International Astronomical Union's definitions of planets, dwarf planets, and small solar system bodies.

Resource of the Month: NASA's Jet Propulsion Laboratory has numerous e-mail lists to which to subscribe. Subscribers may elect to receive information on the latest news, education events, and/or science and missions. Go to www.jpl.nasa.gov/ and click on "Sign up for JPL News."

Activity of the Month: Summer officially ends September 22. Say good-bye to hot summer days with a frozen treat and learn about comets at the same time! Check out http://solarsystem.nasa.gov/educ/docs/Make_A_Comet.pdf.

Suggestions, questions, and comments about "Planetary Wonderings" are welcomed and may be directed to stargazer@keeplookingup.net.

Remember to *keep looking up!*

Sources include NASA JPL e-mails and sse.jpl.nasa.gov