Warm Up Questions

1. Which planet is bigger, Mercury or Jupiter?
2. Are the gas giant planets closer to the Sun than the rocky planets (yes/no)?
3. How many planets are in the Solar System?
4. Is the Sun bigger, smaller, or the same size as the Moon?
5. What is the difference between the Solar System and the Milky Way Galaxy (just one sentence)?

Why are there only 8 planets now?

Three types of objects orbit our Sun:

1. Planets
2. Dwarf Planets
   • Plutoids
3. Small solar system bodies

What is a planet?

• In August of 2007 the International Astronomical Union redefined what a planet is (no official scientific definition of a “planet” existed before). A planet:
  1. Is a body that orbits the sun (this definition only applies to our Solar System)
  2. Is large enough for its own gravity to make it round
  3. And has "cleared its neighborhood" of smaller objects
• So a new the category of dwarf planet was created, which currently includes Pluto, Eris*, and Ceres**.

*Eris is the largest known dwarf planet in the Solar System and the ninth largest body known to orbit the Sun. Its distance from the Sun is 97 AU.
**Ceres is the smallest identified dwarf planet in the Solar System and, because it’s the largest asteroid, the only dwarf planet in the asteroid belt.

What is a Dwarf Planet?

• Celestial body orbiting the Sun
• Massive enough to be rounded by its own gravity
• BUT has NOT cleared its neighboring region of planetesimals
• Is not a satellite
A plutoid is a dwarf planet beyond the orbit of Neptune

Only 5 Dwarf Planets recognized so far but there may be as many as 200

- Pluto, approximate true color
- Makemake, (Artist’s conception)
- Ceres, seen through (Hubble telescope)
- Eris, seen through (Hubble telescope)
- Haumea, with its 2 moons, (Artist and Namaka (Artist’s conception))
Pacific Island Names for Planetary Objects

- Haumea is the Hawaiian goddess of childbirth and fertility.
- The moons "Hi’iaka” and "Namaka” are named after after two of Haumea’s daughters.

- Makemake is the creator of humanity in the myths of the Rapanui, the native people of Easter Island. The name choice preserves the planetary object’s connection with Easter.

3. What are Small Solar System Bodies?

- Neither a planet nor a dwarf planet
- All other objects orbiting the Sun
  - All minor planets except dwarf planets
  - Asteroids (except Ceres, the largest)
  - Comets
- Not massive enough to be rounded by its own gravity

Terrestrial vs. Gaseous Planets

<table>
<thead>
<tr>
<th>Terrestrial</th>
<th>Gaseous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury, Venus, Earth, Mars</td>
<td>Jupiter, Saturn, Uranus, Neptune</td>
</tr>
<tr>
<td>Smaller</td>
<td>Larger</td>
</tr>
<tr>
<td>More densely packed</td>
<td>Spaced farther apart</td>
</tr>
<tr>
<td>Closer to the Sun</td>
<td>Farther from the Sun</td>
</tr>
</tbody>
</table>

Jovian Planets, or Gas Giants

- Jupiter, Saturn, Uranus, Neptune
- Gaseous, has more He and H
  - Less dense (Saturn would float)
- Larger
- Spaced farther apart
- Farther from the Sun

From Nick Strobel’s Astronomy Notes at www.astronomynotes.com
Do you see patterns or anomalies in these data?

On which planet would you weigh the most?

The Milky Way Galaxy

100,000 light years across
1,000 light years thick
200 billion stars