Formation of the Solar System

- __________ — a cloud of dust and gas in space.
- __________ — the sun and planets formed from a rotating disk of dust and gases.
- The growth of __________ began as solid bits of matter that began to __________ and __________ together through a process known as __________.
- The colliding matter formed __________, shaped bodies called __________.

The Planets: An Overview

- __________ (Terrestrial = _______ like) — Mercury, Venus, Earth, and Mars.
  - Relatively _______ and _______.
  - Also known as the __________ Planets.
- Jovian planets (Jovian = _______ like) — Jupiter, Saturn, Uranus, and Neptune.
  - Huge _____ giants.
  - Also known as the __________ Planets.
- _______ is the most obvious __________ between the terrestrial and the Jovian planets.
- ________, __________, and the rate of __________ are other ways in which the two groups of planets differ.

### Table 1 Planetary Data

<table>
<thead>
<tr>
<th>Planet</th>
<th>Average Distance from Sun (AU)</th>
<th>Millions of km</th>
<th>Period of Revolution</th>
<th>Orbital Velocity km/s</th>
<th>Period of Rotation</th>
<th>Diameter (km)</th>
<th>Relative Mass (Earth = 1)</th>
<th>Average Density (g/cm³)</th>
<th>Number of Known Satellites*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>0.39</td>
<td>58</td>
<td>88²</td>
<td>47.5</td>
<td>59¹</td>
<td>4878</td>
<td>0.06</td>
<td>5.4</td>
<td>0</td>
</tr>
<tr>
<td>Venus</td>
<td>0.72</td>
<td>108</td>
<td>225²</td>
<td>35.0</td>
<td>244³</td>
<td>12,104</td>
<td>0.82</td>
<td>5.2</td>
<td>0</td>
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<tr>
<td>Earth</td>
<td>1.00</td>
<td>150</td>
<td>365.25²</td>
<td>29.8</td>
<td>23³ 56⁴ 04⁵</td>
<td>12,756</td>
<td>1.00</td>
<td>5.5</td>
<td>1</td>
</tr>
<tr>
<td>Mars</td>
<td>1.52</td>
<td>228</td>
<td>687³</td>
<td>24.1</td>
<td>24⁴ 37⁴ 23⁵</td>
<td>6794</td>
<td>0.11</td>
<td>3.9</td>
<td>2</td>
</tr>
<tr>
<td>Jupiter</td>
<td>5.20</td>
<td>778</td>
<td>12⁹</td>
<td>13.1</td>
<td>9⁹ 50⁹ 14⁶</td>
<td>143,884</td>
<td>317.87</td>
<td>1.3</td>
<td>63</td>
</tr>
<tr>
<td>Saturn</td>
<td>9.54</td>
<td>1427</td>
<td>295⁸</td>
<td>9.6</td>
<td>10⁵ 14⁶</td>
<td>120,536</td>
<td>95.14</td>
<td>0.7</td>
<td>31</td>
</tr>
<tr>
<td>Uranus</td>
<td>19.18</td>
<td>2870</td>
<td>84⁹</td>
<td>6.8</td>
<td>17⁶ 14⁷</td>
<td>51,118</td>
<td>14.56</td>
<td>1.2</td>
<td>25</td>
</tr>
<tr>
<td>Neptune</td>
<td>30.06</td>
<td>4497</td>
<td>165⁸</td>
<td>5.3</td>
<td>16³ 03⁶</td>
<td>50,530</td>
<td>17.21</td>
<td>1.7</td>
<td>13</td>
</tr>
<tr>
<td>Pluto</td>
<td>39.44</td>
<td>5900</td>
<td>248⁷</td>
<td>4.7</td>
<td>6.4³</td>
<td>approx. 2300</td>
<td>0.002</td>
<td>1.8</td>
<td>1</td>
</tr>
</tbody>
</table>

*includes all satellites discovered as of March 2004.
• The ______________ of the Planets
  o The substances that make up the planets are divided into three groups: __________, __________, and __________.
• The ______________ of the Planets
  o The ______________ planets have very __________ atmospheres of hydrogen, helium, methane, and ammonia.
  o By contrast, the ______________ planets, including __________, have ______________ atmospheres at best.

23.4 - Minor Members of the Solar System

Asteroids

• __________ are small rocky bodies, which can range in size from a few hundred kilometers to less than a kilometer.
• Most asteroids lie between the orbits of __________ and __________.
• They have orbital periods of _____ to _____ years.

Comets

• A __________ is a small body made of rocky and metallic pieces held together by frozen gases.
• Comets generally __________ about the sun in an __________ orbit.
• A __________ is the fuzzy, gaseous component of a comet’s head.
• A small glowing __________ with a diameter of only a ______ ______________ can sometimes be __________ within a coma.
• As comets approach the ______, some, but not all, _______ a _______ that extends for millions of kilometers.

• ____________ Belt
  o Like the asteroids in the inner solar system, most _______ belt comets move in nearly _______ orbits that lie roughly in the same _______ as the planets.

• ____________ Cloud
  o Comets with _______ orbital periods appear to be ___________________ in all directions from the sun, forming a _____________ shell around the solar system called the _________ cloud.

Meteoroids

• A _______________ is a small, solid particle that travels through space.
• A ____________ is the luminous phenomenon observed when a meteoroid enters Earth’s atmosphere and burns up, popularly called a shooting star.
• A _______________ is any portion of a meteoroid that reaches Earth’s surface.
• Most meteoroids _______________ from any one of the following three sources:
  o (1) ___________________________ _________ that was not gravitationally swept up by the planets during the formation of the solar system
  o (2) material from the _______________ _________
  o (3) the _________ _______________ of _____________ that once traveled near Earth’s orbit.