

What's Out There? Our Solar System and Beyond¹(DVD) Teacher Notes

- 1) This is a very important video that introduces the students to the solar system. To maximize attention, distribute worksheet prior to viewing and say something to the effect that they will be tested on the material. After the students have filled out the worksheet from watching the video, if there is time left (or as homework), you can direct them to the book to check their answers.
- 2) The video run time is 25 minutes.
- 3) On the unitedstreaming website <http://www.unitedstreaming.com> there is an excellent although lengthy (40+ pages) teacher's guide that provides the entire script for the video and a lot of other very good information.

Answers to questions:

1) **What is the Milky Way?** Our Galaxy.

2) **What is the main difference between the sun and the planets?** The sun produces helium out of hydrogen. This is called fusion. There is some "left over" mass, which turns into energy based on the equation $E=mc^2$, where E is the energy produced, m is the difference in the mass between the 4 hydrogen nuclei and the helium atom, and c is the velocity of light.

3) **The 9 planets have unique "personalities". In the space below write down a few features that make each planet "special".** There are a lot of facts that the students can put down. Some of the more important features are provided below.

Mercury: (1) Closest to the sun; (2) Long day (Period of rotation is 58 days); (3) Short year (Period of revolution is 88 days); (4) Rocky planet similar to our moon; (5) Core of iron; (6) Thin mantle.

Venus: (1) Day (243 days) is longer than year (224 days); (2) Carbon dioxide atmosphere and sulfuric acid with 90 times the pressure of that of earth; (3) Thick atmosphere makes it very hot (464 °C). This is a greenhouse effect; (4) Volcanoes with lava flow; (5) Retrograde rotation; (6) Similar to earth in size, density, an gravity.

Earth: (1) Atmosphere with oxygen; (2) Water, (3) Moderate temperatures; (4) Life; (5) Moon; (6) Iron core, mantle of molten rock, thin crust.

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Mars: (1) There is evidence that there was water on Mars in the past; (2) Mars is now too cold and any water is frozen solid; (3) Scientists think there might be evidence of life in rocks that have been examined.

Jupiter: (1) Largest planet; (2) Consists of hydrogen and helium. Pressure is so great that they are compressed into a liquid; (3) “Red spot” which is a huge storm; (4) Long year (~ 12 years); (5) Short day (~ 10 hours); (6) Many moons (at least 28 have been identified so far)². The largest and best known are Callisto, Ganymede, Io and Europa.

Saturn: (1) Gas planet similar to Jupiter; (2) Rings; (3) Has at least 30 known moons². The largest one Titan is larger than Mercury.

Uranus: (1) Atmosphere is made of hydrogen, helium, and methane (gives it blue-green color); (2) Deep ocean that extends all the way to a core of liquid rock; (3) At least 21 known moons². One of the most notable ones is Miranda; (4) Rotates on its side.

Neptune: (1) Does not get much sunlight; (2) Has fierce storms in its atmosphere; (3) At least 8 known moons²; (4) One moon, Triton, is the coldest known body in the solar system (-236 °C).

Pluto: (1) Furthest planet; (2) Orbit is more oval than the other planets; (3) Moon Charon is about half the size of Pluto; (4) Smallest planet.

4) **What is an Asteroid?** A rocky space object that can range from a few hundred feet to several hundred km wide. Most asteroids in our solar system orbit the Sun in a belt between Mars and Jupiter.

5) **What is a Meteoroid?** A very small rocky body, that revolves around the sun. Similar terms are “meteorite” which is a meteoroid which reaches the earth’s surface without burning up completely and “meteor” which is a streak of light caused when a meteoroid or comet dust burns up in the Earth’s atmosphere before it reaches the ground. ***You might want to highlight the difference, as the students will most likely not get the difference from the video.***

6) **What is a Comet?** Frozen masses of gas and dust which have a definite orbit through the solar system.

² <http://www.solarviews.com/eng/>, July 13, 2005