The Solar System

What is the solar system? It is our Sun and everything that travels around it. Our solar system is elliptical in shape. That means it is shaped like an egg. Earth’s orbit is nearly circular. The Sun is in the center of the solar system. Our solar system is always in motion. Eight known planets and their moons, along with dwarf planets, comets, asteroids, and other space objects orbit the Sun. The Sun is the biggest object in our solar system. It contains more than 99% of the solar system's mass. Because the sun is so massive, it exerts a strong gravitational pull on the planets and other objects in our solar system. This gravitational pull is what causes the planets to orbit around the sun instead of going off into space. Astronomers think the solar system is more than 4 billion years old.

Source http://starchild.gsfc.nasa.gov/docs/StarChild/solar_system_level1/solar_system.html
The Sun is our closest star. It is a member of the Milky Way galaxy. The Sun is a yellow dwarf star, which means it is a medium size star. It is believed to be over 4 billion years old. The Sun spins slowly on its axis as it moves around the galaxy. Because the Sun is so massive, it exerts a powerful gravitational pull on everything in our solar system. It is because of the Sun's gravitational pull that Earth and the other planets orbit the Sun in the manner that they do.

The center, or core, of the Sun is very hot. A process called "nuclear fusion" takes place there. Nuclear fusion turns hydrogen gas into helium gas. These nuclear reactions create a lot of heat that makes the sun glow. Think of the metal inside a toaster, which glows even though it is not on fire. Some of the Sun’s energy travels out into space as heat and light. Some of it arrives at Earth!

The Sun is made up almost entirely of hydrogen and helium. In addition, the Sun also contains carbon, nitrogen, and small amounts of other gases.

The Planets

A planet is a large, spherical space object that orbits around a star. It also reflects that star's light. Scientists have currently identified eight planets in our solar system. All eight planets travel around the Sun in different orbits.

The Inner Planets

Mercury, Venus, Earth, and Mars are the planets closest to the Sun. They are called the inner planets. The inner planets are made up mostly of rock. The inner planets were constantly bombarded by asteroids and meteorites during their first 600 million years in existence. Consequently, you will find craters of varying sizes on the inner planets and their moons.

The Outer Planets

The outer planets are Jupiter, Saturn, Uranus, and Neptune. They are large balls of gases with rings around them. Until 2006, Pluto was considered one of the outer planets. It is now a dwarf planet.

Graphic from http://yahooligans.yahoo.com/content/science/space/sshome.html
Dwarf Planets

Until 2006, there was no scientific definition for a planet. From 1930 to 2006, Pluto was considered the ninth planet. Scientists discovered other large objects in the Kuiper (rhymes with hyper) belt beyond Neptune’s orbit. Some scientists wanted to consider these objects planets as well. Other scientists argued that Pluto and these newly discovered objects were different from the other eight planets.

In 2006, the International Astronomical Union (IAU) created an official definition of the term “planet”. The definition said that a planet in our Solar System orbits around the Sun, has a nearly round shape, and does not cross the orbit of another planet. Because Pluto crosses Neptune’s orbit once every 248 years, it is no longer considered a planet. Since the year 2000, astronomers realized that Pluto was not like the other eight planets but very much like a new group of objects found in the outer solar system. In 2006, astronomers re-classified Pluto as a dwarf planet.


The scientists created a new category called dwarf planets. Right now scientists have identified three dwarf planets: Pluto, Ceres, and Eris. Ceres is the largest object in the asteroid belt between Mars and Jupiter. Eris is in the Kuiper belt. It was discovered in 2003, and was originally nicknamed “Xena”. Like planets, dwarf planets also orbit the Sun and are nearly round, but they have not cleared the neighborhood around their orbit. Dwarf planets cannot be satellites, or moons, of another planet.

The Asteroid Belt

So far, the largest asteroid found in the asteroid belt is as big as the state of Texas. It has been named Ceres and is a dwarf planet.

An asteroid is a bit of rock. It can be thought of as what was "leftover" after the Sun and all the planets were formed. Most of the asteroids in our solar system can be found orbiting the Sun between the orbits of Mars and Jupiter. This area is sometimes called the "asteroid belt". Think about it this way: the asteroid belt is a big highway in a circle around the Sun. Think about the asteroids as cars on the highway. Sometimes, the asteroid cars run into one another. When this happens, the asteroids may break up into smaller asteroids. Scientists think that most asteroids are the result of collisions between larger rocky space bodies.

Asteroids can be a few feet to several hundred miles wide. The belt probably contains at least 40,000 asteroids that are more than 0.5 miles across.

If an asteroid is captured by the gravitational pull of a planet, the asteroid can be pulled out of the belt and go into orbit as a moon around the planet that pulled on it.

Source http://starchild.gsfc.nasa.gov/docs/StarChild/solar_system_level1/asteroids.html
Comets

A comet's tail can be millions of kilometers in length, but the amount of matter it contains can be held in a large bookbag.

Scientists believe that comets are made up of material left over from when the Sun and the planets were formed. They think that about 100,000 million comets orbit the Sun. Some comets orbit the Sun like planets. Their orbits take them very close to and very far away from the Sun. A few comets come close enough to the Earth for us to see them with our eyes. Halley's Comet, for example, can be seen from Earth every 76 years.

A comet is made of dirty ice, dust, and gas. When a comet gets close to the Sun, part of the ice starts to melt. The solar winds then push the dust and gas released by the melting ice away from the comet. This forms the comet's tail. Every time a comet comes close to the Sun, a part of it melts. Over time, it will completely disappear.

A comet does not give off any light of its own. What seems to be light from the comet is actually a reflection of our Sun's light. Sunlight bounces off the comet's ice particles in the same way light is reflected by a mirror.

A meteoroid is a piece of stone-like or metal-like debris that travels in outer space. Most meteoroids are no bigger than a pebble. Large meteoroids are believed to come from the asteroid belt. Some of the smaller meteoroids may have come from the Moon or Mars. If a meteoroid falls into the Earth's atmosphere, it will begin to heat up and start to glow. This is called a meteor. If you have ever seen a "shooting star", you were actually seeing a meteor. Most of the original object burns up before it strikes the surface of the Earth. Any leftover part that does strike the Earth is called a meteorite. A meteorite can make a hole, or crater, in the ground when it hits it. The larger the meteorite, the bigger the hole it makes.
Study Questions

1. What is the solar system?
2. What is the largest object in the solar system?
3. Name the eight planets in our solar system. Start with the one closest to the sun and go out.
4. Why do the planets orbit the Sun instead of going off into space?
5. The Sun is mostly made of _______________ and _______________.
6. Besides the planets, name two other types of objects in our solar system.

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**Planet Activity**

An easy way to remember the order of the planets is to make up a mnemonic device or a sentence that helps you remember the names. Take the first letters of the planets:

- Mercury
- Venus
- Earth
- Mars
- Jupiter
- Saturn
- Uranus
- Neptune

Then make up a sentence that has the same beginning letters as the planets in the same order.

Ex: **My very energetic mother just served us noodles.**

Come up with a sentence of your own.

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**Challenge Questions**

7. What shape is the solar system?
8. How does the sun create energy?
9. Why do the inner planets have craters?
10. Where is the asteroid belt?
11. What is the difference between a planet and a dwarf planet?
12. Why do comets look bright?
13. What are the differences between a meteor, a meteorite, and a meteoroid?
Glossary

A
ASTEROID
A rocky space object that can be a few feet wide to several hundred miles wide. Most asteroids in our solar system orbit in a belt between Mars and Jupiter.

AXIS
An imaginary straight line around which an object spins.

C
COLLISION
A crash or forceful joining together.

COMET
A big ball of dirty ice and snow in outer space.

CRATER
A hole caused by an object hitting the surface of a planet or moon.

D
DEBRIS
Broken, scattered remains; rubble; pieces of rubbish or litter.

DWARF PLANET
A celestial body within the Solar System that orbits around the Sun, is nearly round, has not cleared the neighborhood around its orbit, and is not a satellite of another planet.

E
ELLIPTICAL
Shaped like an egg that has ends which are equal.

ENERGY
The power to do work.

G
GALAXY
A giant collection of gas, dust, and millions or billions of stars.

GAS
A form of matter which is not a liquid or a solid. A gas will spread out to fill up all of the space that is open to it.

GRAVITY
The invisible force between objects that makes objects attract each other.

GRAVITATIONAL PULL
The attraction that one object has for another object due to the invisible force of gravity.
**M**
**MASS**
The amount of matter in an object.

**METEOR**
An object from space that becomes glowing hot when it passes into Earth's atmosphere.

**METEORITE**
A piece of stone or metal from space that falls to Earth's surface.

**METEOROID**
A piece of stone or metal that travels in outer space.

**N**
**NUCLEAR FUSION**
A process where atoms are joined and tremendous amounts of energy are released.

**O**
**ORBIT**
The path followed by an object in space as it goes around another object; to travel around another object in a single path.

**P**
**PLANET**
An celestial body within the Solar System that is in orbit around the Sun, has a nearly round shape, and has cleared the neighborhood around its orbit.

**R**
**REFLECT**
To throw back light, heat, or sound.

**ROTATE**
To turn around a center point, or axis, like a wheel turns on a bicycle.

**S**
**SOLAR**
Having to do with the Sun.

**SOLAR WIND**
Streams of gas particles flowing out from the Sun.

**U**
**UNIVERSE**
The huge space which contains all of the matter and energy in existence.

Source [http://starchild.gsfc.nasa.gov/docs/StarChild/glossary_level1/glossary_text.html#atmosphere](http://starchild.gsfc.nasa.gov/docs/StarChild/glossary_level1/glossary_text.html#atmosphere)
Recommendations by Reading Level

At grade level:
Read parts on the solar system, the Sun, the planets, the dwarf planets, the asteroid belt, and comets. Answer questions 1-6. Do planet mnemonic activity.

Above grade level:
Read all parts including meteoroids. Answer questions 1-6 and challenge questions 7-12. Do planet mnemonic activity.

Below grade level/ELL:
Read parts on the solar system, the Sun, and planets. Answer questions 1, 2, and 3. Do planet mnemonic activity.