Lecture

A Tour of the Solar System

Objectives
• The classifications of the solar system objects.
• The layout of the solar system.

Notes
• What a star? a planet? a satellite? an asteroid? a comet? a planetary body?
A star is a self-luminous celestial body consisting of a mass of gas held together by its own gravity that, at some stage of its life, produces energy by nuclear fusion.
A planet is a celestial body that orbits the Sun or another star. Planets can consists of rock and metal (as do the inner planets of the Solar System), or predominantly of liquid and gas (as do the giant outer planets).
Many of the planets have moons (also called satellites) that orbit the planet in the same way as the Moon orbits the Earth.
An asteroid is a small rocky or metallic bodies orbiting the Sun. Most are members of the asteroid belt, which lies between the orbits of Mars and Jupiter, from about 2.0-3.3 AU. A small proportion have Earth-crossing orbits
A comet is a minor body composed mainly of water-ice and rocky (silicate) material. Comets originate from the Kuiper Belt or the Oort cloud, and usually have elongated orbits, and a wide range of orbital periods.
Planetary body is a term that refers not only to the planets, but also to their satellites and other small bodies such as asteroids.

• What is AU
AU stands for astronomical unit. It is the distance between the Sun and the Earth. 1 AU = 1.5x10^{11} m.

Class activity
Earth, Moon, Mars Balloons
1, form groups of 6.
2, each group get a blue balloon, a white balloon, one red balloon
3, inflate the blue balloon to 20 cm diameter. This is Earth (obviously the balloon is not a prefect sphere, but neither is the Earth).
4, calculate the size that the Moon and Mars should be, at the same scale as the Earth model.
5, inflate the white balloon to represent the Moon, and the red balloon to represent Mars.
6, at this scale, how far apart are the Earth and Moon?
7, where should Mars be?

Keys
4, 5cm for the Moon and 11cm for Mars
6, 6 meters
7, 120,000 cm, or 3/4 of a mile away (Local landmarks: downtown Urbana or downtown Champaign)

It took the Apollo astronauts about three days to get to the Moon. Mars Pathfinder, which was launched in Dec. 1996, arrived at Mars on July 4, 1997 (7 months). Mars Global Surveyor, which was launched in Nov. 1996, arrived at Mars in Sep. 1997 (11 months).