

ES19A Our Solar System

Name: _____

Date: ___ / ___ / ___ Period ___ Room ___



Did you know?

- 1 The sun and all the objects that are held by the sun's gravity are known as the solar system (See Fig. 1).
- 2 The ancient Greeks recognized five planets - Mercury, Venus, Mars, Jupiter, and Saturn. These objects were thought to be important, so they named them after gods from their mythology. The word "planet" comes from a Greek word meaning "wanderer" - they wandered the sky.



Figure 1 - Solar System (distance not to scale)

So, why is it important to me?

- 3 It was once thought that Earth was the center of the universe. Through experimentation and deduction, we found that this theory was wrong and could be replaced by a better one.
- 4 Solar flares can sometimes disrupt satellite communications on Earth. Knowing about the parts of stars and why solar flares happen might save the life of an astronaut.

What are the big ideas I need to know?

- 5 The ancient Greeks thought that Earth was at the center of the universe. The sky had a set of spheres layered on top of one another. Each object in the sky was attached to one of these spheres. The planets appear to move much faster than the stars, so the Greeks placed them closer to Earth. Ptolemy published this model of the solar system around 150 CE (See Fig. 2).

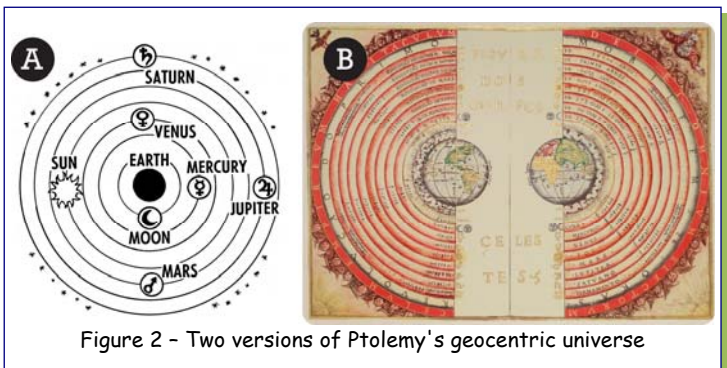


Figure 2 - Two versions of Ptolemy's geocentric universe

- 6 About 1,500 years after Ptolemy, Copernicus proposed a startling idea. He suggested that the sun is at the center of the universe. Copernicus developed his model because it better explained the motions of the planets (See Fig. 3).
- 7 Along with the knowledge that the sun is in the center of our solar system, Johannes Kepler discovered that the orbits of all the planets around the sun is an ellipse - not round, but slightly oval.

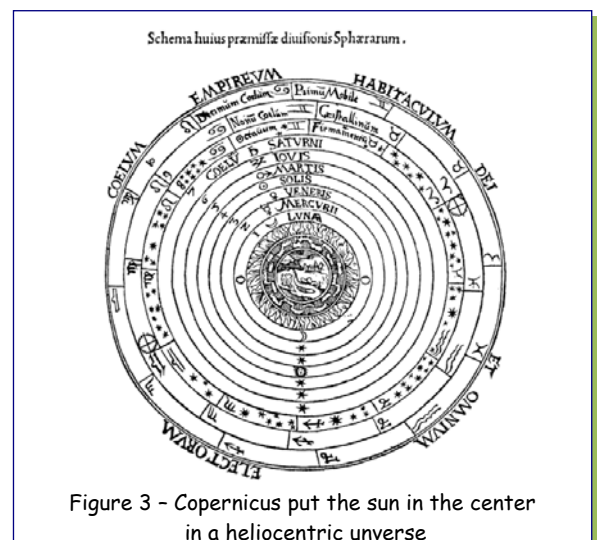


Figure 3 - Copernicus put the sun in the center in a heliocentric universe

ES19A Our Solar System

Name: _____

Date: ___ / ___ / ___ Period ___ Room ___

8 Our sun is a star. This star provides light and heat and supports almost all life on Earth. The sun is the center of the solar system. It is by far the largest part of the solar system. Added together, all of the planets make up just 0.2 percent of the solar system's mass. The sun makes up the remaining 99.8 percent of all the mass in the solar system (See Fig. 4).

9 The sun's atmosphere contains the photosphere, the chromosphere, and the corona. These three outer layers of the sun are its atmosphere.

10 The photosphere is the visible surface of the sun - the part that we see shining.

11 The chromosphere lies above the photosphere. The chromosphere is not as hot as other parts of the sun, and it glows red. Jets of gas sometimes fly up through the chromosphere.

12 The corona is the outermost part of the sun's atmosphere. It is the sun's halo, or "crown." The corona extends millions of kilometers into space. Someday you might try to see a total solar eclipse. You will see the sun's corona shining out into space while the rest of the sun is blocked out by the moon (See Fig. 5).



Figure 4 - The relative size of the planets.

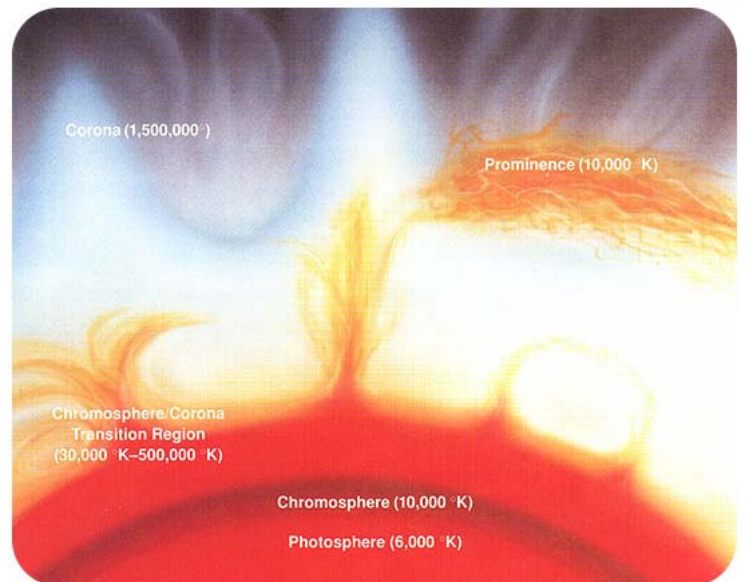


Figure 5 - The parts of the Sun.

What about?

13 Isaac Newton found that the planets are kept in orbit by the combination of two factors - gravity and inertia. Gravity is the force of attraction of the planet with the sun. Things that move tend to keep moving in a straight line called inertia, unless pulled by an object like the sun. These two factors cause planets to orbit the sun in an ellipse.

14 Sunspots are cooler, darker areas on the sun's surface and happen in an 11 year cycle. Solar flares are violent explosions that release huge amounts of energy. The streams of high energy particles that they emit make up the solar wind, which is dangerous to astronauts and can interfere with satellites.