U1L2 OBSERVING THE SOLAR SYSTEM

KEY CONCEPTS

* WHAT ARE THE GEOCENTRIC AND HELIOCENTRIC SYSTEMS
* HOW DID COPERNICUS, GALILEO, AND KEPLER CONTRIBUTE TO OUR KNOWLEDGE OF THE SOLAR SYSTEM
* WHAT OBJECTS MAKE UP THE SOLAR SYSTEM

KEY TERMS

* GEOCENTRIC
* HELIOCENTRIC
* ELLIPSE

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I. EARTH AT THE CENTER

A. When the Greeks watched the stars they noticed that while the stars moved they stayed in the same position during the same month/year.

B. These patterns of stars, called constellations, stayed in the same place year after year.

II. GREEK OBSERVATIONS

A. Greeks observed the night sky and saw some lights wandering between the stars.

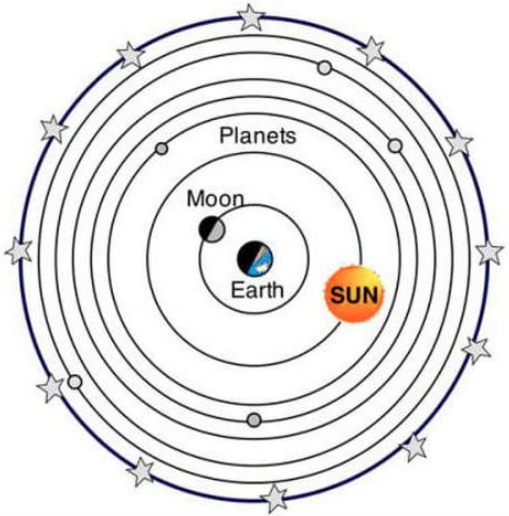
B. They called these points of light planets from the Greek word meaning “wanderers.”

C. The Romans later gave them the names we know today

II. GREEK OBSERVATIONS (cont'd)

D. Greeks believed that the Earth was in a rotating dome they called a celestial sphere

E. Geocentric = definition – Earth is the center of the revolving planets and stars. Geo = Greek word for Earth.



Geocentric Model

III. PTOLEMY'S MODEL

A. Around 140 A.D. Greek Astronomer Ptolemy (TAHL uh mee) took the geocentric theory one step further and said the planets move on small circles that move on bigger circles.

B. It was wrong but it did help explain the movement seen in the sky.

Because of this the geocentric model was accepted for 1,500 years.

IV. SUN AT THE CENTER

A. Not everyone believed in the geocentric system some believed the sun was at the center.

B. Heliocentric – sun centered model (Helios = Greek for sun)

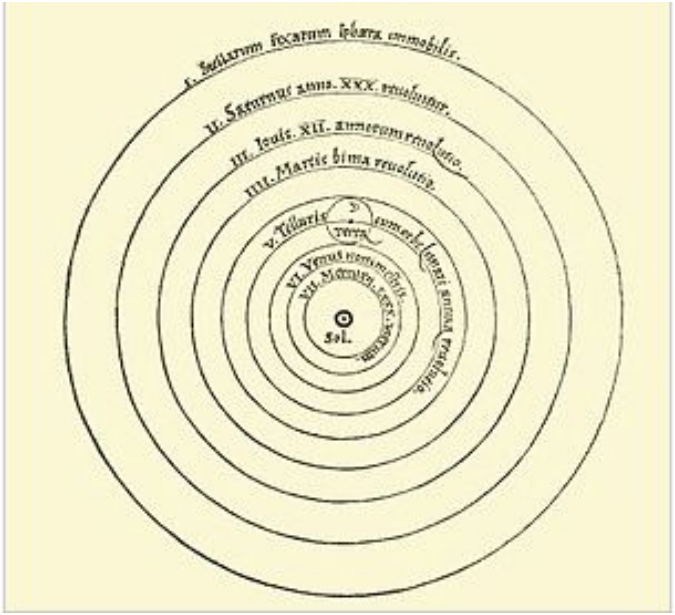
C. In this model the Earth and other planets revolved around the sun – this wasn't well received.

V. THE COPERNICAN REVOLUTION

A. In 1543, the Polish astronomer, Nicolaus Copernicus furthered the heliocentric model

B. Copernicus was able to work out the arrangement of the known planets and how they move around the sun.

C. His theory would eventually change all of the study of astronomy but not until people had more proof. Galileo provided that proof.

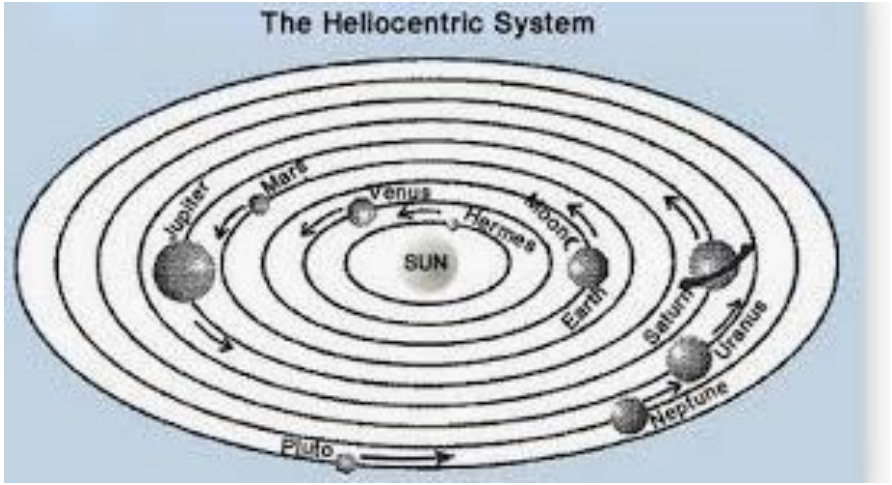


VI. GALILEO'S EVIDENCE

A. Galileo Galilei used the newly invented telescope to make discoveries that supported the heliocentric model.

B. In 1610, he used a telescope to discover 4 moons revolving around Jupiter which proved that not everything in the sky revolved around Earth.

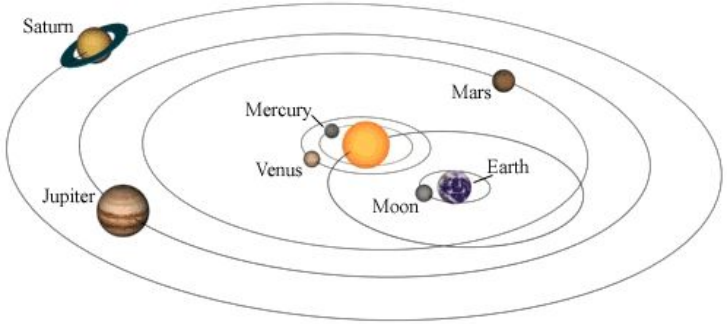
C. He also observed Venus and discovered it went through a series of phases like our moon and it would not do that if it circled Earth.



VII. TYCHO BRAHE'S OBSERVATIONS

A. Copernicus correctly placed the sun in the middle but incorrectly assumed their orbits were perfect circles.

B. In 1500's, Danish astronomer Tycho Brahe (Tee koh BRAH uh) made more accurate observations of the planets locations for over 20 years (without telescopes).



VIII. KEPLERS CALCULATIONS

A. Tycho died in 1601 and his assistant, Johannes Kepler, continued his work.

B. Kepler started with the circular shape of Mars orbit but realized it didn't match his calculations. He realized that the orbit must be in a flattened circle or ellipse.

C. Ellipse = definition – an oval shape, which may be elongated or nearly circular.

D. Kepler found that the orbit of each planet is an ellipse.

IX. MODERN DISCOVERIES

A. Today we know that the solar system consists of the sun, eight planets and their moons, and several kinds of smaller objects that revolve around the sun.

B. Galileo used a telescope to observe the solar system. Today we have telescopes in space as well.