



Heliocentricity At A Glance

The most important concepts presented in the Heliocentric Model of the Solar System illustration above can easily be identified by observing the white text against the black backgrounds.

Introduction: Nicholas Copernicus (1473 - 1543) proposed a Sun-centered model of our solar system. The 1543 Copernican Heliocentric Model illustration above depicts all revolutionary orbits as circles when in fact, the Moon, earth and all planets revolve in elliptical (oval) not circular orbits.

Not obvious in the Heliocentric diagram is the tilt of Earth's axis, the main reason for seasonal temperature changes on Earth.

Nevertheless, the Copernican Model is correct whereas the **Geocentric Model** was not. Retrograde motion of outer planets could now be understood as optical illusions caused simply by one planet passing another in its orbit.

Earth Rotates and Orbits the Sun

The Earth **does** rotate once in 24 hours! And, it is Earth's daily rotation that allows celestial objects like the Sun and Moon to move through our sky, appearing and disappearing from view every day. These are apparent daily motions and not real motions.

Moon Revolves Around Earth

The moon rises, travels through the sky, and then sets each day, most obvious when a Moon Phase is visible. The Moon does revolve around Earth but it does not complete one revolution each day! The Moon takes approximately 28 days (27.32166 days to be exact) to complete its orbit around Earth.

So why does the moon appear to rise, move through the sky then set every day? That apparent motion is caused by a rotating Earth.

Planets Orbit the Sun

Why then does the Sun appear to rise, travel through the celestial sky, then set each day if it does not really move around Earth? It is not Earth's revolution that causes this apparent motion of the Sun. Earth's revolution takes a whole year. It is Earth's rotation that causes the Sun to move across the sky each day. The Sun is not moving! It appears to move due to Earth's rotation.

The nine planets in our solar system orbit the sun in elliptical orbits and at different speeds. Because speeds of revolution vary, outer planets appear to move backwards (Retrograde Motion) as Earth passes them in its own revolution.

Differences in the brightness of the planets can be attributed to their position in their revolutionary orbit and consequential distance from Earth.

The Sun is the Center of the Solar System

Because the sun is seen rising, moving across the sky then setting everyday, it would appear only natural that people might have once believed the sun actually orbited the earth in a circular path. However, the fact is that the Sun is at the center of our Solar System and all 9 planets revolve around the Sun in elliptical orbits.

Stars are Fixed in the Universe

Stars and constellations of stars appear to change their position in the sky throughout the year. In fact, some constellations are only visible from Earth during specific times of the year. Why do they appear to move in the sky and change position?

This phenomenon is caused by the revolution of Earth in its orbit around the sun.

Depending upon the season and where Earth is located in its orbit, some stars, on the "other side of the Sun" are not visible at certain times of the year. We on Earth have a 180 degree view of the sky. As Earth continues to revolve, stars come into view while others disappear from view but this is all due to Earth's "position" in its orbit.

Throughout the universe, stars are located in varying distances from our solar system.

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[The Geocentric Model of the Solar System Lesson](#)
[Geocentric versus Heliocentric Models of Celestial Objects Assignment](#)

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Supplemental Resources that will assist in the understanding of concepts presented in this lesson:

Retrograde Motion - **Retrograde-O-Matic 2000**- Excellent Interactive Animation
Geocentricity - **The Universe of Aristotle and Ptolemy**

Seasonal Constellations- Changing Positions of Constellations in the Sky

Observing the Sky: Constellations - Seasonal When you go there, be sure to click on the links for each of the 4 seasons. The picture will change. Notice the constellations in the night sky.

Motion of the Sun and Stars - The Night Sky Be sure read the page and click "Next" to play the animation.