

Earth Science

With

Mr. Thomas



The Sun

- All stars get their energy from **fusion**:
 - the combining of the nuclei of lighter elements to form a heavier element.
 - Fusion is governed by the following energy equation:

$$E = MC^2$$

Where matter is converted into energy!

The Sun

➤ The sun has several layers:

The Core:

- Mostly hydrogen & helium
- Temp = 15,600,000 degrees C

The Photosphere:

- The visible surface of the sun
- Temp = 6,000 degrees C

The Sun

➤ The sun has several layers:

The Chromosphere:

- The inner layer of the sun's atmosphere
- Temp = 20,000 degrees C

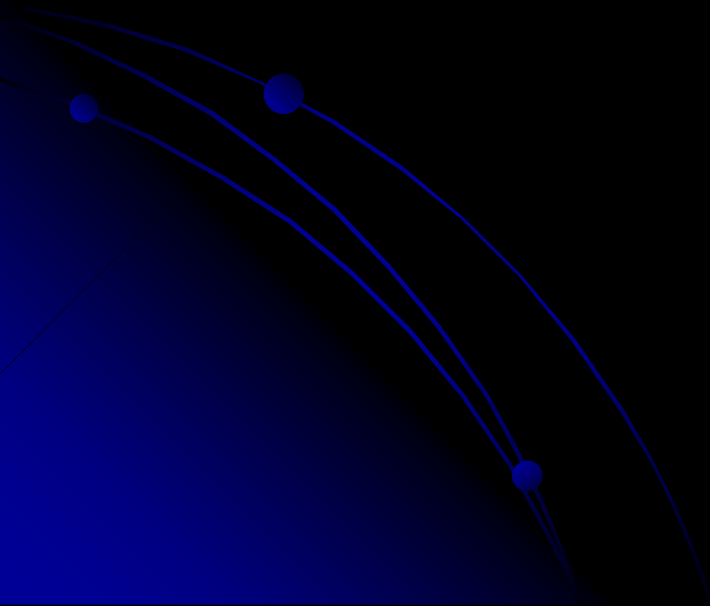
The Corona:

- The thin outer atmosphere
- Temp = 1 - 3,000,000 degrees C

The Sun

- Features of the Sun:
 - **Sunspots** – Dark spots on the photosphere that last varying amounts of time and are associated with very strong magnetic fields.
 - **Solar Wind** – A stream of electrically charged particles by the corona. Solar flares can create huge bursts of these particles that create the Northern Lights, which are also called...

Aurora Borealis



The Solar System

- Early Observations:

- **Geocentric Model** – Developed by Ptolemy, places the Earth at the center with everything revolving around it.

“Earth-Centered Model”

- ★ Could not explain *retrograde motion of the planets*.

- ★ This is when a planet tracking across the sky slowly stops, reverses, then continues on its normal track again.

The Solar System

- Early Observations Cont.:

- **Heliocentric Model** – Developed by Copernicus, places the sun in the center of the solar system with all of the planets revolving around it.

- **“Sun-Centered Model”**

- ★ Could explain *retrograde motion* of the *planets* when Tycho & Kepler discovered that the planet’s orbits were elliptical!

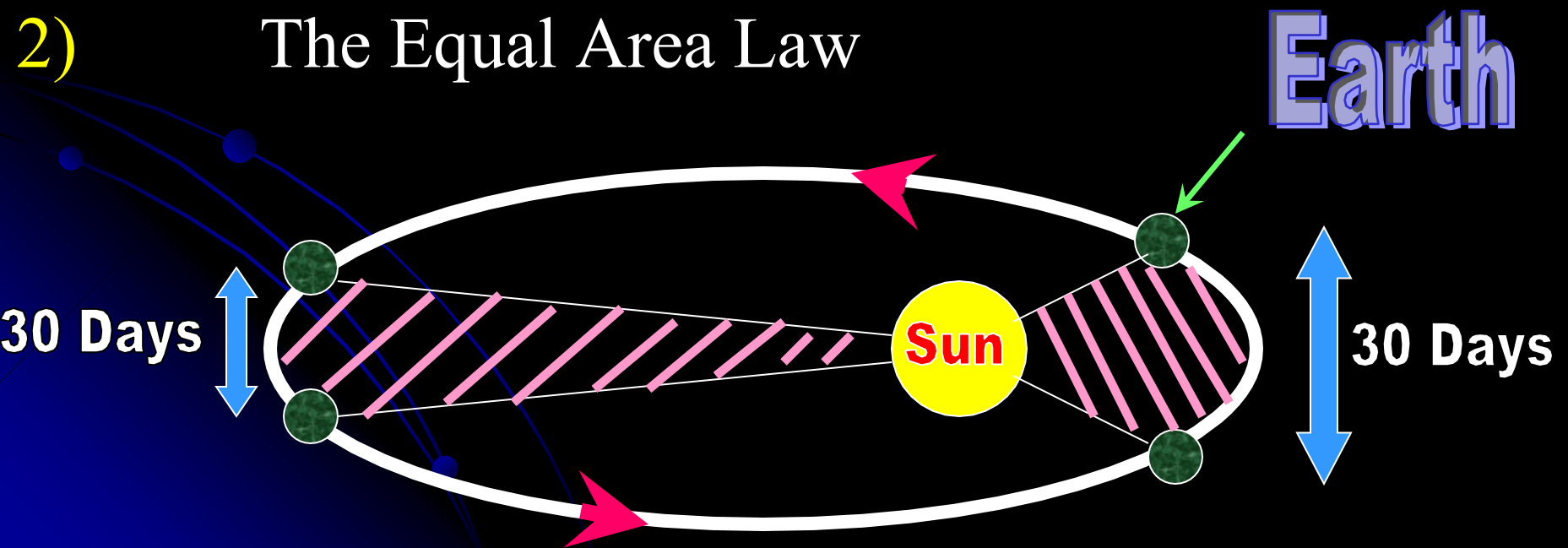
The Solar System

- Early Observations Cont.:

- Kepler's 3 Laws of Planetary Motion:

- 1) Planets travel in elliptical orbits with the sun at one focus.

- 2) The Equal Area Law



The Solar System

- Early Observations Cont.:

- Kepler's 3 Laws of Planetary Motion:

1. 3) The Harmonic Law:

$$\text{Period (P)} = \text{Mean Distance (D)}^2$$

$$\mathbf{P = D^2}$$

2. - The further a planet is from the sun, the longer its period of revolution!

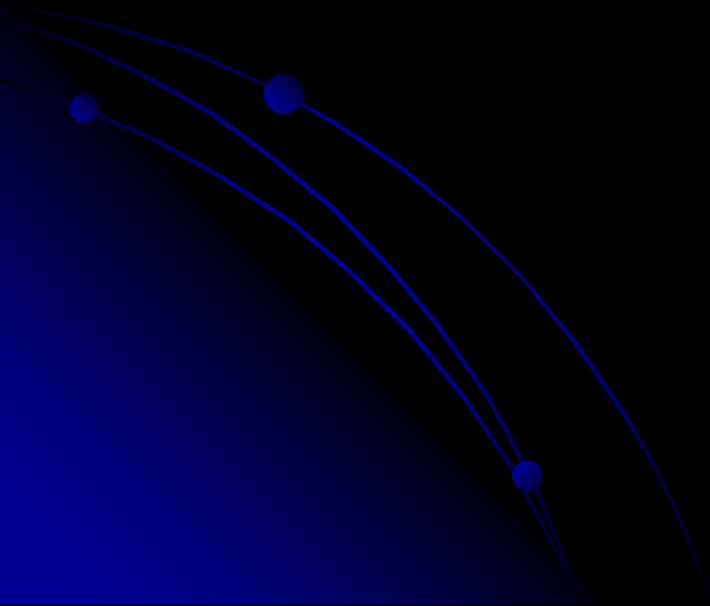
The Solar System

- Early Observations Cont.:
 - How do the planets stay in orbit?
 - Isaac Newton discovered the Law of Gravitation.
 - Newton's 1st Law states:

"An object will forever move in a straight line at the same speed unless some external force changes its

The Solar System

- Early Observations Cont.:
 - Gravitation – The force of attraction between any two objects with mass, where the greater the mass, the greater the force of attraction.



The Solar System

- The Planets:

- Inner Planets :


Mercury **Venus** **Earth**

Mars

- Outer Planets :

Jupiter **Saturn** **Uranus**

Neptune **Pluto**

A diagram of the solar system is shown in the bottom left corner. It features several blue elliptical orbits around a central point. Small blue dots represent the positions of the planets along these orbits. A pink arrow points towards the orbits from the left.

That's it

