

# Earth science cole #1



**ASSIGN  
BUSTER**

5 north circumpolar constellations Ursa Major, Ursa Minor, Cassiopeia, Cephus, Draco Ursa Major represents The great Bear, Big dipper Ursa Minor represents the little bear, the little dipper Cassiopeia represents the queen Cephus represents the King Draco represents the Dragon Describe the geocentric theory of the universe held by many early Greeks. Earth is motionless at the center of the universe. The stars are attached to a CELESTIAL sphere that rotates daily around the Earth. There are 7 objects that move in front of the Celestial sphere. Name the 7 objects that can be seen with the eye to move against the background stars. Planets = wanderer in Greek

Sun, moon, mars, mercury, jupiter, venus and saturn Sunday Sun OE. Sunnandaeg G. Sonntag Monday Moon OE. Monandaeg G. Montag Mars Tuesday OE. Tiwesdaeg G. Dientag Mercury Wednesday OE. Wodnesdaeg G. Wennerstag Jupiter Thursday OE. Thunresdaeg G. Donnerstag Venus Friday OE. Frigedaeg G. Fritag Saturn Saturday OE. Saeterndaeg G. Samstag List the astronomical philosophers of the ancient Greek Aristotle, Eratosthenes, Hipparchus, and Ptolemy Aristotle Geocentric Earth,

Motion requires a continued push or Pull,

Considered infallible Eratosthenes Determined the diameter of the Earth using a well in Syene and a tower in Alexandria. 7 degree angles. 24, 400 miles... now its 24, 900 miles VERY CLOSE Hipparchus Catalogued the location of about 850 stars

divided the brightness of the stars into 6 groups (BASIS OF MAGNITUDE SYSTEM)

Measured the length of the year to within minutes of today's value

Developed a method to predict lunar eclipses.

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Retrograde Motion- some planets appear to move backwards for a short while  
Ptolemy Wrote the Almagest, a summary of astronomy

Developed a geocentric model that explained retrograde motion 1700 hundred years was true. What is the ecliptic? REFER TO SOMEONE ELSE?

Describe the Ptolemaic model of the universe? Ptolemaic system is earth centered system of the universe  
What is retrograde motion to Ptolemy the apparent westward motion of the planets with respect to the stars. Star appears to be going backwards for a short while  
Nicolaus Copernicus 1473-1543 Polish astronomer and mathematician

De Revolutionibus  
Objections to the heliocentric ideas  
Theologians still believe earth is center

counter to "common sense" can't find the wind of the earth moving

No parallax effect observed - stars should move in small closed loops  
Tycho Brahe 1546-1601 made careful observations that were good to within 1-2 minutes of arc

Could not detect PARALLAX (it's too small to be seen with the unaided eye)  
Parallax apparent shift of an object when viewed from two different locations  
Johannes Kepler 1571-1630 German astronomer who first stated laws of planetary motion (1571-1630) Very religious. Believed the creator had made an orderly universe, he spent much of his life looking for that order. Kepler's laws of planetary motion  
1. The planets orbit the Sun in ELLIPSES, with the sun at the one Focus.

Eccentricity,  $e = \text{distance between FOCI} / \text{Length of the major axis}$ .

if  $e = 1$  then shape is a line. if  $e = 0$ , then it's a circle

2. A line joining the Sun and a planet sweeps out equal areas in equal times.

3. the square of the period of Revolution (P) is proportional to the cube of the average distance (R) of the planet from the sun

$P_e = 1 \text{ yr}$   $R_e = 1 \text{ astronomical unit}$   $1 \text{ A. U.}$

1A. U. the average distance from the sun to earth  $P$  and  $R$   $P_e = 1 \text{ yr}$   $R_e = 1$  astronomical unit 1 A. U. What are the longest seasons? Summer and Spring are the longest seasons because the sun has farther to travel Aphelion the point in the orbit of a planet or comet that is at the greatest distance from the sun JULY 4 perihelion the point in the orbit of a planet or comet where it is nearest to the sun JANUARY 3 Galileo Galilei 1564-1642 the Father of modern science, process of science.

overthrew the authority of aristotle through observation and experimentation

1616- forbidden to teach the motion of Earth

1630- published Dialogue of the Two Great World Systems

1632- condemned by the Roman inquisition and sentenced to house arrest for the last 10 years of his life.

List and describe the three main objections to the heliocentric model of the universe at the time of Copernicus (De Revolutionibus) 1. Stars are stationary [ Earth must rotate]

2. The sun is the center of the Solar system. [ Heliocentric model] EARTH REVOLVES AROUND SUN!!!!

3. Planets move in perfect circles at constant speeds is now WRONG!!!!

Retrograde motion proves this false Modern science is often dated to galileo,

why? The process of Science, discovered inertia and made telescope 30  
powerlist some of Galileo's significant discoveries discovered Inertia

advocated the copernican model because of its simplicity and logic

Made the first astronomical telescope

1. Discovered moon's around Jupiter 4 moons
2. planets are disks, not points of light like the stars
3. moon has mountains, craters, darker areas (Maria) (SEAS) thought the moon had bodies of water, but they were just the shadows
4. the milky Way is made up of many stars
5. the sun has dark spots= blemishes that move around the Sun, Sun moves too
6. Venus shows a full range of Phases and appears to vary in size, (expected in copernican (heliocentric model))

inertia(physics) the tendency of a body to maintain its state of rest or uniform motion unless acted upon by an external force.

Object in motion stays in motion

Isaac Newton... Kepler's law of motion... Describe Newton's three Laws of Motion... Difference between rotation and revolution... what is a solar day average time from noon to noon 24 hours Sidereal Day Rotation of the earth with respect to a star 23 hours 56 mins and 4 secs Describe the characteristics of the earth's orbit around the Sun... What does precession mean and what effect it produces The wobble of the earth axis. Once every 25, 800 years. Vega won't always be in Lyra. Name and describe some

characteristics of the moon and it's orbit around the Earth (More elliptical than the earth; s orbit around the sun  $e = 0.055$  vs.  $.017$ )

Perigee- moon and earth the closest

Apogee- moon and earth are farthest away from each other

238, 000 miles average distance between earth and moon Lunar Sidereal

month revolution of the moon using a star  $27 \frac{1}{3}$  days Synodic

Month revolution of the moon using the Sun  $29 \frac{1}{2}$  days WE USE THIS TO

MEASURE A MONTH!!!! A lunar day is equal to a lunar night = 2 weeks Umbra a

region of complete shadow resulting from total obstruction of

light Penumbra a fringe region of partial shadow around an

umbra craters Produced by the impact of the meteoroids. like bomb crater

Flooded with lava,

Ejecta- light colored material blasted out by moon. rayed Craters LOOK UP!

How do Lunar highlands compare in age to the Maria basins? Lunar

highlands densely cratered, brighter areas 4.5 billion years old

Maria Basin Darker areas, relatively flat, large impact basins flooded with

lava circular shape 3.2-3.8 billion years old. ONEARTH SCIENCE COLE #1

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