

# Test 1 Study Guide

GLY 1000

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# Chapter 1 Notes: Cosmology and the Birth of Earth

## Universe

*This includes all of space and all the matter and energy within it.*

## Cosmology

*This is the study of the overall structure and history of the universe.*

In Homer's, a Greek poet, day astronomers knew the difference between stars and planets. However, they did not know that the Earth was round, that it was a planet, or that the sun was actually the center of the universe.

## Geocentric Model

*The earth was stable at the center of the universe and the moon and planets revolved around the earth.*

Ptolemy, an Egyptian mathematician, developed equations that appeared to predict the motion of the planets in correlation to the Geocentric model.

This model was held as religious dogma for 1400 years.

This model was in favor because of the idea that humans, the only life form to exhibit complex and conscious thought, were at the center of the universe. This complex thought lead to curiosity, insight, and the ability to learn.

## Heliocentric Model

*The sun is the center of the universe and the earth and other planets orbited the sun.*

During the Renaissance, Nicolas Copernicus and Galileo Galilei changed people's views to being in favor of the Heliocentric model. Copernicus published evidence for heliocentricity. Galileo observed moons orbiting Jupiter.

## Facts about Earth

*Earth spins on its axis at about 1674 km/h (faster than the speed of light).*

Leon Foucault, a French scientist, proved the theory of earth spinning on its' axis by using a pendulum.

*Earth travels in orbits around the sun for a total distance of about 150 million km in the 365 days that it takes to complete an orbit.*

*The Earth has a circumference of 40,000 km (calculated by Eratosthenes).*

*Earth is 4.7 billion years old.*

*There are billions of solar systems in the galaxy, and billions of galaxies in the universe.*

## Gravity

*The attractive force that one object exerts on another.*

Isaac Newton discovered gravity. Newton's theory of gravity explained planet motion. The strength of gravity depends on the quantity of matter in the two masses and the distance between them. Natural laws govern natural events- not the gods. The entire solar system is held together by gravity.

## Planets

*A planet is an object that orbits a star, is spherical in nature, and has cleared its' neighborhood of other objects.*

There are 8 planets in the solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pluto is NOT considered a planet.

## Moons

*A moon is a sizeable, solid body that is locked into orbit around a planet.*

## Terrestrial Planets

*Mercury, Venus, Earth, and Mars are considered this because they consist of a shell of rock surrounding a ball of metallic iron alloy.*

The 4 planets that are closest to the sun are relatively small. They are small, dense, and rocky.

## Gas-Giant Planets (Jovian Planets)

*Jupiter, Saturn, Uranus, and Neptune are considered this because their mass mostly consists of gas and ice.*

The 4 planets that are furthest from the sun are huge in size. They are large, have a low density, and are gaseous.

## Asteroids

*Chunks of rock or metal comprise a belt between the orbits of Mars and Jupiter.*

## Force

*This is a push or a pull that causes the velocity (speed) of an object to change in magnitude and/or direction.*

A mechanical contact force results when one mass moves and comes into contact with another.

A non-contact or field force applies across a distance; it includes gravity and magnetism.

## Magnetism

*The force that is generated by electricity flowing in a wire or by special materials called magnets. This can be attractive (pulling) or repulsive (pushing).*

## Stars

*Immense balls of incandescent gas in which nuclear fusion reactions produce intense heat and light.*

Gravity holds stars together in groups called galaxies.

Alpha Centauri is the nearest star to earth.

Stars are fixed relative to each other and all of the stars rotate at a fixed point.

The planets move against the background of the stars.

## Light

*Light travels at a constant, unchanging speed of 300,000 km/s.*

*A light-year is the distance that light travels in one earth year (about 9.5 trillion km).*

*Earth's moon is 1.3 light-seconds away (237,000 miles).*

*The sun is 8.3 light-seconds away (93 million miles).*

*Alpha Centauri is 4.3 light-seconds away (40.85 trillion km).*

Light and heat come from nuclear fusion reactions.

## Galaxy

*Earth is located towards the outer belt of the Milky Way Galaxy.*