Ch. 22 Sun & Solar System Review Name _____

Ch 22 - Sun and Its Solar System

Lesson I - The Sun

Studying the sun should be done with caution. Observing the sun directly, especially with a telescope, can cause permanent eye damage. A _____ is an instrument that's used to determine the sun's chemical composition, temperature, and internal pressure. Solar physicists alsc use a _____ _____ , which projects a large image of the sun into a dark underground room. OSO-1 through OSO-8, Helios A & B, and Solar Max, are a few of the _____ used to study the sun and its radiation without interference from the Earth's atmosphere.

Though the sun is an average-sized star, it is much larger than earth. The diameter of the sun is _____ times Earth's diameter. The sun's volume can hold more than _____ Earth's. The sun is _____ kilometers from earth. It takes light from the sun approximately _____ minutes to reach earth

The three regions of the sun's atmosphere include the _____ (bright yellow; lower& denser part of the atmosphere) , _____ (lower part of the outer atmosphere; colored red by glowing hydrogen), and the _____ (outermost portion of sun's atmosphere; faint, pearly light seen during total eclipse).

Dark spots on the photosphere, called _____ , vary in size (larger than Earth's diameter), duration (from a few hours to a few months), and numbers (from none to over 100). These dark features appear in magnetic pairs (N-S) and may be 1500ºC _____ than the surrounding photosphere. Studying their motion shows the sun rotates from _____ to _____ . Because the sun is made of gases, its rate of rotation varies, about 25 days at the _____ and 36 days (NASA, 2007) at the _____ .

The corona gives off a constant stream of electrically charged particles called _____ _____. Solar events causing huge gusts of charged particles include _____ holes and _____ flares. As the charged particles from the sun interact with the Earth's magnetic field, it causes _____ (northern lights) and possible _____ _____ , which can disrupt radio signals and electrical service.

The sun's energy comes from the _____ of lighter elements into heavier ones. Einstein's famous equation, $E=mc^2$ states that _____ can be converted into _____ and vise versa. The sun is mostly _____ and has enough matter to keep releasing energy for another _____ billion years.

Lesson II - Observing the Solar System

The solar system includes all objects that _____ (revolve) around the sun. Includes eight (8) planets [+dwarf planets], numerous _____ (moons), thousands of _____, millions of _____, many _____. Some orbits are nearly circular, others are highly elongated. Some objects travel close to the sun, others are billions of kilometers away. In the region of the solar system beyond Neptune are objects of the _____. Farther out in space is thought to exist the _____, possible source of long-period comets.

Due to the distance of stars from Earth, their positions relative to other stars do not appear to change. The position of planets, however, appear to move eastward in front of the stars; periodic backward (westward) loops called _____ motion occurs as earth passes another planet in its orbit

_____ (100 -165 AD) – Greek astronomer

Developed an earth-centered (_____) model of the solar system to predict the location of the planets; He imagined planets on small orbits (_____), and that the center of each epicycle moved around earth on a larger orbit (_____)

_____ – Polish astronomer

Proposed the _____ solar system – the Earth and other planets revolve around the sun

Lesson III - Motion in the Solar System

_____ (1546-1601) – Danish

Built an astronomical observatory on an island; first long-term (20 years) observations of the sky; best observations made before telescope

_____ (1571-1630) – German

Used Tycho Brahe's data to develop **three laws of** _____

First Law – _____ **law** – every planet follows an elliptical orbit around the sun; the sun is located at one _____; the planet's distance from sun varies along its path (the point farthest from sun is _____, the point nearest is _____)

Second Law – _____ **law** – planets speed around sun varies; an imaginary line from the center of the sun to the center of a planet sweeps out the same area in a given time; planets move faster when they are closer to the sun

Third Law – _____ **law** – states that the period (P) of a planet squared is proportionate to the cube of its distance (D); $P^2 = D^3$; _____ is the time it takes for a planet to travel one orbit around the sun; the farther a planet is from the sun, the longer its period (due to larger orbit & slower motion)

_____ (1564-1642) – Italian

Believed to be the first astronomer to use a _____ to study the sky; observed craters and mountains on the moon; discovered four moons in orbit around _____, which helped confirm the heliocentric view of the solar system (proved not all objects in the sky rotated around the Earth)

_____ (1642-1727) – English

Identified the force that kept planets in motion around the sun – _____; Newton's **universal law of** _____ showed that the force of gravity between any two objects is directly related to the _____ of the two objects, and inversely related to the square of the _____ between the centers of the two objects. More simply, gravitional force is 1) greater between objects of greater mass, and 2) decreases as distance between the centers of the two objects increases

Universal Law of Gravitation helps explain ...

... the reason that planets closest to sun move _____; why the speed of the the planets change (move _____ near the sun, _____ farther from the sun); used to determine masses of planets (when their period is known); cause of tides (Earth's moon); the long orbits of comets; the _____ (minimum speed needed to escape the gravitational pull) of a planet, moon, or asteroid.