Name _____ Date _____

Study Guide for Unit on Space

The Universe

- Name of theory that the universe began about 13.7 billion years ago from a single point and has been expanding ever since: _____
- Evidence for the above theory include:
  - _____ shift in light as a star moves away from a viewer
  - _____ shift in light as a star moves towards a viewer
  - Edwin _____ used the red/blue shift in the light of stars to show that not only are objects in space moving away from Earth, they are actually moving away from each other – proving that the universe is _____.
- _____ are large clouds of gas and are where stars are born.
- _____ occur when stars explode.
- _____ form after very large stars experience a supernova.
- _____ consist of a collection of stars, gas, and planets, moons, and rocks.
- _____ is the name given to our galaxy.
- What is the difference between a moon and a planet? _____
  _____

Orbital Motion

- _____ refers to an object's resistance to motion and depends upon the object's mass and speed.
- The Law of _____ states that an object in motion will stay in motion and an object at rest will remain at rest, unless acted upon by a _____.
- _____ refers to a pulling (attraction) force between any two objects and is due to the bending of space by an object.
- Gravity depends upon the _____ of an object and the _____ between the two objects.
- As planets move through space, their own _____ has them moving in a straight path. However, the pull of _____ from the Sun pulls the planets towards the Sun. The combination of _____ and _____ create an orbital path for each planet around the Sun or each moon around a planet.

Understanding Our Solar System

- _____ is the model of our solar system with Earth as the center of our solar system.
- _____ is the model of our solar system with the Sun as the center of our solar system.
- _____ was the first person to develop the model of our solar system with the Sun at the center of our solar system.
- _____ mathematically proved that the Sun was at the center of solar system with the planets orbiting around the Sun.
- Kepler's 1st Law of Planetary Motion states – that the orbit of every planet is an _____ with the Sun located at one _____.

    - _____ is when the Earth is closer to the Sun and occurs in January.
    - _____ is when the Earth is farther from the Sun and occurs in July.
- Kepler's 2nd Law of Planetary Motion states – Planets travel faster when they are _____ to the sun and _____ when they are farther from the Sun.
- Kepler's 3rd Law of Planetary Motion states – Planets _____ to the Sun take less time to orbit the Sun than planets _____ from the Sun.
- _____ was the first person to provide visible evidence that the Sun is located at the center of our solar system and that the planets orbit the Sun and moons orbit planets.

Energy from the Sun

- _____ is the state of most matter within our Sun and is the most common state of matter in the universe.
- Plasma is not made up atoms but is instead made up of _____ _____
- The temperatures inside the Sun are so high that charged particles and small atoms collide with such force that they fuse together to form larger _____ , while releasing tons of _____ in a process called nuclear _____.
- During nuclear _____ reactions, large atoms split apart into smaller atoms, while releasing tons of energy. Nuclear fission reactions occur in nuclear bombs and at nuclear power plants.

Electromagnetic Spectrum

- The energy created in the Sun travel to earth as _____ energy which uses _____ waves to transfer energy.
- Electromagnetic waves all travel at the same _____ through the vacuum of space but vary according to wavelength and frequency.
- _____ is the distance from the crest of one wave to the crest of another wave.
- _____ is the time it takes for one wavelength to pass a given point within one second and is measured in Hertz.
- _____ waves have the longest wavelengths and the lowest frequency.
- _____ waves have shorter wavelengths than radio waves but longer wavelengths than infrared waves.
- _____ waves are also known as heat waves and have shorter wavelengths than light waves.
- _____ waves are the only part of the electromagnetic spectrum that we can see.
    - White light is made up of seven different colored of lights including: _____ _____
    - _____ light has the longest wavelengths and _____light has the shortest wavelengths.
- We see the colors of objects according to the color of light that they _____.

Photosynthesis and Cellular Respiration

- Plants use the energy from sunlight to rearrange the atoms in carbon dioxide, CO_2, and water, H_2O, into _____ sugar, $C_6H_{12}O_6$, and Oxygen, O_2, and _____ chemical energy during the process of _____.
- Sunlight is captured by _____ pigments in green parts of plants, algae, phytoplankton, and cyanobacteria.
- Chlorophylls _____ green light but absorbs and uses red and blue light.
- Photosynthesis takes place in _____ organelles.
- The energy produced by plants travel through the food chain as organisms _____ plants or animals that have eaten plants.
- All organisms use the process of _____ _____ to break down glucose, $C_6H_{12}O_6$, and oxygen, O_2, into carbon dioxide, CO_2, water, H_2O, and _____ energy.
- Cellular respiration takes place in the _____ organelles.

Seasons

- The Earth takes _____ days to orbit the Sun. Every _____ years, we add one day to the calendar to account for the extra 0.25 days.
- The Earth takes _____ hours to rotate once around its axis in _____ direction.
- The counter-clockwise direction is why the Sun rises in the _____ and sets in the _____.
- Earth's axis of rotation is _____ at a 23.5 degree angle in relation to the ecliptic plane.
- The tilt of Earth's axis is why parts of Earth experience different _____.
- During the _____ the hemisphere is tilted away from the Sun, so the Sun sits _____ in the sky and the light intensity is _____.
- The _____ solstice is the first day of winter and occurs on December 21 in the northern hemisphere and June 21 in the southern hemisphere. This is the _____ day of the year.
- During the _____ the hemisphere is tilted towards the Sun, so the Sun sits _____ if the sky and the light intensity is _____.
- The _____ solstice is the first day of summer and occurs on June 21 in the northern hemisphere and December 21 in the southern hemisphere. This is the _____ day of the year.
- During the _____ each hemisphere is not tilted away for towards the Sun, so the days and nights are equal in length. These occur on March 21 and September 21.

Tides and Eclipses

- Lunar is the name of our Moon and it only _____ light. It does not produce any light of its own.
- The Moon takes _____ days to orbit Earth.
- _____ phase of the Moon when it is between the Sun and the Earth.
- _____ phase of the Moon when it is on the other side of the Earth from the Sun.
- _____ phases of the Moon occur when the Moon is perpendicular to the Sun.
- _____ eclipses occur when the moon's shadow falls on the Earth and only occurs during a _____ moon.
- The moons shadow follows a path across Earth called the path of _____ and one can only see a solar eclipse when one is standing within that path.
- In order to see a total solar eclipse, one must be standing in the _____ shadow of the moon.
- In order to see a partial solar eclipse, once must be standing in the _____ shadow of the moon.
- _____ eclipses occur when Earth's shadow falls on the Moon and only occurs during a _____ moon.
- Tides are produced by the gravitational pull of the _____ on the Earth.
- The moon plays a larger part in Earth's tides, than the Sun, because the moon is a lot _____ to Earth than the Sun.
- _____ tides occur during _____ and _____ moons, when the gravitational pull of the Sun is combined with the gravitational pull from the Moon. During these tides, the difference between high and low tides is really large.
- _____ tides occur during quarter moons, when the gravitational pull from the Sun cancels some of the moon's gravitational pull. The difference between high and low tides during these times is not that different.