Glossary

This glossary undoubtedly contains terms that you already know. I have tried to be inclusive by making notes from my lectures, and the questions that students ask me. This glossary not only contains words that I am sure will be of value to many readers, but many terms that students have asked about during lecture over the years.

Acceleration | To increase steadily in speed. See also: Gravity, and Velocity.

Accretion | To increase in size by adding smaller pieces. Ex: Planets grow by accretion.

Altitude | The angle above the horizon. Ex: Measuring the Moon's altitude angle.

Analemma | A horizontal figure-8 shape. See also: Solar Calendar.

Angular Velocity | Rotational speed. Ex: degrees per hour or revolutions per minute (rpm). See also: Rotation, Revolution.

Anti-clockwise | Anti-Clockwise rotates to the left.

Antipodes | Any two points on exact opposite sides of a planet or moon. Ex: The poles of any planet are also antipodes.

Aperture | The diameter of a telescope's primary lens or mirror. The term is also used for binoculars and other optical equipment. See also: Focal Length, Focal Ratio, and Magnification.

Aphelion | The farthest point from the Sun in a planetary orbit. Ex: the Earth's farthest distance from Sun each year is called its aphelion. See also: Apogee, Lunar Orbit, Perigee, and Perihelion.

Apogee | The farthest point from the Earth in an orbit in space. Ex: the Moon's farthest distance from Earth each month is called its Apogee. See also: Aphelion, Lunar Orbit, Perigee, and Perihelion.

Apparent Motion | An illusion of motion caused by the rotation of our own planet. Ex: The daily motion of the Sun crossing the sky as it appears to circle the Earth.

Artificial Horizon | A line or boundary that represents the true horizon in a model.

Asteroid | Any object in space too small to be seen with the naked eye. Asteroids are different from planets in that they are irregularly shaped. Asteroids do not have enough gravity to crush themselves into a spherical shape.

Astronomical Unit | The distance from Earth to the Sun, approximately 150 million km. This is often used as a yardstick distance when discussing the dimensions of a solar system. Also referred to as an AU.

Axis | The imaginary line around which a planet spins. A planet's axis is also defined by a line connecting its north and south poles.

Azimuth | A compass bearing. Azimuth points the way from our own position to some distant place or object.

Barringer Crater | The best preserved impact crater in the world. Located near Winslow, AZ, Barringer Crater is almost one mile in diameter and ¼ mile deep.

Binary | Charon is a binary planet system located 40 AU from the Sun. See also: Earth-Moon System.

Celestial Equator | A line that divides the skies into a southern and northern hemisphere; essentially a projection of the Earth's equator onto the sky.

Celestial Pole | A projection of the Earth's polar axis onto the night sky. Viewed from Earth, all the stars appear to rotate around the celestial pole. See also: Apparent Motion.

Central Mount | A mountainous feature located in the center of a large crater. Central mounts require large craters – usually over 50 km wide – and are known to exist on Earth, Moon, and Mars.

Centrifugal | Centrifugal [Latin: Center fleeing] is the outward force or motion that we experience when rapidly spinning around a central point, such as on a carnival ride.

Centripetal | Centripetal [Latin: Center seeking] is the inward force that holds any object in circular motion, such as Earth's gravity holding the Moon in orbit.

Chixulub Crater | The largest known impact crater on Earth. Located of the Yucatan coast of Mexico, Chixulub is a 180 km wide crater. It is also the site of the impact that caused the extinction of the dinosaurs.

Clockwise | Clockwise rotates to the right, as the shadow on a sundial does.

Competing Theories | It is frequently the case in science that there are competing theories trying to explain a poorly understood phenomenon. This is a strength of science – not a weakness. In any case, it is experiments which decide between competing theories – not people. See also: Experiment.

Constellation | A collection of bright stars that appear to form a pattern or shape. Constellations are cultural, different cultures see and name different patterns even though everyone sees the same stars in the sky. See also: Zodiac.

Constructivism | A method of teaching that relies on the student to explore and discover instead of relying upon the teacher to deliver facts and vocabulary.

Crater | Bowl-shaped excavations created in just seconds by the impact of an asteroid or meteoroid. Craters range from microscopic to thousands of kilometers in diameter and are found on all terrestrial planets and moons. See also: Crater Rim, Ejecta, Maria, and Rays.

Crater Rim | The raised outer ring of stone surrounding an impact crater. The rim is created in seconds from the pressure and heat of the asteroid impact. See also: Craters, Ejecta, Maria, and Rays.

Crescent Moon | One of the five different lunar phases, crescent moon is seen just before or after the new moon. The crescent is a curved shape, often described as looking like a fingernail. See also: Full Moon, Gibbous Moon, New Moon, and Quarter Moon.

Daylight Savings Time | Each fall the clocks are adjusted back one hour so that the Sun is still near the zenith at 12 'o clock noon. Without daylight savings time, sunrise would not occur until 9 or 10 'o clock in northern latitudes.

Diurnal Motion | The daily motion of the Sun, Moon, and stars across the skies. [Latin: Daily]

Dwarf Planet | The smallest category in a system that classifies planets by size. There are competing classification systems that order planets by the type of surface, interior composition, and location in space. *Note: Dwarf planets such as Pluto and Quaoar are still indeed planets.*

Earth-Moon System | The Earth and Moon affect each other in many ways, including gravitation, orbital motion, orbital stability, and others. Astronomers often study our planet and its satellite as a system of two bodies in orbit around each other. See also: Binary Planet.

Eclipse | An event when one body in space crosses into the shadow of another body. See also: Eclipse Seasons, Lunar Eclipse, Nodes, Partial Eclipse, Path of Totality, and Solar Eclipse.

Eclipse Seasons | Because of the nature of the orbit of the Earth-Moon system around the Sun, eclipses tend to happen during the same months for several years in a row. The eclipse season changes slowly on a 19-year cycle. See also: Eclipse, Lunar Eclipse, Nodes, Partial Eclipse, Path of Totality, and Solar Eclipse.

Ecliptic | The plane of the solar system projected across the skies as seen from Earth. Because our solar system is essentially flat (all the planets orbit in roughly the same plane), the *ecliptic* is the path across the sky taken by the Sun, Moon, and all the planets. See also: Zodiac.

Ejecta | Material blasted out of a crater by the blast energy of an impacting asteroid. Ejecta covers the area immediately surrounding the crater in an *Ejecta Blanket.* Some ejecta is sprayed out in long thin streams called *Rays* which can be hundreds of kilometers long. See also: Craters, Crater Rim, Maria, and Rays.

Ellipse | An oval-shaped geometrical figure, similar to the circle, except that instead of having a single center point, the ellipse has two focal points. Kepler proved that all planetary orbits are elliptical in shape with the Sun located at one focal point. See also: Hooke's Pendulum, and Johannes Kepler.

Exoplanet | A planet that orbits a star other than the Sun. There are currently approximately 4000 confirmed exoplanets – most discovered by the Kepler satellite. Current estimates are that there may be over 1 trillion (1,000,000,000,000) exoplanets in our galaxy alone.

Experiment | A controlled scientific test that examines only one variable at a time. Experiments are used to support, or invalidate, theories and hypotheses. An experiment can *never prove an hypothesis true – it can only falsify it.* See also: Hypothesis, Model, Proof, Theory, and Truth.

Far Side | The side of the Moon that forever faces away from the Earth. We cannot see the far side of the Moon unless we send a spacecraft there. See also: Near Side, and Synchronous Orbit.

Fixed Earth | An ancient idea related to the Geocentric Theory. The term *fixed* literally means 'motionless'; in this theory, the Earth neither spins on its axis nor revolves in orbit around the Sun. See also: Geocentric Theory, Heliocentric Theory, and Aristotle.

Focal Length | The distance from the surface of a lens or mirror to the point where all light comes gathered to a point. See also: Aperture, Focal Ratio, and Magnification.

Focal Ratio | The ratio of focal length to aperture, dividing these two values gives an f-number or focal ratio. Ex: A telescope has a focal length of 900 mm and an aperture of 125 mm. This gives a focal ratio of 900/125 or f/7.2. See also: Aperture, Focal Length, and Magnification.

Full Moon | The brightest lunar phase when the entire disk of the Moon is visible. See also: Crescent Moon, Gibbous Moon, New Moon, and Quarter Moon.

Fundamental Forces | There are four fundamental forces that control everything in the Universe; the Strong Force (atomic nuclei), Weak Force (radioactivity), Electromagnetic Force (light), and Gravity. Only electromagnetic force (light) and gravity concern us in observational astronomy. See also: Gravity, and Light.

Galilean Moons | The four great moons of Jupiter discovered by Galileo in 1609. These moons were named for friends and lovers of Jupiter (Zeus), they are called: Io, Europa, Calisto, and Ganymede. See also: Galileo.

Geocentric Theory | An ancient theory which states that the Earth is fixed (motionless) and also the center of the cosmos. In this theory, the Sun and Moon, as well as all the planets and stars, revolve around the Earth. This theory was disproved by Copernicus and Galileo. See also: Fixed Earth, Heliocentric Theory, Copernicus, and Galileo.

Geologically Dead | A planet that has cooled and become solid all the way to its core (no magma or liquid mantle), no earthquakes, volcanoes, or tectonic plate movement is possible on a dead planet. Small planets generally cool and solidify faster than large planets. Ex: The Moon and Mercury are geologically dead, the larger planets Earth and Venus are not.

Gibbous Moon | The phase of the Moon seen just before or after the full moon, this phase is often described as 'almost full', but the entire lunar disk is *not* visible here. See also: Crescent Moon, Full Moon, New Moon, and Quarter Moon.

Gnomon | A vertical stick or rod, used in sundials to cast a shadow and tell time. See also: Solar Clock.

Gravitational Constant | The amount of gravity depends in part upon a planet's mass, the more massive the planet, the stronger its gravity. The acceleration or rate at which something falls on any particular planet or moon is called local gravity or the gravitational constant for that world. Ex: Earth's gravity is 9.8 m/s2, while the Moon's gravitational constant is just 1.6 m/s2. See also: Fundamental Forces, and Gravity.

Gravity | One of the four fundamental forces in Nature. Gravity is always attractive – objects are always pulled toward each other. Gravitational strength is related to mass – the larger an object is, the more gravitational pull it has. See also: Fundamental Forces and Gravitational Constant.

Gyroscope | A device with a rapidly spinning wheel or disk, used to keep rockets and small aircraft stable in flight. Small toy gyroscopes can be used to demonstrate the stability of the Earth's axis in space.

Heliocentric Theory | A theory first developed in ancient Greece and revived by Copernicus. In this theory, the Sun is the center of the solar system, and the Earth is just one of many planets. This theory was first proven true by Galileo in 1620. See also: Fixed Earth, Geocentric Theory, Copernicus, and Galileo.

Hooke's Pendulum | A specialized pendulum that moves in an elliptical path. Robert Hooke invented this pendulum and used it to prove that only gravity and momentum were necessary to create an elliptical orbit. See also: Ellipse, Orbital Motion, Pendulum, Robert Hooke, and Isaac Newton.

Hypothesis | An particular or limited idea or speculation based upon observation and data. An hypothesis must be falsifiable, able to be disproved by experiment, in order to be valid. See also: Experiment, Model, Proof, Theory, and Truth.

Ice Giant Planet | Some Jovian planets are large enough to compress their gaseous interiors first into liquids, then into solid ice forms deep in their interiors (think of dry ice here.) Neptune and Uranus are examples of this type. See also: Jovian Planet, and Terrestrial Planet.

Impact Energy | The amount of energy that an impactor delivers when it strikes the surface of a moon or planet. Impact energy depends on just two factors: the mass of the impactor and its speed. Impact energy of this type is usually expressed in megatons (MT), one megaton is sufficient to completely destroy a large city. See also: Impactor.

Impactor | made such as a falling satellite, or natural such as an asteroid.

Inertia | The property of matter that resists any change in motion. Ex: If you try to throw a bowling ball, you feel a resistance – this is due to the ball's inertia.

Inferior Planet | Any planet closer to the Sun than the Earth. Mercury and Venus are the only inferior planets in our solar system. Inferior planets show changing phases, like the Moon does, when they are seen in a telescope. Galileo used the phases of Venus to prove the heliocentric theory in 1620. See also: Galileo, Heliocentric Theory, and Superior Planet.

Infrared Light | A wavelength of light that is too long for the human eye to detect. Infrared light can be felt by the skin as heat. See also: Ultraviolet Light, and Visible Light.

Inner Solar System | All planets inside the orbit of Jupiter: Mercury, Venus, Earth, Mars, Vesta, Ceres, and the asteroid belt. (R £ 5 AU) See also: Outer Solar System.

Interstellar Space | Vast empty spaces between the stars and their respective solar systems; the distance to our nearest star is 4.6 light years – almost all of this is empty interstellar space.

Jovian Planet | Any planet that is composed primarily of gaseous elements such as helium and hydrogen. Jupiter, Saturn, Uranus, and Neptune are all Jovian worlds. These used to be called *Gas Giant Planets*, but it has been learned that most of the interior of these worlds are under so much pressure that the gas becomes liquid, and even solid deep in the interior. See also: Ice Giant Planet, and Terrestrial Planet.

Kilo / Mega / Giga / Tera | These are metric prefixes. Kilo = thousands; Mega = millions, Giga = Billions, and Tera = trillions.

Kuiper Belt | A large belt of comets in the outer solar system. This belt is thought to extend from 50 – 100 AU out from the Sun, far beyond the orbit of Pluto. See also: Oört Cloud.

Latitude | Lines that divide the Earth in a north-south direction, starting with the equator (0 degrees) and extending to the poles (+/- 90 degrees). See also: Longitude.

Leap Year / Leap Second | Because the does not take exactly 365 days to orbit the Sun, we add an extra day to February every four years to keep the calendar correctly aligned with our seasons. The leap second is similar and used because Earth's rotation on its axis does not take exactly 24 hours.

Libration | The wobbling motion of the Moon as it orbits the Earth. Libration turns the Moon so that we may occasionally see a small portion of the lunar far side. See also: Far Side, Near Side, and Orbital Motion.

Light | Light is also called electromagnetic radiation. The electromagnetic spectrum includes radio waves, infrared (heat), visible light, ultra violet, x-rays, and gamma rays. We have telescopes that can 'see' in all these types of light – each kind of light brings us unique kinds of information about distant stars and galaxies. See also: Fundamental Forces.

Light Year | The distance that a beam of light in space will travel in one year; approximately six trillion kilometers.

Longitude | Lines that divide the Earth in an east-west direction, starting with the Prime Meridian (0 degrees) and extending to the International Date Line (180 degrees). See also: Latitude.

Lunar Atlas | A high resolution map of the Moon which names craters, mountains, maria and other features.

Lunar Eclipse | An event where the Moon crosses into the Earth's shadow for a period of a few hours. This darkens the Moon from silvery-white to a red-brown-orange color, similar to the effect of the light of a sunset on hills or buildings. See also: Eclipse, Eclipse Seasons, Nodes, Partial Eclipse, Path of Totality, and Solar Eclipse.

Lunar Orbit | The elliptical path of the Moon around the Earth; the nearest point to the Earth is called perigee while the most distant point of the Moon's orbit is called Apogee. The Moon is held in orbit by the Earth gravitational pull. See also: Apogee, Gravity, and Perigee.

Lunar Phases | The changing appearance of the Moon as it orbits the Earth is called lunar phases. See also: Crescent Moon, Full Moon, Gibbous Moon, New Moon, and Quarter Moon.

Lunation | One complete cycle of lunar phases from new moon to full moon and back to new moon again, this cycle takes about 29.5 days. See also: Lunar Orbit, and Lunar Phases.

Magnification | Magnification is a measure of how much closer an object appears when looking through a binocular or telescope. If an object appears ten times closer in the telescope than in the naked eye, this is referred to as 10x, or 10-power magnification. Magnification is a *very poor* way to judge the quality of a telescope or binocular; it is a complex subject worthy of much study. In binoculars, 10x is generally the highest power that is practical. With a telescope, our atmosphere limits the highest practical magnification in any telescope to 350x under most conditions. A telescope's magnification is calculated by dividing the telescope's focal length by the eyepiece's focal length. Ex: An eyepiece with a focal length of 12 mm is attached to a telescope with a 900 mm focal length. Magnification = 900/12 or 75x. See also: Aperture, Focal Length, and Focal Ratio.

Maria | A lake or ocean of lava that fills a very large crater. The most famous maria is the *Sea of Tranquility* where men first set foot on the Moon in 1969. See also, Crater, Crater Rim, Ejecta, and Rays.

Meteor / Meteoroid / Meteorite | A *meteoroid* is a small object in space, usually less than a few meters across. While a meteoroid falls through the atmosphere and burns up due to air friction, it is called a *meteor*, this phase lasts only a few seconds. Once a meteor lands on a planet's surface and comes to rest, it is called a *meteorite*. See also: Impactor, and Impact Energy.

Model | A model is a physical or mathematical hypothesis. A model allows the scientist to explore and gather data and predictions that can be tested by experiment or observation. If a model is sufficiently broad in scope, it may be referred to as a theory rather than an hypothesis. See also: Experiment, Hypothesis, Proof, Theory, and Truth.

Moonrise / Moonset | Like sunrise and sunset, moonrise is the time when the Moon rises above the horizon and becomes visible in the sky; moonset is the time when the Moon falls below the horizon and is no longer visible.

NASA / ESA / JAXA | These are the space exploration agencies of the United States, European Union, and Japan respectively.

Near Side | The side of the Moon that forever faces the Earth. See also, Far Side, Synchronous Orbit.

Nodes | A point in space where the orbit of the Moon crosses the plane of the Earth's orbit. If the Earth or Moon cross over a node, an eclipse is possible. See also: Eclipse, Eclipse Seasons, Lunar Eclipse, Partial Eclipse, Path of Totality, and Solar Eclipse.

Orbital Motion | The motion of a smaller body (the satellite) in an elliptical path around a larger body. See also: Gravity, Lunar Orbit, and Orbital Period.

Orbital Period | The time it takes for an object to complete one orbit around another body. For planet Earth, this is called a *year*. See also: Gravity, Lunar Orbit, and Orbital Motion.

Outer Solar System | The portion of the solar system that resides at or beyond the orbit of Jupiter (R = 5 AU to 150 AU). This includes the Jupiter, Saturn, Uranus, and Neptune, many dwarf planets, and two comet belts. See also: Inner Solar System.

Oört Cloud | A spherical shell of comets extending from 100 – 150 AU from the Sun. No object this far from the Sun has ever been directly observed with a telescope. See also: Kuiper Belt.

Pantograph | 1) A device for copying a drawing or shape from one surface to another. 2) A specialized device for copying the shape and size of a constellation in the sky accurately onto paper.

Parabolic Curve | Any object freely falling under the influence of gravity moves in a parabolic curve. This includes falling bodies such as a ball in flight to orbiting bodies such as moons and planets. See also: Gravity.

Partial Eclipse | A condition where only part of a body such as the Sun or Moon is darkened during the eclipse event. See also: Eclipse, Eclipse Seasons, Lunar Eclipse, Nodes, Path of Totality, and Solar Eclipse.

Path of Totality | The shadow of the Moon upon the Earth is relatively small, often less than 50 km wide. This circular shadow traces a path across the Earth during a solar eclipse called the *path of totality*, only if one stands inside this narrow pathway can one see a total eclipse of the Sun. See also: Eclipse, Eclipse Seasons, Lunar Eclipse, Nodes, Path of Totality, and Solar Eclipse.

Pendulum | A device comprised of a weight or bob suspended by a line. The pendulum bob swings back and forth in a regular motion; the period or time of the swing is controlled only by the length of the line – not the weight of the pendulum bob. See also: Hooke's Pendulum.

Perigee | The closest point to Earth in an orbit in space. Ex: the Moon's closest approach to Earth each month is called its Perigee. See also: Aphelion, Apogee, Lunar Orbit, and Perihelion.

Perihelion | The closest point to the Sun in an orbit in space. Ex: the Earth's closest approach to Sun each year is called perihelion. See also: Aphelion, Apogee, Lunar Orbit, and Perigee.

Period | See: Orbital Period.

Pinhole Camera | A primitive camera that projects an image onto a screen or film through a small pinhole – very useful for viewing a solar eclipse safely. Also called a *camera obscura.*

Proof | Proof is a mathematical concept, it has no place in science at all. A scientific hypothesis or theory can be *supported* by data, but *never proven.* Experimental data and observations increase our confidence in a theory, but a good scientist always acknowledges room for error. Ex: Newton's theory of gravitation was considered absolutely sound (but not proven!) for over 250 years until Einstein's theory of relativity reformed and updated it. See also: Experiment, Hypothesis, Model, Theory, and Truth.

Punctuated Equilibrium | A theory that says geological change on a planet is very gradual over millions of years, but occasionally interrupted by massive sudden change such as from a large asteroid impact. See also: Impact Energy, Impactor, and Meteor.

Quarter | way between the full and new moon phases. See also: Crescent Moon, Full Moon, Gibbous Moon, and New Moon.

Rays | Thin streams of powdered rock ejecta that are blasted out of a crater during impact. Rays are usually only a thin layer of powder on the ground and difficult to see unless the lighting is exactly right. See also: Crater, Crater Rim, Ejecta, and Maria.

Relativity Theory | Developed by Albert Einstein in 1915, this is the first significant correction to Newton's theory of gravitation in 250 years. Einstein envisioned space and time as a unified fabric – not separate things. Spacetime fabric could be bent or warped – and this curvature is the cause of gravity. See also: Albert Einstein, Gravity, and Spacetime.

Revolution | The motion of one body around another. Ex: The Earth revolves around the Sun. See also: Orbital Motion, Rotation, and Satellite.

Rotation | The motion of a body spinning on an internal axis. Ex: The Earth rotating on its axis creates the daily cycle of night and day. See also: Revolution.

Satellite | Any object that orbits another larger body. Satellites may be natural (such as the Moon) or artificial (such as a weather satellite.) See also: Orbital Motion, and Revolution.

Scale | The size of one thing relative to another. Ex: If the Sun is the size of a basketball, then Neptune is the size of a small marble almost 1 kilometer away – this shows the *scale* of the solar system.

Seasonal | Cycle – The annual change from spring, to summer, fall, and winter. This seasonal change in the weather is caused by the tilt of Earth's axis. See also: Tilted Axis.

Solar Clock | Also called a sundial, this is a device that uses a gnomon (vertical stick) to cast a shadow in order to tell time. See also: Gnomon.

Solar Eclipse | An event when the Moon temporarily blocks the light of the Sun. When seen from Earth, the Sun appears to go completely dark for a period of minutes. See also: Eclipse, Eclipse Seasons, Lunar Eclipse, Nodes, Partial Eclipse, and Path of Totality.

Solstice | The day where the Sun reaches is greatest northern (or southern) position in the sky; this is also the date when we experience either the longest night (winter solstice – Dec 21) or the longest day (summer solstice – June 21.) [Latin: Sun Stands Still] See also: Equinox.

Spacetime | A concept from Einstein's theory of relativity, Einstein saw space and time as one unified thing instead of separate entities. The curvature of spacetime is what causes gravitational force. See also: Albert Einstein, Gravity, and Relatively Theory.

Star Party | A public event where students, parents, and members of the public are invited to come and enjoy observing through telescopes; often hosted by members of an astronomy club.

Sun Spot | A cool spot on the surface of the Sun that appears darker than surrounding areas. Sunspots average 4500 K – almost 1500 degrees cooler than the rest of the solar surface. Sunspots are caused by *magnetic storms*, anomalies in the Sun's powerful magnetic field.

Sundial | See: Solar Clock.

Superior Planet | Any planet that lies further out from the Sun than the Earth. Mars, Jupiter, and Saturn are all superior planets. Superior planets always appear as full disks (never phases) when you see them in a telescope. See also: Inferior planets.

Synchronous Orbit | A large planet may lock a small satellite in position so that one side forever faces the planet, and one side always faces away; this process is also called Tidal Locking. When a moon is locked in synchronous orbit, it has only one rotation on its axis for each revolution around the planet. This 1:1 ratio gives a synchronous orbit its name. See also: Near Side, and Far Side.

Terminator | The line that separates daylight from darkness on the lunar surface. See also: Lunar Phases.

Terrestrial Planet | A planet with a rocky crust (silicate composition.) Ex: Mercury, Venus, Earth, and Mars are all terrestrial planets. [Latin: Earthlike] See also: Ice Giant Planet, and Jovian Planet.

Theory | A mathematical or physical model that explains *everything we know* about a particular subject. A theory not only explains what we know, it points our way to new investigations and ideas by acknowledging what we do not know. A theory is always far greater in scope than a mere hypothesis, and often represents many years of effort and study by many scientists. See also: Experiment, Hypothesis, Model, Proof, and Truth.

Tilted Axis | Any planet that has an axis which is not aligned with the axis of the Sun is said to have a tilted axis. Ex: Earth's axis is tilted by 23.5 degrees – this causes the seasonal cycle on our planet. See also: Seasonal Cycle.

Tonne / Ton | A unit of weight. 2,000 pounds is an *Imperial Ton.* In metric units, 1,000 kilograms is a *Metric Tonne.* Because of the difference in metric and Imperial units, the metric tonne is approximately 20% heavier.

Truth | Truth is a philosophical concept, not a scientific one. Scientists performing experiments never learn the Truth – they collect data which may support an hypothesis or theory, but a good scientist always acknowledges room for error. See also: Experiment, Hypothesis, Model, Proof, and Theory.

Ultraviolet Light | A wavelength of light that is too short to be detected by the human eye. Ultraviolet light causes tanning, sunburn, and can cause skin cancer. See also: Infrared Light, and Visible Light.

Velocity | Rate of travel, usually expressed in meters per second (m/s), kilometers per hour (kph), miles per hour (mph), etc. See also: Acceleration.

Visible Light | The narrow range of the electromagnetic spectrum that the human eye can detect. There are seven color bands in the visible spectrum: red, orange, yellow, green, blue, indigo, and violet, but the human eye can detect millions of distinct colors. See also: Infrared Light, and Ultraviolet Light.

Waning | 1) Decreasing or growing smaller. 2) The portion of the lunar cycle from the full moon to the new moon when the lighted portion of the Moon gets smaller each day. See also: Waxing.

Water Clock | A primitive clock that uses water dripping from a small hole in a jar to tell the time.

Waxing | 1) Increasing or growing larger. 2) The portion of the lunar cycle from the new moon to the full moon when the lighted portion of the Moon gets larger each day. See also: Waning.

Zodiac | A group of 13 constellations that lie along the ecliptic. The 13th constellation, Ophiuchus – The Healer, is less well-known than the other 12 constellations which are known from fiction and fantasy such as horoscopes, etc. See also: Ecliptic.