

Starry Starry Night Event Glossary

active galaxy -- A normal galaxy that is emitting an abnormal amount of energy. It is believed that this unusual amount of energy is being created by a supermassive black hole at the center of the galaxy. (see: galaxy)

annular eclipse - An eclipse of the Sun where the edge of the Sun remains visible as a bright ring around the Moon. It appears this way because the Moon is further away from the Earth during an annular eclipse than during a total eclipse and therefore does not completely cover the Sun. (see: apogee)

aphelion - The point in planet, asteroid, or comet's orbit where it is farthest away from the Sun. (see: perihelion)

apogee - The point in the orbit of the Moon or a satellite where it is farthest from the Earth. (see: perigee)

asterism - A familiar shape that appears when imaginary lines are drawn between stars in a area of the sky. (see: constellation)

asteroid - A stony or metal-rich rock in space. Smaller than a planet. Bigger than a meteoroid.

asteroid belt - An area in the Solar System between Mars and Jupiter where hundreds of thousands of asteroids orbit the Sun. It is also where the dwarf planet Ceres is located. (see: asteroid and dwarf planet)

astrobiology – the study of life in the universe.

astronomical unit - The average distance between the center of the Sun and the center of the Earth. 93 million miles. 150 million kilometers. Referred to as AU.

atom - The basic unit of all matter in the universe.

aurora - A glow in a planet's atmosphere caused by the interaction of the solar wind and the atoms and molecules in its ionosphere. (see: magnetic field, ionosphere, solar wind)

aurora australis - The aurora in the southern hemisphere of Earth.

aurora borealis - The aurora in the northern hemisphere. Also called the Northern Lights.

autumnal equinox - The day that the Sun crosses the celestial equator in the fall -- when day and night are of equal length. About September 22. (see: equinox, vernal equinox and celestial equator)

barred spiral galaxy - A spiral galaxy with a bar shape at its center. The Milky Way is a barred spiral galaxy. (see: galaxy and spiral galaxy.)

barycenter - The point around which objects in space orbit each other -- their center of mass. In the Earth-Moon system, this point is about 2,900 miles from the center of the Earth.

black hole - A region in space where gravity is so intense that matter, even light, cannot escape. (see: active galaxy and supernova)

brown dwarf - A ball of hydrogen gas larger than Jupiter but not with enough mass to start nuclear fusion and thus become a main sequence star. (see: protostar, main sequence stars, fusion)

celestial equator - An imaginary circle projected onto the celestial sphere of the Earth's equator.

celestial meridian - The line on the celestial sphere joining the observer's zenith with the north and south celestial poles. (see: zenith)

celestial poles - Two imaginary points in the sky above the Earth's north and south poles. Polaris (the North Star) is very close to the north celestial pole.

celestial sphere - An imaginary grid projected onto the sky around the Earth to help us identify the locations of objects in the universe.

centaurs - Small Solar System bodies that orbit the Sun within the orbits of the outer planets and have the characteristics of both comets and asteroids. (see: outer planets)

charged particle - A particle that has an electric charge.

chromosphere - The level of the atmosphere on the Sun between the photosphere and the corona. (see: photosphere and corona)

coma - The dust and gas surrounding the nucleus of an active comet.

comet - A small, irregularly shaped ball of ice and dust orbiting the Sun. When near the Sun, they can vaporize, forming a coma and sometimes a tail. They have been referred to as "dirty snowballs".

constellation - An area of the sky with defined boundaries. They are given the names of the asterisms that appear within them. (see: asterism)

corona -- The outermost part of the Sun's atmosphere. (see: photosphere and chromosphere)

coronal mass ejection - An extremely powerful, massive explosion on the Sun that sends a giant cloud of charged particles into space. If directed at the Earth, this kind of solar storm can disable satellites, radio communications and power grids. (see: charged particles)

dark energy - A theoretical, unknown form of energy that's existence is used by scientists to explain the accelerating expansion of the universe. It is thought to account for 69% of what the universe is made of. (see: dark matter and ordinary matter)

dark matter - -- A theoretical, unknown form of matter that's existence is used by scientists to explain the puzzling way gravity is moving stars around in a galaxy and galaxies themselves are moving around in the universe. It is thought to account for 26% of what the universe is made of. (see: dark energy and ordinary matter)

dark nebula - A cloud of dust in space that blocks the view of the starlight behind it. (see: nebula)

differential rotation - Different parts of a rotating body moving at different speeds. Because it is a gas and not a solid, the Sun rotates faster at its equator than at its poles.

dwarf planet - An object in space that 1) revolves around the Sun, 2) has enough mass to create enough gravity to pull it into a nearly round shape and 3) has not cleared out the other material in its orbit. (see: planet and small Solar System bodies)

eccentricity – A measure of the degree to which an orbit is shaped like an ellipse rather than a circle.

eclipse - When our view of one object is blocked by another object.

ecliptic - The plane of the Earth's orbit around the Sun. It is shown on the celestial sphere as a line representing the Sun's path across the sky during the year. It is called the "ecliptic" because lunar and solar eclipses can only occur when the Moon crosses it.

ellipse - An elongated circle. The orbits of the planets, dwarf planets and small Solar Solar system bodies are ellipses. (see: eccentricity)

elliptical galaxy - A galaxy with a ellipsoidal or spherical shape. (see: galaxy)

emission nebula - A cloud of gas in space whose atoms are energized by a nearby star causing the nebula to glow -- like a neon light. These nebulae tend to be red in color because of the abundance of hydrogen in them. But blue and green colors in the nebulae can be produced by the atoms of other elements. (see: nebula, reflection nebula)

equinox - The day on which day and night are of equal length. (see: autumnal equinox and vernal equinox)

exoplanet - A planet that orbits around a star other than the Sun.

flare - A sudden, explosive burst of light from the Sun that can cause damage to radio communications on Earth.

fusion - In the Sun, the joining together of two hydrogen atoms to form one helium atom. This process also produces a photon. (see: photon)

galaxy - A system of millions or billions of stars, gas and dust held together by gravity. (see: active galaxy, spiral galaxy, elliptical galaxy, irregular galaxy)

Galilean moons - Jupiter's four largest moons -- Io, Callisto, Ganymede and Europa -- discovered by Galileo Galilei.

giant and supergiant stars - Stars that have used up most of their hydrogen and are at the end of their life cycles.

gibbous - More than half but less than completely full.

globular cluster - A large, spherical cluster of usually older stars in the outer regions of a galaxy. (see: star cluster and open cluster)

gravity - We define it as the force that causes objects in space to be attracted to each other. And we have mathematical formulas that describe exactly how it works. But the truth is that no one really knows what it is! Albert Einstein's theory of general relativity describes it as a warping, or distortion of space and time (he called it spacetime) that causes less massive objects to follow curved pathways towards more massive objects.

heliopause - The boundary of the heliosphere.

heliosphere - The region of space containing the Solar System.

inclination - The angle between the plane of a planet's orbit and the ecliptic.

inner planets - Mercury, Venus, Earth and Mars

ionosphere - The area in the Earth's atmosphere between 50 and 250 miles above the Earth's surface.

irregular galaxy - A galaxy with no defined shape. (see: galaxy)

Kuiper belt - The area in the Solar System beyond the orbit of Neptune, between 30 and 50 AU's (astronomical units) from the Sun, populated by icy bodies. The dwarf planets Pluto, Haumea, Makemake and Eris are located there. (see dwarf planet and astronomical unit)

light year - The distance light travels in one year. 5.9 trillion miles. (see: speed of light)

lunar eclipse - When the Moon passes through the Earth's shadow. We still see the Moon because the Earth's atmosphere bends (refracts) some of the Sun's light around the Earth onto the Moon.

lunar month - The 29.5 days it takes the Moon to move around the Earth from new moon to new moon. Also called the synodic month.

magnetic field - An area around a magnetic object within which the force of magnetism acts. (see: aurora)

main sequence stars - Stars that are fusing hydrogen into helium. Most stars, including our Sun, are main sequence stars.

mass - A measure of how many atoms are in an object

meteor - A meteoroid burning up as it enters the Earth's atmosphere thus creating a streak of light in the night sky. Also called a shooting star.

meteorite - debris from a meteor that survives passage through the Earth's atmosphere and reaches the ground.

meteoroid - A small piece of an asteroid or comet orbiting the Sun. Space junk!

meteor shower - An event that occurs when the Earth passes through debris left behind by a comet. This debris enters our atmosphere and forms meteors which radiate from a given point in the sky. They are given names according to the constellations in which they appear. (see: radiant, meteor, comet, constellation)

Milky Way - Our home galaxy. It is a barred, spiral galaxy. It is estimated to have more than 100 billion stars in it and a black hole in its center. It is estimated to be 100,000 light years in diameter and is 13.6 billion years old. Our Solar System lies about 26,000 light years from its center. (see: galaxy, spiral galaxy)

near-Earth objects - Asteroids or comets that come near the Earth.

nebula - A cloud of gas and/or dust in space.

neutron star - A star created from the remains of the supernova explosion of a massive star. (see: supernova)

observable universe - Hundreds of billions of galaxies of stars structured together in space like the wispy filaments in the web of a black widow spider. It is estimated to be 92 billion light years in diameter and 13.8 billion years old. It is also referred to as the cosmos. (see: galaxy, ordinary matter, dark matter, dark energy)

Oort cloud - A spherical shell of cometary bodies theorized to surround the Sun at a distance between 50,000 and 100,000 AU's. (see: astronomical unit, comet)

open star cluster - a group of stars that were formed at the same time in the same area of space and are still loosely bound together by gravity. (see: gravity)

orbit - The path that one object makes around another.

ordinary matter - The hard stuff of the universe. You, me and all we can touch and see. It is thought to account for 5% of what the universe is made of. Also called baryonic matter. (see: dark matter, dark energy)

outer planets - Jupiter, Saturn, Uranus and Neptune

penumbra - The partially shaded area of a shadow. (see: umbra)

perigee - The closest point the Moon or a satellite gets to the Earth in its orbit around the Earth. (see: apogee)

perihelion - The point in a planet, asteroid, or comet's orbit where it is closest to the Sun. (see: aphelion)

photon - A difficult to understand and explain object that sometimes appears to act as a wave moving through space, and at other times as a particle of stuff. When photons of certain wavelengths enter our eyes, we call them "light". Different wavelengths produce different colors. Most photons we see are made in the Sun when two hydrogen atoms smash together to form a helium atom. But we can also make them here on Earth by energizing the atoms of certain materials -- such as by passing an electrical current through the tungsten metal wire in a light bulb.

photosphere - the visible surface of the Sun. (see: chromosphere, corona)

planet - An object in space that 1) revolves around the Sun, 2) has enough mass to create enough gravity to pull it into a nearly round shape and 3) has cleared out the other material in its orbit. (see: dwarf planet, small Solar System bodies)

planetary nebula - A spherical cloud of gas in space produced at the end stage in the life of a low mass star -- such as our Sun. The star's core collapses into a white dwarf visible at the center of the nebula. (see: white dwarf, nebula)

plasma -- The fourth state of matter (after solid, liquid and gas). A gas so hot that electrons have been stripped away from their atoms within it.

prominence - A bright strand of gas extending out from the Sun's photosphere into its corona. (see: photosphere, corona)

protoplanet -- A large body of matter orbiting around a star and developing into a planet.

protoplanetary disk - The rotating mass of dense gas and dust surrounding a newly formed star.

protostar - A mass of gas in the early stage in the formation of a star.

radiant -- During a meteor shower, the area in the sky where meteors appear to radiate from in the Earth's atmosphere.

reflection nebula - A cloud of gas and dust in space that reflects the light of a nearby star. They tend to be blue in color. (see: nebula, emission nebula)

retrograde - Rotation in a clockwise direction when viewed from a north pole. Venus and Uranus rotate with retrograde motion. All the other planets rotate counterclockwise.

rotation -- The turning around of something on its axis. The Earth rotates on its axis.

revolution -- The orbiting of one object around another. The Earth revolves around the Sun.

scattered disk - The area in the Solar System above, below, beyond and over-lapping the Kuiper belt and populated by icy bodies.

small Solar System bodies - All objects orbiting the Sun other than planets, dwarf planets and their moons. This includes comets, asteroids, Trojans, centaurs and most trans-Neptunian objects. (see: planet, dwarf planet, centaurs, comet, asteroid, Trojans, trans-Neptunian objects)

Solar System - The Sun and all the objects that orbit around it. It is about 4.6 billion years old.

solar wind - An energized stream of charged particles flowing outward from the Sun into the Solar System. It can take several days for these particles to reach the Earth. (see: charged particle, aurora)

solstice - When the Sun reaches its highest or lowest point in the sky when viewed from Earth.

speed of light - 186,000 miles per second. At this speed, it takes light eight minutes to reach the Earth from the Sun. (see: photons)

spiral galaxy - A galaxy with a flat, spiral shape. (see: Milky Way, barred spiral galaxy, elliptical galaxy, irregular galaxy, active galaxy)

summer solstice - About June 21. The longest day of the year. (see: solstice, winter solstice)

sunspot - A dark spot on the photosphere of the Sun produced by strong magnetic fields. It is dark because it is cooler than the area surrounding it on the photosphere. (see: photosphere, magnetic field)

supernova - After a massive star uses up its nuclear fuel, gravity causes its remains to collapse into its core where it becomes so heavy that it explodes leaving behind a nebula at the center of which is either a neutron star or a black hole. (see: nebula, black hole, neutron star)

supernova remnant - A type of nebula produced after the explosion of a massive star.

trans-Neptunian objects - objects in the Solar System orbiting the Sun beyond the orbit of Neptune. Objects in the Kuiper belt and the scattered disk are trans-Neptunian objects.

Trojans - Asteroids sharing an orbit with a planet.

umbra - The fully shaded inner region of a shadow. (see: penumbra)

vernal equinox - The day that the Sun crosses the celestial equator in the spring -- when day and night are of equal length. About March 21. (see: equinox, autumnal equinox and celestial equator)

waning - Getting smaller.

waxing - Getting bigger.

white dwarf - A small, very dense star -- typically the size of a planet -- that is formed when a low-mass star -- like our Sun -- has used up all of its nuclear fuel and lost its outer layers as a planetary nebula. (see: planetary nebula, nebula)

winter solstice - About December 21. The shortest day of the year. (see: solstice, summer solstice)

zenith - The point on the celestial sphere directly above an observer on Earth.