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Asteroid

A small solar system object composed mostly of rock. Many of these objects orbit the Sun between Mars and Jupiter. Their sizes range anywhere from 33 feet (10 meters) in diameter to less than 620 miles (1,000 kilometers). The largest known asteroid, Ceres, has a diameter of 579 miles (926 kilometers).

Asteroid Belt

A region of space between Mars and Jupiter where the great majority of asteroids is found.

Atmosphere

The layer of gases surrounding the surface of a planet, moon, or star.

Aurora

A phenomenon produced when the solar wind (made up of energized electrons and protons) disturbs the atoms and molecules in a planet's upper atmosphere. Some of the energy produced by these disturbances is converted into colorful visible light, which shimmers and dances. Auroras have been seen on several planets in our solar system. On Earth, auroras are also known as the "Northern Lights" (aurora borealis) or "Southern Lights" (aurora australis), depending on in which polar region they appear.

Bolide

Large, brilliant meteors that enter the Earth's atmosphere. Friction between a fast-moving meteor and Earth's air molecules generates tremendous heat, which causes the meteor to heat up, glow, and perhaps disintegrate. In some cases, the meteor literally explodes, leaving a visible cloud that dissipates slowly.

Carbonaceous Chondrite

A meteorite with embedded pebble-sized granules that contain significant quantities of organic (complex carbon-

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rich) matter.

Chromosphere

The middle layer of the solar atmosphere between the photosphere and the corona. The chromosphere is roughly 10,000 kilometers (6,200 miles) thick and is composed primarily of hydrogen. It varies in temperature from below 10,000 Kelvin (18,000° F) to over 100,000 Kelvin (180,000° F).

Comet

A ball of rock and ice, often referred to as a "dirty snowball." Typically a few kilometers in diameter, comets orbit the Sun in paths that either allow them to pass by the Sun only once or that repeatedly bring them through the solar system (as in the 76-year orbit of Halley's Comet). A comet's "signature" long, glowing tail is formed when the Sun's heat warms the coma or nucleus, which releases vapors into space.

Comet Shoemaker-Levy 9 (SL-9)

A comet that became gravitationally bound to Jupiter, colliding with the planet in July 1994. Prior to entering the planet's atmosphere, the comet broke into several distinct pieces, each with a separate coma and tail.

Convection Zone

The region below a star's surface where energy flows outward by the rising of hot gas known as convection.

Corona

The outermost layer of the atmosphere of a star, including the Sun. The corona is visible during a solar eclipse or when special adapters or filters are attached to a telescope to block the light from the star's central region. The gaseous corona extends millions of kilometers from the star's surface and has a temperature in the millions of degrees.

Coronal Hole

Regions in the corona from which the high-speed solar wind is known to originate. Coronal holes, usually found near the Sun's poles, are large regions in the corona that are less dense and cooler than the surrounding region.

Crater

A bowl-shaped depression caused by a comet or meteorite colliding with the surface of a planet, moon, or asteroid. On geologically active moons and planets (like Earth), craters can result from

volcanic activity.

Earth

The third planet from the Sun and one of four terrestrial planets in the inner solar system. Earth, the only planet where water exists in large quantities, has an atmosphere capable of supporting myriad life forms. The planet is 150 million kilometers (93 million miles) away from the Sun. Earth has one satellite — the Moon.

Erosion

Natural processes that wear or grind away the surface of an object. On Earth, the major agents of erosion are water and wind.

Extraterrestrial

An adjective that means “beyond the Earth.” The phrase “extraterrestrial life” refers to possible life on other planets.

Fault

A geological term that refers to a fracture or a break in a hard surface like the Earth’s crust. This area is a zone of weakness and may be the site of earthquakes or volcanoes. All planets or moons with a hard crust are candidates for faults or breaks on their surfaces.

Flare

A sudden and violent outburst of solar energy that is often observed in the vicinity of a sunspot or solar prominence; also known as a solar flare.

Ganymede

One of Jupiter’s largest moons. Ganymede, the largest satellite in our solar system, is about 5300 kilometers (3300 miles) wide and larger than the planet Mercury.

Gravity Assist

An effect through which an orbiting object, such as a spacecraft or a comet, gains or loses speed by virtue of the gravitational might of a planet or other celestial object that it passes. For example, the Cassini spacecraft in its journey to Saturn used a gravity assist from Earth to increase its velocity by about 36,000 kilometers per hour (22,300 miles per hour).

Great Red Spot

A circulating storm located in Jupiter’s upper atmosphere. The storm, which rotates around the planet in six days, is

the width of two to three Earths. Galileo first observed the spot in the 17th century.

Greenhouse Effect

The result of a planet's atmosphere trapping infrared heat, rather than allowing it to escape into space. This effect increases the planet's surface temperature, a phenomenon known as global warming.

Habitable Zone

A region around a star where planets with liquid water may be present. A planet on the near edge of the habitable zone would have a surface temperature slightly lower than the boiling point of water. A planet on the distant edge of the habitable zone would have a surface temperature slightly higher than the freezing point of water.

Heliocentric

An adjective meaning "centered on the Sun."

Impact

When one body strikes another with great force. Some examples include a meteor colliding with the Moon or a comet, such as Shoemaker-Levy 9, slamming into Jupiter.

Impact Event

A collision between two solar system bodies that releases exceptionally large amounts of energy. Some examples are the 1908 Siberian Tunguska impact by a comet or an asteroid and the asteroid that struck Earth 65 million years ago, which may have led to the extinction of the dinosaurs and other species of the Cretaceous-Tertiary era.

Interplanetary Matter

Dust, gas, and other debris found within the solar system.

Interplanetary Space

The region of space surrounding our Sun. Asteroids, comets, Earth, and the solar wind are examples of things occupying interplanetary space.

Io

The innermost of Jupiter's four large moons. Due to Jupiter's gravitational might, Io is geologically active; its surface is peppered with volcanoes that send sulfurous eruptions into its thin atmosphere. Io appears to have the most active volcanoes in the solar system.

Io Plasma Torus

A bagel-shaped region of trapped sulfur ions around Jupiter that originates from the surface of Io, one of Jupiter's moons. Gravitational tidal forces between Jupiter, other Galilean moons, and Io cause tidal friction in Io's interior, producing geysers that spew sulfur at tremendous speeds. Some of the sulfur ions leave Io's surface and become trapped around Jupiter.

Ionosphere

A region of the Earth's upper atmosphere where solar radiation ionizes the air molecules. This region affects the transmission of radio waves and extends from 50 to 400 kilometers (30 to 250 miles) above the Earth's surface.

Jovian Atmosphere

The atmosphere surrounding the giant, massive planet Jupiter. The Jovian atmosphere is composed primarily of hydrogen (90 percent) and helium (10 percent). Other minor ingredients include water, hydrogen sulfide, methane, and ammonia.

Jovian Planets

The planets Jupiter, Saturn, Uranus, and Neptune. They are called Jovian planets because of similarities in their composition and location. This group is also known as the "giant planets," the "gas planets" and, when grouped with the planet Pluto, the "outer planets."

Jovian Winds

The hurricane-force, high-velocity motion of gas molecules in Jupiter's atmosphere. The wind speed increases as one travels deeper into Jupiter's atmosphere. The various patterns of atmospheric winds are easily identified in Jupiter's upper cloud layer.

Jupiter

The fifth planet from the Sun and the largest planet in our solar system, twice as massive as all the other planets combined. Jupiter is a gaseous planet with a very faint ring system. Four large moons and numerous smaller moons orbit the planet. Jupiter is more than five times the Earth's distance from the Sun. It completes an orbit around the Sun in about 12 Earth years.

Kuiper Belt

A region in our outer solar system where many "short-period" comets originate. The orbits of short-period comets are less than 200 years. This region begins near

Neptune's orbit at 30 astronomical units (AU) and extends to about 50 AU away from the Sun. An astronomical unit is the average distance between Earth and the Sun. The Kuiper Belt may have as many as 100 million comets.

Lithosphere

The solid part of a planet's surface, composed of the crust and upper mantle. On Earth, it includes the continents and the sea floor.

Long-Period Comet

A comet having an orbital period greater than 200 years and usually moving in a highly elliptical, eccentric orbit. Comets have orbits that take them great distances from the Sun. Most long-period comets pass through the inner solar system only once. Hale-Bopp is an example of a long-period comet.

Lunar Eclipse

A darkening of the Moon, as viewed from Earth, caused when our planet passes between the Sun and the Moon.

Magnetic-Field Lines

Imaginary lines used to visualize a magnetic field. Magnetic field lines are related to the strength of the magnetic object's influence and point in the same direction as a compass needle would.

Magnetosphere

A region of space above the Earth's (or other planet's) atmosphere where magnetic fields influence the motions of charged particles. The magnetosphere magnetically deflects or traps charged particles from space that would otherwise bombard the planet's surface.

Mantle

The interior region of a terrestrial (rocky) planet or other solid body that is below the crust and above the core.

Maria

A dark, flat, large region on the surface of the Moon. The term is also applied to the less well-defined areas on Mars. Although maria literally means "seas," watery regions do not exist on the Moon or Mars. Marias on the Moon may be evidence of past volcanic lava flows.

Mars

The fourth planet in the solar system and the last member of the hard, rocky planets (the inner or terrestrial planets)

that orbit close to the Sun. The planet has a thin atmosphere, volcanoes, and numerous valleys. Mars has two moons: Deimos and Phobos.

Mercury

The closest planet to the Sun. The temperature range on Mercury's surface is the most extreme in the solar system, ranging from about 400° C (750° F) during the day to about -200° C (-300° F) at night. Mercury, which looks like Earth's moon, has virtually no atmosphere, no moons, and no water.

Meteor

A bright streak of light in the sky caused when a meteoroid enters the Earth's atmosphere. The streak of light is produced from heat generated by the meteoroid traveling into the Earth's atmosphere.

Meteorite

The remains of a meteoroid that plunges to the Earth's surface. A meteorite is a stony or metallic mass of matter that did not completely vaporize when it entered the Earth's atmosphere.

Meteoroid

A small, solid object moving through space. A meteoroid produces a meteor when it enters the Earth's atmosphere.

Micrometeoroid

A very small meteoroid with a diameter of less than a millimeter. Micrometeoroids form the bulk of the interplanetary solid matter scattered throughout the solar system.

Moon

A large body orbiting a planet. On Earth's only moon, scientists have not detected life, water, or oxygen on this heavily cratered body. The Moon orbits our planet in about 28 days.

Nebular Theory

The idea that our solar system originated in a contracting, rotating cloud of gas that flattened to form a disk as it contracted. According to this theory, the Sun formed at the center of the disk and the planets formed in concentric bands of the disk.

Neptune

The eighth planet and the most distant giant gaseous planet in our solar system. The planet is 30 times the Earth's distance from the Sun, and each orbit

takes 165 Earth years. Neptune is the fourth largest planet and has at least eight moons, the largest of which is Triton. Neptune has a ring system, just like all the giant gaseous outer planets.

Oort Cloud

A vast spherical region in the outer reaches of our solar system where a trillion long-period comets (those with orbital periods greater than 200 years) reside. Comets from the Oort Cloud come from all directions, often from as far away as 50,000 astronomical units.

Ozone Layer

A region in the upper atmosphere that has high concentrations of ozone (triatomic oxygen, O₃). The ozone layer protects the Earth by absorbing the Sun's high-energy ultraviolet radiation.

Periodic Comet

A comet in a closed, elliptical orbit within our solar system. These comets typically have orbital periods of less than 200 years. Many comets have orbits that keep them in the inner solar system and allow their trajectories to be calculated with great accuracy and precision. Perhaps the best-known periodic comet is Halley's comet, whose orbital period is 76 years.

Photosphere

The extremely thin, visible surface layer of the Sun or a star. The average temperature of the Sun's photosphere is about 5800 Kelvin (about 10,000° F). Although the Sun is completely made up of gas, its gas is so dense that we cannot see through it. When we look at the Sun, we are seeing the photosphere.

Planet

An object that orbits a star. Although smaller than stars, planets are relatively large and shine only by reflected light. Planets are made up mostly of rock or gas, with a small, solid core. In our solar system, the inner planets — Mercury, Venus, Earth, and Mars — are the rocky objects, and most of the outer planets — Jupiter, Saturn, Uranus, and Neptune — are the gaseous ones. Because Pluto is made largely of ice, like a comet, some astronomers do not consider it a true planet.

Planetesimal

A small body of rock and/or ice — under 10 kilometers (6 miles) across — formed during the early stages of the solar system. Planetesimals are the building blocks of planets, but many never

combined to form large bodies. Asteroids are one example of planetesimals.

Pluto

The outermost planet in our solar system. Pluto is, on average, about 40 times the Earth's distance from the Sun. Pluto orbits the Sun in 248 Earth years.

Prominence

An eruption of gas from the chromosphere of a star. Solar prominences are visible as part of the corona during a total solar eclipse. These eruptions occur above the Sun's surface (photosphere), where gases are suspended in a loop, apparently by magnetic forces that arch upward into the solar corona and then return to the surface.

Protoplanet

A small body that attracts gas and dust as it orbits a young star. Eventually, it may form a planetary body.

Regolith

The layer of loose rock resting on bedrock (sometimes called mantle rock), found on the Earth, the Moon, or a planet. Regolith is made up of soils, sediments, weathered rock, and hard, near-surface crusts. On the surface of the Moon, regolith is a fine rocky layer of fragmentary debris (or dust) produced mainly by meteoroid collisions.

Saturn

The sixth planet in the solar system, noted for its obvious ring structure. Saturn is almost ten times the Earth's distance from the Sun. The planet completes a circuit around the Sun in about 30 Earth years. Saturn is the second largest and the least dense planet in our solar system. The planet has more than 21 moons, including Titan, the second largest known moon in our solar system.

Secondary Atmosphere

A gas or gases, such as helium, that a planet discharges from its interior after having lost its primary or primordial atmosphere.

Seismic Wave

The transfer of energy throughout a celestial object, such as a planet, resulting from an external impact or an internal event. On Earth, seismic waves are generated primarily by earthquakes.

Short-Period Comet

Comets that orbit mainly in the inner solar system. Usually these objects orbit the Sun in less than 200 years. Halley's comet is an example of a short-period comet.

Solar Constant

The average amount of solar radiation reaching a planet; usually expressed in watts (energy per unit time) per square meter. For Earth, the solar constant equals $1,372 \text{ W/m}^2$. Each planet has a unique solar constant depending on its distance from the Sun.

Solar Cycle

The periodic changing of the Sun's magnetic field, which determines the number of sunspots and the amount of particles emitted in the solar wind. The period of the cycle is about 11 years.

Solar Eclipse

A phenomenon in which the Moon's disk passes in front of the Sun, blocking sunlight. A total eclipse occurs when the Moon completely obscures the Sun's disk, leaving only the solar corona visible. A solar eclipse can only occur during a new phase of the Moon.

Solar Maximum

The midpoint in the solar cycle where the amount of sunspot activity and the output of cosmic particles and solar radiation is highest.

Solar Minimum

The beginning and the end of a sunspot cycle when only a few sunspots are usually observed, and the output of particles and radiation is normal.

Solar System

The Sun and its surrounding matter, including asteroids, comets, planets and moons, held together by the Sun's gravitational influence.

Solar Wind

Streams of charged particles flowing from the Sun at millions of kilometers an hour. The composition of this high-speed solar wind may vary, but it always streams away from the Sun. The solar wind is responsible for the Northern and Southern Lights on Earth and causes the tails of comets to point away from the Sun.

Sprites

Gamma-ray flashes produced in Earth's atmosphere by severe lightning storms and upper atmospheric events.

Sun

The star at the center of our solar system. An average star in terms of size and mass, the Sun is a yellow dwarf of spectral type G2. It is about 5 billion years old, contains $2 * 10^{30}$ kilograms of material, and has a diameter more than 100 times that of Earth.

Sunspot

A region on the Sun's photosphere that is cooler and darker than the surrounding material. Sunspots often appear in pairs or groups with specific magnetic polarities that indicate electromagnetic origins.

Sunspot Cycle

The change in strength of the Sun's magnetic field, which determines the number of sunspots and the amount of particles emitted in the solar wind. The period of the cycle is about 11 years.

Terrestrial Planets

The four planets of the inner solar system (Mercury, Venus, Earth, and Mars) are called terrestrial planets because they are made up mostly of rock.

Triton

The largest of Neptune's satellites. Triton has an atmosphere and is roughly the size of Earth's moon. It has an "ice cap" of frozen nitrogen and methane with "ice volcanoes" that erupt liquid nitrogen, dust, and methane compounds from beneath its frozen surface.

Uranus

The third largest planet in the solar system and the seventh from the Sun. Uranus is 19 times the Earth's distance from the Sun and completes a circuit around the Sun in about 84 Earth years. This gaseous, giant outer planet has a visible ring system and over 20 moons, the largest of which is Titania. Uranus is tipped on its side, with a rotation axis in nearly the same plane as its orbit.

Van Allen Belt

A region containing charged particles trapped in the Earth's magnetic force field (magnetosphere). The belt's lower boundary begins at about 800 kilometers (496 miles) above the Earth's surface and extends thousands of kilometers into space.

Venus

An inner, terrestrial (rocky) planet that is slightly smaller than Earth. Located between the orbits of Mercury and Earth, Venus has a very thick atmosphere that is covered by a layer of clouds that produce a "greenhouse effect" on the planet. Venus's surface temperature is roughly 480° C (900° F), making it the hottest planet in the solar system.

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