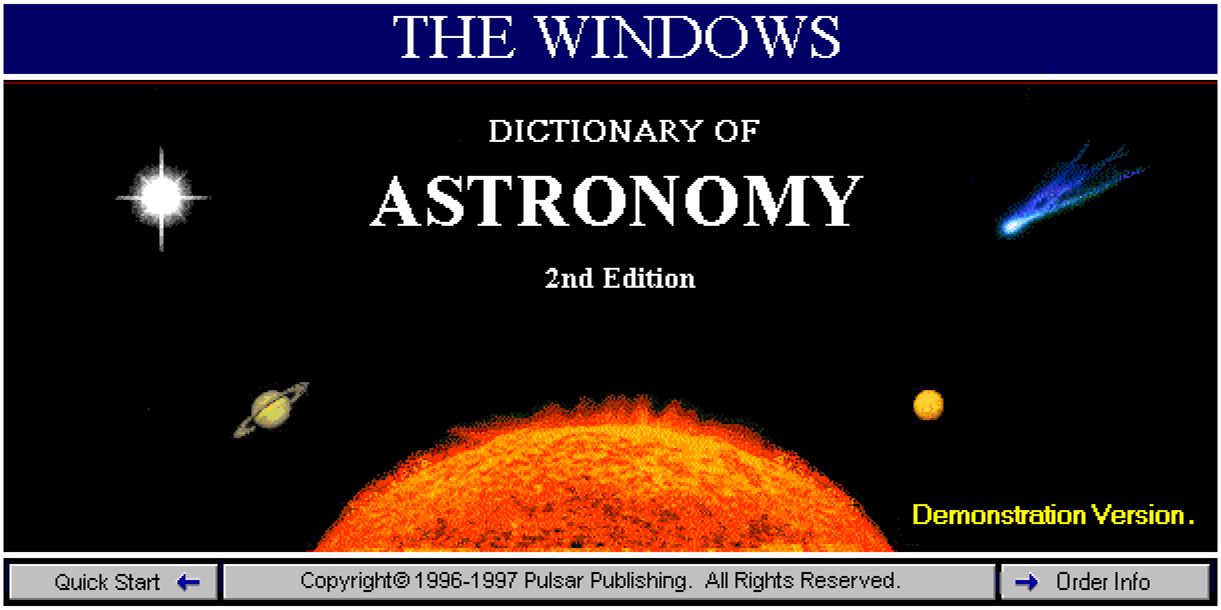
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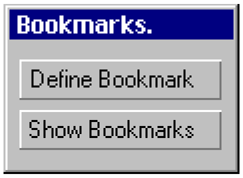
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{dtype} **Ablation{dtype}**:

Ablation collectively describes the processes that decrease the mass of a glacier, iceberg, ice sheet, or snowfield. Melting and evaporation is the most important; calving and removal by wind and by avalanching are less so. In the lower part of a glacier, ablation outpaces accumulation, causing shrinkage. Higher up, the reverse is true, and the glacial mass increases {dtype} **Absorption{dtype}**:

The process by which the intensity of radiation decreases as it passes through a material medium. The energy lost by the radiation is transferred to the medium. Many physical processes observed in astronomy involve absorption, including absorption of light from celestial objects in the Earth's Atmosphere.

{dtype} **Atmosphere{dtype}**:

The atmosphere is the nearly transparent envelope of gases and suspended particles that surrounds the Earth, profoundly influencing environmental conditions on the planet's surface. Without chemical processes involving several of the atmospheric gases, life could not exist. The physical processes that operate in the atmosphere are also of vital importance because they are responsible for the Earth's varied climates.

Further Reading

{dtype} **Achondrite{dtype}**:

An achondrite is a stony meteorite that contains no chondrules (small rounded bodies of chiefly silicate minerals) and only traces of metallic nickel-iron. Achondrites are Breccias containing broken fragments whose mineralogy and texture resemble those of a variety of basaltic igneous rocks. Like lunar breccias, achondrites probably formed when basaltic rocks were fragmented and rewelded during meteorite impacts on the surfaces of their parent bodies. In most cases, their constituent igneous rocks crystallised 4.6 billion years ago, but some achondrites were re-crystallised much more recently.

{dtype} **Alt-Azimuth Mounting{dtype}**:

A telescope mounting incorporating two independent rotation axis allowing movement of the instrument in Altitude and Azimuth.   A simple form of telescope mounting making it easy to move the telescope about both axis at the same time in order to track the motion of celestial objects across the sky.   Not suitable for small motor-driven telescopes.

Telescopes

{dtype} **Alpha Centauri{dtype}**: (Rigel Kentaurus),

Alpha Centauri is the closest star to the Earth, next to the sun. Being a mere 4.34 Light Years away, the star is one of the finest visual binaries in the sky with an orbital period of 80.089 years. The brighter star is very close to our sun in size. As seen from Alpha Centauri, our sun would be a first Magnitude star, with the earth too dim to be visible.

The 25 Brightest Stars

{dtype}● **Altitude{dtype}**:

In astronomy, navigation, and surveying, the altitude of a celestial object is its Angular Distance above or below the celestial horizon. The angular distance is measured along the vertical circle, the circle passing through both the celestial object and the Zenith, an imaginary point directly above the observer.

{dtype} **Angle{dtype}**:

A plane angle is the measure of the amount of rotation when a line segment rotates in a plane about a fixed point. By convention, a counter clockwise rotation is positive, and a clockwise rotation is negative.

{dtype}● **Angular Distance{dtype}**:

The length of an Arc expressed in angular measure (i.e. radians, degrees, arc seconds or arc minutes) as the angle subtended by the arc at the observer. The angle between imaginary lines from the observer in the directions of the two points.

{dtype} **Angular Momentum{dtype}**:

Angular momentum is a measure of the energy of a rotating object or system of objects, such as a Planetary system. The amount of angular momentum depends on the speed of rotation, mass, and mass distribution of the object or system. Mass distribution is known as the moment of inertia.

{dtype} **Apparent Magnitude{dtype}**:

A measure of the relative brightness of a star or other celestial object as perceived by an observer on Earth.

{dtype} **Aquarius{dtype}**:

Aquarius the Water Bearer, or Water Carrier, is one of the Constellation of the Zodiac, the band of sky through which the Sun, Moon, and planets appear to move. Most prominent during the autumn months in the Northern Hemisphere, Aquarius contains the globular cluster M 2, the planetary nebula NGC 7009, also known as the Saturn nebula, and NGC 7293, known as the Helix nebula.

Constellations
Ptolomy's List

{dtype} **Aurora Borealis{dtype}**:

The "Northern Lights"; caused by the interaction between the solar wind, the Earth's magnetic field and the upper atmosphere. A similar effect happens in the southern hemisphere where it is known as the Aurora Australis.

- Aurora Borealis
- Further Reading

{dtype} **Arc{dtype}**:

An arc is a continuous segment of a simple curve. More specifically, any segment of the circumference of a circle is called a circular arc. In a circle with centre at O and two points A and B on the circumference, the Angle AOB is a central angle of the circle; the larger of the two arcs AB is a major arc of the circle; the smaller, a minor arc. If A and B are end points of a diameter, the two arcs AB are the same length, and each arc is a semicircle.

{dtype} **Arc Minute{dtype}**:

A unit in which very small angles are measured. One arc minute is equal to one-sixtieth of a degree.

{dtype} **Arc Second{dtype}**:

A unit in which very small angles are measured. One arc second is equal to one-sixtieth of an Arc Minute.

{dtype} **Azimuth{dtype}**:

The angular distance of an object eastwards along the horizon, measured from due north, between the astronomical meridian (the vertical circle passing through the centre of the sky and the north and south points on the horizon) and the vertical circle containing the celestial body whose position is to be measured. meridian (the vertical circle passing through the centre of the sky and the north and south points on the horizon) and the vertical circle containing the celestial body whose position is to be measured.

{dtype} **Baily's Beads{dtype}**,

Phenomenon associated with total eclipses of the sun, first described in the 19th century by the British astronomer Francis Baily Just before the moon completely covers the sun, and again when the sun begins to re-emerge, the thin, crescent shaped, unobscured portion of the sun suddenly appears discontinuous. It looks like a belt of bright points, varying in size and separated by dark spaces, an effect that looks like a string of beads. The phenomenon is caused by irregularities of the edge of the disk of the moon.

- Eclipses

{dtype} **Barycentre{dtype}**:

The Centre of Mass of objects moving under the influence of their mutual Gravity.

{dtype} **Bayer Letters{dtype}**:

The letters of the Greek alphabet used in conjunction with constellation names (as in Alpha Leonis), to identify the brightness or in some instances, in order of position in the sky of stars. This system is still in use today.

Stellar Nomenclature

Greek Alphabet

{dtype} **Big Bang{dtype}**:

The big bang theory of Cosmology assumes that the Universe began from a singular state of infinite density. This theory was implicit in the complete solution of Albert Einstein's equations, obtained by Aleksandr Friedman in 1922. In 1927, Georges Lemaitre used these equations to devise a cosmological theory incorporating the concept that the universe is expanding from an explosive moment of creation.

- Further Reading

{dtype}● **Binary Stars{dtype}**:

Binary stars are pairs of stars that, because of their mutual gravitational attraction, orbit around a common Centre of Mass. If a group of three or more stars revolve around one another, it is called a multiple system. It is believed that approximately 50 percent of all stars belong to binary or multiple systems. Systems with individual components that can be seen separately by telescope are called visual binaries or visual multiples. The nearest "star" to our solar system, Alpha Centauri, is actually our nearest example of a multiple star system, it consists of three stars two very similar to our Sun and one dim, small, red star orbiting around one another.

● Rapid Motion Binary Stars

{dtype} **BL Lacertae Objects{dtype}**:

BL Lacertae, once thought to be an irregular variable star, is the prototype of an active galaxy that has a sharp brilliant nucleus with a fuzzy halo around it. Although most of the energy it emits is in the infrared, it is also a strong emitter in optical and radio wavelengths.

Radio Astronomy

{dtype} **Black Body{dtype}**

A body that absorbs all the radiation incident on it. The intensity of the radiation emitted by a black body and the way it varies with wavelength depend only on the temperature of the body and can be predicted by quantum theory.

- Blackbody Temperature

{dtype} **Black Dwarf{dtype}**:

A black dwarf is the final phase in the Stellar Evolution of White Dwarfs. Such stars have exhausted their nuclear energy sources; thus any light they produce is from gravitational contraction. The cold, dark hulks that remain when this energy is expended are called black dwarfs. Because they are small and emit no light, no black dwarfs have yet been discovered.

- Bright White Dwarfs

{dtype} **Blackbody Temperature{dtype}**: (effective temperature)

The temperature of an object if it is re-radiating all the thermal energy that has been added to it; if an object is not a blackbody radiator, it will not radiate all the excess heat and the leftover will go toward increasing its temperature.

{dtype} **Black Hole{dtype}**:

Black holes are believed to be the final stage in the collapse of a dying star which was very massive. The collapsed star's material is so densely packed, even more so than a Neutron Star and the gravitational force so great, that even light waves are unable to escape from the surface of a black hole. All external evidence of its presence disappears. Because black holes emit no light or other radiation, their existence predicted by the laws of Relativity, cannot be confirmed by direct observation, but it can be inferred. Astronomers have identified a powerful X-ray source in the constellation Cygnus. Some suspect the source, which has been labelled Cygnus X-l, may be just such a black hole.

- Further Reading

{dtype} **Bok Globules{dtype}**:

Dark clouds of gas and dust seen against the background of stars of an H II region. Bok globules, named after the astronomer Bart J. Bok are believed be part of a contraction of the core when the material becomes so dense as to become almost opaque at optical wavelengths.

{dtype} **Broad Band X-ray Telescope{dtype}**: (BBXRT)

The Broad Band X-ray Telescope was flown on the space shuttle Columbia on 1990 December 2-December 11, as part of the ASTRO-1 payload. Its flight marked the first opportunity for performing X-ray observations over a broad energy range (0.3-12 keV) with a moderate energy resolution (typically 90 eV and 150 eV at 1 and 6 keV, respectively). This energy resolution, coupled with an extremely low detector background, made BBXRT a very powerful tool for the study of continuum and line emission from cosmic sources. The observing program was designed to be an even mix of Galactic and extragalactic targets, although the Galactic Centre region was not available due to the time of year that BBXRT was launched. In spite of some well publicised technical hitches during the mission with the instrument's pointing system, BBXRT successfully performed 160 observations of 80 celestial sources including clusters of galaxies, active galaxies, SNR, X-ray binaries, cataclysmic variables, stars, and the X-ray background.

{dtype} **Brahe, Tycho{dtype}** 1546-1601

Danish astronomer whose accurate astronomical observations formed the basis for Johannes Kepler's Laws of planetary motion. He made a remarkable star catalogue of over 1000 stars, far more than any astronomer before him. He proved that comets are not objects in the atmosphere. He showed irregularities in the moons orbit. His wall quadrant and other instrument became widely copied and lead to improved stellar instruments. Kepler used Tycho Brahe's observations when he constructed his famous laws of planetary movement.

{dtype} **Breccia{dtype}**:

Breccia is a type of rock composed of large angular fragments that have become cemented together. Unlike the cobbles in conglomerates, which have been rounded by transport, the angular fragments of breccias have been formed in place rather than by erosion and sedimentation.

{dtype} **Byurakan Astrophysical Observatory{dtype}**:

Byurakan Astrophysical Observatory, founded in 1946 by Soviet astrophysicist Vicktor A. Ambartsumian, is located 1,500 m (5,000 ft) above sea level on the south slope of Mount Aragatz, 27km (17 mi) Northwest of Yerevan, the capital of the Armenian SSR. Its 2.6-m (102-in) reflecting telescope, installed in 1976, is used especially to study Flare Stars and peculiar galaxies. The 1-m (40-in) Schmidt Telescope uses three of the world's largest objective prisms for spectroscopic work.

Observatory

{dtype} **Celestial Sphere{dtype}**:

The celestial sphere is an imaginary sphere surrounding the Earth, on which the stars seem to be placed and which seems to rotate from east to west.

{dtype}● **Celestial Coordinates{dtype}**:

Any system of coordinates that can be used to describe the position of an object on the Celestial Sphere. Different types of coordinates are used for different applications in astronomy. Commonly used are equatorial coordinates, Horizontal coordinates, elliptical coordinates and galactic coordinates.

- Celestial Coordinate Systems
- Further Reading

{dtype} **Celestial Equator{dtype}**:

The great circle on the Celestial Sphere marking the boundary between the northern and southern hemispheres, and acting as the zero-mark for Declination.

{dtype} **Centre of Mass{dtype}**:

The point of balance in a system of individual masses or in a solid object through which mass is distributed.

- Barycentre

{dtype} **Chandrasekhar Limit{dtype}**:

The Chandrasekhar limit is an upper limit to the mass of a very dense type of star known as a White Dwarf. This upper limit is equal to 1.44 times the mass of the Sun. White dwarfs are so dense (on the order of 100,000 g/cu cm) that their electrons are squeezed into a small space, and the effect known as electron degeneracy is thus produced.

- Bright White Dwarfs

{dtype} **Circular, Motion{dtype}**:

Circular motion is one of the most widespread forms of motion, both in nature and in artificial devices. The planets go around the Sun in orbits that are almost circular, the daily rotation of the Earth makes the stars appear to travel in circular paths through the sky, and the machinery of modern industrial civilisation depends on rotating wheels.

The Greek philosophers their scholastic successors in the middle ages thought that circular motion was the most perfect kind of motion. Necessarily, they argued, the motions of the heavenly bodies must be circular. Because the apparent motions of the planets in the sky are clearly not circular, Ptolemy of Alexandria devised a complicated explanatory model based on circular motions of planets around points going in larger circles. This epicycle system could predict the apparent positions of the planets fairly well over several years, but it was eventually proved wrong.

{dtype} **Comet Swift-Tuttle{dtype}**:

Periodic comet Swift-Tuttle was last seen in 1862. Its orbit was then calculated to have a period of about 120 years. It was predicted to return in 1982 but was not observed. Because of this, there was speculation that the comet had disintegrated. But it was rediscovered in September 1992 almost 10 years away from its expected position.

- Comets
- Comets

{dtype} **Conic Sections{dtype}**:

A conic section (or simply, a conic) is a curve formed by the intersection of a plane with a right circular cone, or conical surface. When the intersecting plane is perpendicular to the axis of the conical surface, the conic formed is a circle. When the plane is parallel to an element of the cone (or generator of the surface), the conic is a Parabola.

{dtype} **Conjunction{dtype}**:

Two or more bodies in the solar system are in conjunction when they have the same Longitude, that is, when their positions are aligned when seen from the Earth. Mercury and Venus are in inferior conjunction when they are between the Earth and the Sun. Any one of the planets is in superior conjunction when the Earth is on the opposite side of the Sun from the particular planet. The term conjunction may be distinguished from opposition, but is often used loosely to describe any close planetary alignment.

- Planetary Conjunctions 1996-2000

{dtype} **Constellation{dtype}**:

Largely on the basis of Greek astronomy, the sky is divided somewhat arbitrarily into sections called constellations. Greek mythological characters dominate the original names, which were given to conspicuous arrangements of stars that roughly outline the fanciful figure named. For example, when looking at a particular apparent group of stars visible in the evening sky during the spring, the Greeks imagined the figure of a lion and named the grouping Leo.

- Constellations
- Constellation Names & Abrreviations
- Constellation Pronunciation Guide
- Ptolomy's List
- Further Reading

{dtype} **Copernicus, Nicolaus{dtype}**

Born on Feb. 19, 1473, in Thorn (Torun), Poland, Nicolaus Copernicus was destined to become, through the publication of his Heliocentric theory 70 years later, one of the seminal figures in the history of scientific thought. It had become clear by his time that even the elaborate celestial clockwork of Ptolomy's geocentric system could not accurately represent the observed motions of the planets. Copernicus realised that it was logical to assume, as Aristarchus had done over 1700 years before him, that the Sun lay at the centre of the universe, and that the Earth and all other planets were orbiting it.

- Copernican System
- Further Reading

{dtype} **Copernican System{dtype}**:

The heliocentric system proposed by Nicolaus Copernicus and published in 1543 in his book *De Revolutionibus*. A representation which, in opposition to the Ptolemaic System places the Sun at the centre of the universe, making it the centre of the rotational movements of the planets. The system, represented a great innovation in astronomy.and can be schematically described as follows: From the centre going outwards we have the Sun, around which rotate Mercury, Venus, Earth (with the moon rotating around it), Mars, Jupiter and Saturn. The spheres of the various planets known at the time were enclosed in the sphere of the fixed stars, which, according to Copernicus, was immobile.

{dtype} **Cosmology{dtype}**:

Cosmology is the study of the origin, constitution, structure, and evolution of the Universe. It makes use especially of the theory of Gravitation, Relativity, Riemannian geometry, and the observation of Extragalactic Systems. Interpreting the observational data requires an understanding of the evolutionary processes of individual galaxies; hence it involves the study of stellar evolution and Interstellar Matter.

- Cosmology
- Further Reading

{dtype} **Cyclone and Anticyclone{dtype}**:

Cyclones and anticyclones are circulation systems in the Atmosphere that can be considered, alternatively, as either producing, or resulting from, the intermediate zones of high and low pressure between the equator and the poles. In cyclones, the central pressure is lower than that of the surrounding environment, and the flow of circulation is clockwise in the Southern Hemisphere and counter clockwise in the Northern Hemisphere. Cyclones are characterised by low-level convergence and ascending air within the system. An anti-cyclone system has the opposite characteristics--the central pressure is higher than that of its surroundings, the flow is counter clock-wise in the Southern Hemisphere and clockwise in the Northern Hemisphere, and anti-cyclones are usually characterised by low-level divergence and subsiding air.

{dtype} **Declination{dtype}**:

Declination is the angular distance between a celestial object and the celestial equator. The declination and the Right Ascension are used together to give the position of a star with reference to the Celestial Equator and the Vernal Equinox respectively.

{dtype} **Diffraction Grating{dtype}**:

The diffraction grating is a precise optical component of Spectroscope and various measuring machines. Used like a prism, which separates light into its constituent wavelengths, it may consist of a surface ruled with thousands of accurately spaced, parallel slits, each slit being only several light wavelengths wide.

{dtype} **Earth{dtype}**: (The planet)

The Earth is a Planet, a celestial body that revolves around a central star. It is one of the nine known planets revolving around its star, called the Sun along with a multitude of smaller objects. The system as a whole is known as the Solar System. The Earth is a terrestrial planet in its structure and composition. That is, like the other inner planets of the solar system--Mercury, Venus, Mars, and the Earth's own Moon--it has an internal structure of different layers of rocky materials composed of a wide range of minerals. The other planets of the system probably all have rocky cores as well, but these cores are cloaked by massive layers of gases and are not available for comparative study.

- Earth, Geomagnetic field
- Earth, Gravitational field

- Planetary
- The Planet Earth
- Further Reading

{dtype}● **Earth, geomagnetic field{dtype}**

The Earth has a magnetic field, which originates primarily within the Earth's interior, although a small part is produced by the planet's Ionosphere and Magnetosphere.   About 90 percent of the geomagnetic field can be represented by the magnetic field that would be produced by a bar magnet located at the Earth's centre and inclined at about an 11 deg angle to the Earth's rotational axis. The geomagnetic field is vertically downward (I = 90 deg) at the north magnetic pole (76 deg   north latitude, 100 deg west longitude in 1975), and vertically upward (I = 90 deg) at the south magnetic pole (66 deg south latitude, 139 deg east longitude in 1975). The surface intensity of the geomagnetic field is smallest at the magnetic equator (a plane midway between the magnetic poles) and increases toward both poles.

{dtype} **Earth, gravitational field{dtype}**

The planet Earth, as with any object possessing Mass, has a gravitational field (Escape Velocity). The Earth's force of gravity is expressed in terms of units of acceleration called gals, 1 gal being 1 cm/sec 2. Roughly, 980 gals (32 ft/sec 2) is the rate at which objects fall freely toward the Earth's surface. Earth scientists use a reference point for the Earth's field as a base station in Potsdam, East Germany, where the figure is actually 981.260 gal. The value of gravity over the Earth ranges from a low of 978,0 gal at the equator to a high of 983.2 gal at the poles. Gravity at the equator is lower than at the poles because of the increased radius there and the rotational acceleration of the planet. The mass of the equatorial bulge, on the other hand, causes gravity to be increased at the equator.

{dtype} **Eccentricity{dtype}**:

Eccentricity (e) is a characteristic of a Conic Section; it is the constant ratio of the distance of any of its points P from a fixed point (called a focus) to the distance from a fixed line (called a directrix). The value of the eccentricity determines the type and shape of the conic. When e equals 0, the curve is a circle (or a point). When e is between 0 and 1 (0 e 1), the conic is an ellipse; when e is close to 0, the ellipse is rounder (more like a circle); as e becomes greater, approaching 1, the ellipse becomes flatter. When e = 1, the conic ceases to be a closed curve and becomes a Parabola. When e 1, the curve is a Hyperbola, becoming wider as e becomes greater.

{dtype} **Ecliptic{dtype}**:

The ecliptic is the plane of the Earth's orbit around the Sun, or the intersection of this plane with the Celestial Sphere. The Sun appears to make a complete circuit around the ecliptic every year. The constellations around the ecliptic make up the Zodiac. The ecliptic is inclined by an angle--the obliquity of the ecliptic--of about 23.5 deg to the equator; the Inclination influences the character of the seasons. Planetary Perturbations cause the ecliptic to change very slowly; for precise work the time of observation (epoch) relative to the ecliptic must be stated.

{dtype} **Einstein, Albert** {dtype}

The German-American physicist Albert Einstein 1879-1955, contributed more than any other scientist to the 20th-century vision of physical reality. In the wake of World War I, Einstein's theories--especially his theory of relativity--seemed to many people to point to a pure quality of human thought, one far removed from the war and its aftermath. Seldom has a scientist received such public attention for having cultivated the fruit of pure learning.

{dtype} **Electromagnetic Radiation{dtype}**:

Electromagnetic radiation is the transmission of energy in the form of waves having both an electric and a magnetic component. It is not possible for a wave with just one of these components to exist. The most familiar forms of electromagnetic radiation are radio waves and light waves. Less familiar forms are infrared radiation, ultraviolet light, X rays, and gamma rays, all of which constitute the electromagnetic spectrum. All of these forms are essentially the same physical phenomena, differing principally in the wavelength and frequency of the radiation.   All electro - magnetic waves propagate through empty space with the same velocity, c, equal to 299,792.4562 km/sec (186,282 mi/sec). For most calculations, the approximate value 300, 000,000 m/sec is adequate.

- Further Reading

{dtype} **Equinox{dtype}**:

The equinoxes are the two points of intersection between the Ecliptic (the Sun's apparent annual path) and the celestial equator (the Equator of the Celestial Sphere). The two moments in the year when the Sun is exactly over the equator, and day and night are hence of equal length, are the times of these equinoxes. In the Northern Hemisphere the vernal, or spring, equinox occurs about March 21, and the autumnal equinox occurs about September 23. In the Southern Hemisphere the seasons are reversed.

{dtype} **Escape Velocity{dtype}**:

Escape Velocity, minimum initial velocity required for an object to escape the gravitational attraction of an astronomical body, and to continue travelling away from it without the use of propulsive machinery. The escape velocity is usually given in terms of the surface-launch velocity, disregarding aerodynamic friction . Objects travelling at less than 0.71 x escape velocity cannot achieve a stable orbit. At 0.71 x escape velocity, the orbit becomes circular, and at higher velocities the orbit becomes elliptical until the escape velocity is reached, and then the orbit becomes parabolic. (Escape velocity is thus also known as parabolic velocity.)

{dtype} **Flare Star{dtype}**: (UV Ceti stars)

Flare stars are cool, Red Dwarf stars of spectral type M that undergo unpredictable short outbursts of brightness, which sometimes increase the total visual luminosity of the star by several magnitudes. A typical outburst lasts from a few minutes to as long as an hour or so, and may recur several times in a day.

- Stars

{dtype} **Gravity{dtype}**:

- Gravitation

{dtype} **Gravitation{dtype}**:

Gravitation, or gravity, is a force that attracts all objects in the universe; it is the most familiar of the four fundamental interactions of matter. Gravitation has several basic characteristics that distinguish it from the other fundamental interactions. First, it is universal, affecting all forms of matter and energy in essentially the same way, whereas all the other interactions directly affect only certain types of particles. The electromagnetic force, for example, affects only charged particles. Second, gravity is always attractive, since it interacts with mass-energy, which is always positive. In electromagnetism, on the other hand, charges can either attract or repel. Third, gravitation is a long-range interaction. Electromagnetism is also long-range, but the strong and weak nuclear forces generally operate only within a distance the size of an atomic nucleus. Fourth, gravity is the weakest of the four fundamental forces. It has a negligible effect on elementary particles. The electromagnetic attractive force between a proton and an electron is nearly 10 to the 40th power times greater than the gravitational force at the same separation. Because gravity is a long-range attractive force affecting all matter, however, it is the dominant force in the universe.

{dtype} **Heliocentric World System{dtype}**:

The heliocentric world system is the modern cosmological view of the universe that places the Earth and other planets in motion around the central Sun. First supported by Aristarchus of Samos in the 3rd century BC, it was rejected in favour of the Geocentric World System until Copernicus set forth its technical details in the 16th century.

{dtype}● **Inclination{dtype}**

One of the principle orbital elements used to define an orbit, giving the angle between the orbital plane and a reference plane. For instance, for the orbits of planets around the sun the reference plane is the Ecliptic.

{dtype}● **Interferometer{dtype}**:

An interferometer is an instrument that allows a variety of precise measurements to be made through the interference patterns of light, sound, or radio waves. In the laboratory, the optical interferometer may be used to determine the thickness or refractive index of a material, and the acoustical interferometer can measure the velocity of sound in a gas or liquid. In optical astronomy the interferometer serves to determine the apparent diameter of stars. In radio astronomy the technique is used to obtain accurate measurements of the position of radio sources. The interferometer is also used in the study of stellar spectra.

{dtype} Kepler, Johannes{dtype}

The German astronomer Johannes Kepler, 1571-1630, was the first strong supporter of the Heliocentric Theory of Copernicus and the discoverer of the three laws of planetary motion.

- Laws of Motion
- Further Reading

{dtype} **Kepler's Laws{dtype}**:

Three laws concerning the motions of planets formulated by the German astronomer Johannes Kepler early in the 17th century. Kepler based his laws on planetary data collected by the Danish astronomer Tycho Brahe, to whom he was an assistant. According to Kepler's first law, the planets orbit the sun in elliptical paths, with the sun at one focus of the ellipse. The second law states that the areas described in a planetary orbit by the straight line joining the centre of the planet and the centre of the sun are equal for equal time intervals; that is, the closer a planet comes to the sun, the more rapidly it moves. Kepler's third law states that the ratio of the cube of a planet's mean distance, d, from the sun to the square of its orbital period, t, is a constant that is, d3/t2 is the same for all Planets.

- Laws of Motion

- Further Reading

{dtype} **Laws of Motion{dtype}**:

Newton's laws of motion are the three most fundamental natural laws of classical mechanics. Newton's first law of motion is also known as the law of Inertia, which states that any object in a state of rest or of uniform linear motion tends to remain in such a state unless acted upon by an external force. In effect, this is a definition of equilibrium; the branch of physics that treats equilibrium situations is statics. The tendency for matter to maintain its state of motion is known as inertia. Inertia prevents an object at rest from moving spontaneously or an object in uniform linear motion from changing its speed or direction spontaneously. More specifically, such spontaneous accelerations do not occur because no force acts to bring them about. Newton's second law of motion, the most important and useful of the three, establishes a relationship between the unbalanced force applied to an object and the resultant acceleration of the object. This relationship states that an unbalanced force acting on an object produces an acceleration that is in the direction of the force, directly proportional to the force, and inversely proportional to the mass of the object. In other words, force equals mass times acceleration, or F = ma. Thus, a given force will accelerate an object of small mass more rapidly than it will a massive object. Similarly, doubling the applied force produces twice the acceleration of an object of arbitrary mass. In metric units, the newton is defined, according to Newton's second law of motion, as the force required to impart an acceleration of one meter-sec (2) to a mass of one kilogram.

According to Newton's third law of motion, which is also known as the principle of action and reaction, every action (or force) gives rise to a reaction (or opposing force) of equal strength but opposite direction. In other words, every object that exerts a force on another object is always acted upon by a reaction force. The recoil of a gun, the thrust of a rocket, and the rebound of a hammer from a struck nail are particular examples of motion due to reaction forces.

- Further Reading

{dtype} **Light-Year{dtype}**:

A light-year is the distance light traverses in a vacuum in one year at the speed of 299,792 km/ sec. With 31,557,600 seconds in a year, the light-year equals a distance of 9.46 X 1 trillion km (5.87 X 1 trillion). One Parsec, the distance at which the Semimajor Axis of the Earth's orbit (1 Astronomical Unit) subtends one arc second, is equal to 3.26 light-years. Astronomers commonly use the parsec and the light-year to measure astronomical distances. Alpha Centauri, the nearest star to the Sun, has a Parallax of 0.76 Arc Second, equivalent to a distance of 1.3 Parsecs, or 4.3 light-years.

{dtype}**Magnitude{dtype}**:

Magnitude is a measure of the brightness of a celestial body. The brightest stars are assigned magnitude 1 and those increasingly fainter from 2 down to magnitude 5. The faintest star that can be seen without a telescope is about magnitude 6. The English astronomer Norman Robert Pogson established (1850) that each magnitude step would correspond to a ratio of 2.5 in brightness. Thus a star of magnitude 1 is 2.5 times brighter than a star of magnitude 2, 2.5 to the power of 2 times brighter than a star of magnitude 3, and 2.5 to the power of 5, or 100 times brighter than a star of magnitude 6.

The brightness of a celestial object as seen in the sky is expressed as its apparent magnitude. The brightest star, Sirius, has an apparent magnitude of -1.6, the full moon is -12.7, and the Sun's brightness, expressed on a magnitude scale, is -26.78. The zero point of the apparent magnitude scale is arbitrary; it depends on the magnitudes given in Ptolemy's catalogue. The term absolute magnitude is used to define the intrinsic brightness of a star. This is the magnitude a star would have if it were placed at a distance of 10 parsecs, or 32.6 light-years. If d is the distance in parsecs, m the apparent magnitude, and M the absolute magnitude, then M = (m 5)-5 log d. The Sun has an absolute magnitude of 4.79; at a distance of 10 parsecs it would just be visible on Earth on a clear moonless night away from surface light. A star of absolute magnitude zero is 82.4 times as bright as the Sun. The brightest stars have absolute magnitudes around -7 or -8; the faintest have absolute magnitudes greater than 15, which means that they are more than 10,000 times fainter than the Sun.

{dtype} **Mass{dtype}**:

Every physical body has an inherent property called its mass. Mass may most simply be considered as the amount of substance in a body.

{dtype} **Neutron Star{dtype}**:

A neutron star is an extremely small, high-density star composed of tightly packed neutrons. Neutron stars are believed to have a solid crust, perhaps consisting of crystalline iron. Inside this crust there is probably a neutron-rich solid shell, and still deeper inside there is probably a superfluid material. The sudden slight changes that neutron stars show in their rotation period are thought to be caused by small, sudden changes in the star's structure.

- Stars

{dtype} **Observatory{dtype}**:

An astronomical observatory is a scientific institution specially equipped for making observations of celestial objects. Among its most important instruments are the Telescope, the Photometer, the Spectrograph, and the photographic plate. The classic picture of an astronomical observatory as one or more large, white-domed buildings atop a remote mountain peak is at best in-complete. Astronomical observations are also made at radio observatories, which are seldom located on mountain tops.

- Further Reading

{dtype} **Parabola{dtype}**:

A parabola is a special type of plane curve. It may be defined in a number of ways. A parabola is formed by a plane that intersects a right circular cone and is parallel to one of its elements; that is, it is a Conic Section. A parabola may also be defined as the focus of points that are equidistant from a fixed point (the focus) and a fixed line (the directrix).

{dtype} **Parallax{dtype}**:

Parallax is the difference in the apparent position of an object against a background when viewed by an observer from two different locations. These positions and the actual position of the object form a triangle from which the apex angle (the parallax) and the distance of the object can be determined if the length of the baseline between the observing positions is known and the angular direction of the object from each position at the ends of the baseline has been measured. The traditional method in astronomy of determining the distance to a celestial object is to measure its parallax.

{dtype} **Parsec{dtype}**:

The parsec (pc), a unit used in astronomy, is the distance at which a stars Parallax (apparent shift as measured from opposite points on a base line equivalent to the radius of the Earth's orbit) is 1 second of arc. The parsec equals 3.26 light-years; 206,265 astronomical units; 3.086 X (10 to the power of 13) kilometres; or 1.917 X (10 to the power of 13) miles. If parallax is given in seconds, the reciprocal is distance in parsecs.

{dtype} **Photometer{dtype}**:

The photometer is an optical-electronic instrument that measures the intensity of a beam of light. A photometer transforms a beam of photons into an electric current, measures this current, and conveys the information to the user by means of a meter or digital readout.

{dtype} **Planet{dtype}**:

The Earth is a planet and the main difference between planets, including the Earth, and stars is that stars shine with their own light, generated in their interiors by fusion of the elements whereas planets shine by reflected light from the star around which they orbit. Astronomers have tried very hard to find planets around other stars. The evidence so far for planets at all like the Earth is not very convincing, although astronomers think that it is very likely that many stars do have planetary systems.

- Planetary
- Planetary Conjunctions 1996-2000
- Further Reading

{dtype} **Ptolemaic System{dtype}**:

This was a world system which, unlike the Copernican System, placed the Earth immobile at the centre of the Universe, as the centre for the planetary motions. The Ptolemaic system, which dates from antiquity and which was formed by Aristotle, before Ptolemy's quantitative formulation, in the fourth century B.C., can be schematically described as follows: Earth (said to be immobile at the centre of the universe), the Moon, Mercury, Venus, Sol (the Sun), Mars, Jupiter, Saturn. The planetary spheres were enclosed by the heaven of the fixed stars which rotated due to the impulse which it received from the primum mobile (the ninth heaven, which moved extremely quickly and was devoid of stars), with the aid of God.

{dtype} **Perturbation{dtype}**

A temporary gravitational disturbance in an other-wise uniform motion of a planet or other body. For example, the motion of a comet suffers perturbations if it passes to close to a planet whilst orbiting the Sun.

{dtype} **Precession{dtype}**:

Precession is the motion of the end of the axis of a spinning object, if it is free to move, so that the axis traces out the surface of a cone. The torque on a spinning top due to gravity, for example, produces a change in the top's Angular Momentum, which previously had been only along the axis; the additional angular momentum adds to the original in such a way that the free end of the top moves slowly in a horizontal circle rather than falling down.

{dtype} **Proper Motion{dtype}**

The apparent motion of a star across the celestial sphere, measured as the angular shift in position per year, caused by the combination of the star's true motion through space and the relative motion of the solar system.

{dtype} **Protostar{dtype}**:

A star in the first stages of evolution before the onset of interior nuclear reactions.   As a protostar slowly contracts, its pressure and temperature increase, the temperature rise being the result of the release of gravitational energy. The protostar eventually becomes hot enough to shine, although temperatures are not yet great enough to sustain nuclear reactions. The pressure builds up enough almost to balance gravity, but the radiation emitted drains energy and inhibits the ability of the internal pressure to complete the balance. Therefore the contraction and heating slowly continue. The temperature at the centre of the protostar finally becomes high enough to initiate nuclear reactions and the subsequent release of nuclear energy.

Stars

{dtype} **Radio Astronomy{dtype}**:

Radio astronomy is the study of the universe through observations of the radio waves emitted by cosmic objects. Everything in the universe radiates radio waves, and modern radio telescopes are capable of detecting these waves from almost all known objects.

- Getting started in amateur radio astronomy
- Further Reading

{dtype} **Red Dwarf{dtype}**:

A small star, of the order of 100 times the mass of the planet Jupiter.

- Stars

{dtype} **Relativity{dtype}**:

Albert Einstein's theory of relativity has caused major revolutions in physics and astronomy during the 20th century. The theory of relativity is a single, all-encompassing theory of space-time, Gravitation, and mechanics. It is popularly viewed, however, as having two separate, independent theoretical parts--special relativity and general relativity. General relativity was not published in its final form until 1916. Another reason is the very different realms of applicability of the two parts of the theory: special relativity in the world of microscopic physics, general relativity in the world of Astrophysics and Cosmology.

- Relativity
- Further Reading

{dtype} **Right Ascension{dtype}**: (RA)

the angular distance of a celestial object measured in hours, minutes, and seconds along the Celestial Equator eastward from the Vernal Equinox.

{dtype} **Saturn{dtype}**: (the planet)

The planet Saturn orbits the Sun at a mean distance of 1.427 billion km (0.893 billion mi) with a period of 29.4577 tropical years. The orbit is inclined 2.49 degrees to the Ecliptic, or Earth-orbital, plane and has an Eccentricity of 0.0556. At Saturn's distance from the Sun, it receives only 0.01 of the unit solar radiation flux that the Earth does. Among planets in the solar system, Saturn is second in size only to Jupiter; Saturn has an equatorial diameter of 120,660 km (74,980 mi). Its volume would enclose about 769 Earth-sized bodies. Saturn's internal rotation period, defined by periodic radio emissions, is 10.657 hours. This fast rotation is responsible for Saturn's equatorial bulge and oblate shape.

- Saturn's Rings
- Saturm's Saterllites

- Planetary
- Planetary Conjunctions 1996-2000
- The Planet Saturn
- Further Reading

{dtype} **Saturn's Rings{dtype}**:

Saturn's rings were first seen by Galileo but were identified as a ring system by Huygens in 1656. For many years Saturn was thought to be unique in having a ring system but we know now that all the major gaseous-planets have ring systems although none is so prominent as that of Saturn. The rings are divided up into several distinct rings with gaps between them. The largest gap was discovered by Cassini in 1675 but we now know that there is a very complex structure to the ring system. The rings are composed of many, many small particles up to about 10 metres across. These are thought to have originated in a satellite which collided with a minor planet and/or that they are made of matter which was present when the planets were formed. Saturn's rings are very reflective and could be composed of ices such as make up comets.

{dtype} **Saturn's Satellites{dtype}**:

Saturn has 8 satellites with diameters greater than 200 kms. Of these Titan is, by far, the largest; with a diameter of 5,150 km it is the second largest satellite in the solar system. It is probably the only satellite which has an atmosphere; this atmosphere is denser than the Earth's but is composed almost entirely of methane. Mimas has a diameter of 390 km. Its surface is very cratered and the Voyager pictures show one giant crater with a diameter almost equal to one third of that of the satellite. Enceladus has a diameter of 500 km. It shows cratering and also complex geological structures indicating large crustal movements.

Tethys has a diameter of 1,050 km. It appears to be made of ice and is heavily cratered. There is a huge trench-like structure extending a quarter of the way around the satellite which is 100 km wide and 4 to 5 km deep. Dione is 1,120 km in diameter. It shows many craters and large plains. Rhea has a diameter of 1,530 km and is heavily cratered. There are several small satellites some of which are believed to be responsible for `shepherding' some of the features seen in the structure of the rings.

Planetary Satellites

{dtype} **Schmidt Telescope{dtype}**:

Rated the most important advance in optics in 200 years, the Schmidt telescope combines the best features of the refractor and reflector for photographic purposes. It was invented in 1930 by Bernhard Voldemar Schmidt (1879-1935), an Estonian optician at the Bergedorf Observatory.

- Telescopes

{dtype} **Solar System{dtype}**:

The solar system consists of an average star we call the Sun, the planets Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. It includes the satellites of the planets, numerous Comets, Asteroids, Meteoroids, and the Interplanetary Medium. The sun is the richest source of electromagnetic energy (mostly in the form of heat and light) in the solar system. The Sun's nearest known stellar neighbour is a red dwarf star called Proxima Centauri, at a distance of 4.3 light years away (a light year is the distance light travels in a year, at the rate of 300,000 km per second). The whole solar system, together with the local stars visible on a clear night, orbits the centre of our home galaxy, a spiral disk of 200 billion stars we call the Milky Way. The Milky Way has two small galaxies orbiting it nearby, which are visible from the southern hemisphere. They are called the Large and Small Magellanic Clouds. Our galaxy, one of billions of galaxies known, is travelling through Intergalactic space. The planets, most of the satellites of the planets, and the asteroids revolve around the sun in the same direction, in nearly circular orbits. The sun and planets rotate on their axes. All the planets orbit the sun in or near the same plane, called the Ecliptic. Pluto is a special case in that its orbit is the most highly inclined (18 degrees) and the most highly elliptical of all the planets. Because of this, for part of its orbit, Pluto is closer to the sun than is Neptune.

- Solar System Extrema
- Our Solar System
- Further Reading

{dtype} **Spectrograph{dtype}**

An instrument for obtaining a permanent record of a Spectrum

- Spectroscopy

{dtype} **Spectroscope{dtype}**

An instrument for observing a Spectrum visually. The term is sometimes used as an alternative to Spectrograph.

{dtype} **Spectroscopy{dtype}**:

The study and interpretation of Spectra. Different materials absorb or emit Electromagnetic Radiation to varying extents, depending on their electronic structure. Therefore, studies of the electromagnetic spectrum of a material yield scientific information. Such studies are collectively known as spectroscopy (Spectroscope). They are used for research and analysis in many fields, including chemistry, physics, astronomy, biology, and medicine.

{dtype} **Spectrum{dtype}**:

A spectrum, in general, is the dispersion or display of light, radiation, or energy into its components. White light is a continuous spectrum; all wavelengths (or frequencies) of visible light are present. The separation of white light is effected by a prism or Diffraction Grating to create a spectrum of colours; the rainbow is a natural example of this spectrum. Some spectra comprise only a few wavelengths, whereas others contain all except a handful that are conspicuously absent. As recorded on spectrograph film, the former appear as bright lines on a dark background and the latter as dark lines on a Continuous Spectrum.

{dtype} **Semimajor Axis{dtype}**:

The semimajor axis of an ellipse (e.g. a planetary orbit) is 1/2 the length of the major axis which is a segment of a line passing through the foci of the ellipse with endpoints on the ellipse itself. The semimajor axis of a planetary orbit is also the average distance from the planet to its primary. The Perihelion Periapsis and Aphelion Apoapsis distances can be calculated from the semimajor axis and the Eccentricity by rp = a(1-e) and ra = a(1e).

{dtype} **Stellar Nomenclature{dtype}**:

The most convenient way of naming stars was introduced in 1603 by Johann Bayer and called Bayer letters. The system introduced letters of the Greek alphabet such as: alpha (a), beta (b), gamma (g), delta (d), epsilon (e), zeta (z) etc to the brightest stars in the constellation. The Greek letter followed by the genitive of the Latin name of the constellation. After the Greek letters have been assigned, lower-case Roman letters a-b-c-d etc and then upper-case are used. The astronomer royal John Flamsteed numbered the stars in a constellation in order of Right Ascension. Modern catalogues now ignore the constellation and number stars by right ascension.

{dtype} **Telescope{dtype}**:

An optical astronomical telescope is an instrument that is used to collect light from a celestial object, to bring the light to focus and produce an image, and to magnify that image. The two main types of telescopes are refractors, which use lenses, and reflectors, which use mirrors. The main lens or mirror that focuses the light is called the objective. Both telescopes have an eyepiece, or combination of small lenses, to magnify the image formed by the objective. In addition, the reflector telescope uses a small secondary mirror to reflect the light from the main, or primary, mirror to a convenient position for placement of the eyepiece or of auxiliary equipment, such as a photometer or spectrograph. In general, refractor telescopes are used for lunar and planetary studies, as well as for astrometric work involving precision measurements of Double Stars and stellar Proper Motions. Reflector telescopes are preferred for extragalactic studies, photography of faint objects, photometry, and spectrographic work.

- Telescopes
- Further Reading

{dtype} **Terrestrial Planets{dtype}**:

(the planets closest to the Sun (Mercury, Venus, the Earth and Mars)) are termed Terrestrial Planets, similar in that they all have solid surfaces. They all have metallic cores and silicate mantles with a crust near their surfaces. All show signs of having been bombarded by large bodies during their early existence although those planets with atmospheres show weathering of these early features. The Earth shows the most weathering with very little early cratering remaining. The larger, and more massive, of the group have atmospheres but these are very different from the Earth's. Active volcanoes have been seen with radar echoes on Venus and huge extinct ones were discovered on Mars by the Mariner 9 probe in 1971. Our knowledge of the surfaces of all the planets rests almost entirely on the results from space probes.

- Planetary
- Planetary Conjunctions 1996-2000

{dtype} **Vernal Equinox{dtype}**:

Equinox

{dtype} **White Dwarf{dtype}**:

White dwarfs are Stars that are nearing the end of their lives, having exhausted the hydrogen and helium in their interiors by nuclear reactions. They are thought to be the final evolutionary stage for stars whose masses are less than 1.4 times the solar mass. Their future is to cool down very slowly until they become Black Dwarfs, unable to radiate any more energy. Several hundred white-dwarf stars are known. They have radii about one-hundredth the solar radius, their absolute visual magnitudes are mostly in the range 10 to 14, their surface temperatures range from 4,000 to 25,000 K, and their mean densities are high--approximately a million times that of water.

- Bright White Dwarfs
- Stars

{dtype} **Zenith{dtype}**:

The point on the Celestial Sphere directly above the observer.

{dtype} **Zodiac{dtype}**:

The zodiac is the portion of the Celestial Sphere that lies within 8 deg on either side of the Ecliptic. The apparent paths of the Sun, the Moon, and the principal planets, with the exception of some portions of the path of Pluto, lie within this band. Twelve divisions, or signs, each 30 deg in width, comprise the zodiac. These signs coincided with the zodiacal constellations about 2,000 years ago. Because of the Precession of the Earth's axis, the Vernal Equinox has moved westward by about 30 deg since that time; the signs have moved with it and thus no longer coincide with the constellations.

WDA Help Contents

General & Order Information

Ways to Find Information

To find information in the WDA, you can use the following techniques:

- **Choose words from the index.**
- **Perform full-text searches for text.**

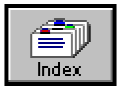
Using the index button, 

you can search on any word or words in the topics. The Search feature not only takes you to the topic found, but highlights the word or words found by the search. You can use search operators such as AND, OR, NOT, THRU, and NEAR to further narrow your search.

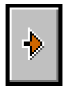
See Also
Finding Information Using the Index
Using Full-Text Search

Using the Next browse feature.

If you would like to browse through the dictionary a word at a time:

1. Select the **Index** 

button and choose a word. This can be any word, depending on where in the dictionary you would like to start browsing.

2. From here , just click on the **Next**  button to select the next word in the browse sequence.

NOTE: The Next button is only enabled after a word is selected from the index or Search buttons.

See Also
Browsing Through the Search Results
Using Search Operators

Using Full-Text Search

To search for topics that contain a certain word or phrase:

1 Choose the **Search button** in the WDA window.

2 In the Search by Word box, type a **search query** telling the program what text you are searching for. To enter a search query that you've searched on previously, select the search query from the drop-down list box.

3 Under Search In, select All Topics, Current Topic Only, or List of Previous Topics Found. To search only the **topic titles**, choose the **Options button** and select this option, then choose the OK button.

4 Choose OK.
The program lists the title of each topic containing a **search hit** in the **Search Results** dialog box.

See Also
Browsing Through the Search Results
Using Search Operators

Browsing Through the Search Results

When you choose the OK button to search for information, The program lists the **topics** that contain **search hits** in the **Search Results** dialog box.

To view a topic in the list:
Double-click the title. Use the scroll bar to see titles not visible in the list.
or
Use the Search Results buttons to move through topics.

To view	**Do this**
Selected topic	Choose the **Go To button** or double-click the topic.
Search dialog box	Choose the **To Search button**
Next search hit in the current topic	Choose the **Next Match button**
Previous search hit in the current topic	Choose the **Previous Match button**

When you view a topic with search hits, the program highlights the search hits in that topic. If you minimize the Search Results window, highlighting turns off until you maximize the Search Results window again.

To close the Search Results window:

Choose the Cancel button in the Search Results window. For your convenience, the Search Results window always appears on top of the WDA window. You can resize it, move it, or you can minimize it to an icon and then restore it later when you need it.

See Also

Using Full-Text Search
Using Search Operators

Using Search Operators

When you use the **Search button** to search for information, you can use the search operators AND, OR, NOT, and NEAR to narrow your search. Each operator is described below. You can enter an operator in either lowercase or uppercase letters ("and" is interpreted the same as "AND").

AND

The AND operator selects topics containing all phrases connected by AND operators. If a phrase does not appear in quotes, any space between words in the phrase is assumed to represent an implicit AND.

For example: Bees love Honey. This phrase finds any topic containing the three words "Bees," "love," and "Honey." This is the same as specifying Bees AND love AND Honey. However, when quotes are used, the program searches for the entire phrase.

For example:

"Bees love Honey"

This phrase finds any topic containing the phrase "Bees love Honey."

OR

The OR operator selects topics containing either phrase connected by OR operators.

For example: Bees OR Honey

This query displays topics containing either the word "Bees" or the word "Honey."

NOT

The NOT operator selects any topic that does contain the phrase preceding NOT, but doesn't contain the phrase following NOT.

For example: Bees NOT Honey. This query finds topics containing the word "Bees" but not the word "Honey."

NEAR

The NEAR operator selects any topic in which one phrase appears within a certain number of words of the second phrase. The default value is 8 words. For example:

Bees NEAR Honey

This query finds any topic in which the word "Bees" appears within 8 words before or after the word "Honey."

To change the default value, choose the **Options button** in the Search dialog box and enter a new number in the NEAR Means Within box. Words that are next to each other are within one word of each other.

Tip: You can choose the **Hints button** in the Search dialog box for a quick reminder on how to use search operators.

See Also

Using Full-Text Search

Finding Information Using the Index

Using the Index is like using the index of a book. You can browse through a list of keywords, and then jump to a topic by selecting a word from the index.

To look up a topic using the index:

1 Choose the **Index button** in the WDA window.
2 Type the word you want to search for or select the word from the Index list. You can press a key on your keyboard to move quickly to different parts of the list.

For example,

type "S" to move to words beginning with the letter "S" and then type "O" to see words beginning with "So."
3 Choose OK.

If only one topic is linked to the word, the program jumps to that topic. If there is more than one topic linked to the word, the program displays the topics in the **Topics Indexed** dialog box. To return to the Index, choose the **To Index button**.

4 Double-click the topic you want to view, or select the topic and choose the **Go To button**.

See Also
Using Full-Text Search

Printing and Copying Information

You may want to use information from the dictionary in other applications, such as word processors. The WDA lets you copy text onto the Windows Clipboard. From the Clipboard, you can paste the text into any Windows application. You can also print out topics, and change printers from within the dictionary.

See Also
Printing Topics
Copying Topic Text

Changing Printers and Printer Options

The dictionary prints **topics** on the default printer. If you have installed more than one printer in Windows, you can make any of your installed printers the default printer. You can also change the default printer options.

To change printers:

1 From the File menu, choose Print Setup.
2 Select Specific Printer.
3 Select the printer that you want to change to, from the drop down list box. If this file is not in the list box, switch to the Control Panel, select Printers, and activate the printer you want to use. Then switch back to the dictionary.
4 Choose OK to close the Print Setup dialog box.

To change printer options:

1 From the File menu, choose Print Setup.
2 Choose the Options button to change the default printer options. The options available depend on the type of printer you have selected.
3 Choose the options you want, and then choose OK.
4 Choose the OK button to close the Print Setup dialog box.

To change printer orientation, paper size, or source:

1 From the File menu, choose Print Setup.
2 Select Portrait or Landscape for the orientation.
3 Select the paper size you want from the drop down list box.
4 Select the paper source you want from the drop down list box.
5 Choose OK to close the Print Setup dialog box.

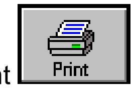
For more information on setting up printers, see your Windows documentation.

See Also
Printing Topics

Printing Topics

To print an entire WDA topic:

1 Display the topic.

2 From the File menu, choose Print or select the Print 

button

To print part of a WDA topic:

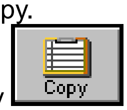
1 Display the topic.
2 From the Edit menu, choose Copy.,
3 In the Copy dialog box, select the text you want to print, and then choose the Copy button.
4 Paste the text into a word processing application.
5 Use the Print command on the application's File menu to print the text.

See Also
Copying Topic Text

Copying Topic Text

To copy WDA text to the Clipboard:

1 Display the topic that contains the text you want to copy.

2 From the Edit menu, choose Copy, or select the Copy  to Clipboard button.

3 Select the text you want to copy in the Copy dialog box.
4 Choose the Copy button.

To paste the Clipboard contents into another document, use the Paste command from the application's Edit menu.

Selecting a function from the Menu

Most functions contained in the dictionary can be accessed via menus, although we strongly suggest that you use the mouse if you have one.

To access menus

1. Press the **ALT** key to select menus.
2. Use the left and right **arrow** keys to move from one menu to another.
3. Press Enter to select a function.
4. You can also select a function is by using the Alt key and the first letter of your menu choice.

Preface

Astronomy is a science with a language all of its own. Its vocabulary has a heritage accumulated over many centuries but at the same time continues to move forward with new discoveries together with new words, terms and acronyms and at times, it has been hard to keep up. However, we are confident that the Windows Dictionary of Astronomy is the most complete and up-to-date astronomical dictionary on the market to date. We aim to update the dictionary on a regular basis and registered users of the program can upgrade at very low cost to make sure they have the most up-to-date astronomical reference at hand, avoiding the expense of having to purchase a new dictionary each year as new words and phrases appear. The dictionary should prove very useful to amateurs and professionals engaged in the study of astronomy.

Cross-referencing

Certain words used in the text have their own entries and are high-lighted in Blue. Clicking on the word in question with the mouse pointer displays a window containing the meaning of the highlighted word allowing for very quick cross-referencing. This is one of the many advantages of a computerised dictionary over paper-based alternatives. Not all possible cross-references are highlighted in this way; to do so in many cases would result in a text that is almost unreadable. Instead we have indicated cross-references only where we consider that they are needed. Users encountering an unfamiliar term may well find that the term has its own entry.

Units of measurement

Metric units have been used for physical quantities and imperial equivalents (rounded off) are also given. See Below: Units of Measure, for a list of selected units and conversion factors.

UNITS OF MEASURE

Units, constants and conversion factors.

angstrom (A)	0.1 nanometre
astronomical unit (AU)	1.459 787 0 x 10 kilometres
centimetre (cm)	0.3937 inches
electron volt (eV)	1.60022 x 10-19 joules
foot (ft)	30.48 centimetres
inch (in)	2.54 centimetres
kilogram (kg)	2.2046 pounds
kilometre (km)	0.6214 miles
light year (l.y.)	9.4605 x 10 kilometres = 0.306 60 parsecs
micron (um)	1 micrometre = 10 metres
mile (mi)	1.6093 kilometres
nanometre (nm)	10-9 metres
parsec (ps)	3.0857 x 10 kilometres = 3.261 61 light years
radian	57.295 78
solar mass	1.9891 x 10 kilograms
solar radius	6.960 x 10 kilometres
speed of light	299,792.458 kilometres per second
tonne	1,000 kilograms

These conversion factors are approximations.

Order of alphabetical entries

The order takes no account of word breaks or hyphens, it uses the letter-by-letter system. This system seems to result in the least confusion. However, there are a number of examples where we have sacrificed absolute consistency in an attempt to predict where users are most likely to look first.

Tables

There are some kinds of information that are best displayed in tabular form rather then scattered about between individual entries. Indeed, The Windows Dictionary of Astronomy would not be complete without tables. Data tables are given for the Planets, Satellites, Asteroids, Comets, Constellations, Brightest stars and lots more. Cross-references to these tables appear at the end of certain entries and are highlighted in Red. Clicking on the word or words following the table icon: will display the associated table in the table viewer window.

About Pulsar Publishing

Pulsar Publishing is a company dedicated to designing and producing quality education and reference products for all those interested in the fascinating science of astronomy. Our first such product, The Windows Dictionary of Astronomy (WDA) is a comprehensive computerised astronomical dictionary. We hope you enjoy using the program, don't forget to keep a look out in the future for more great titles from Pulsar.

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WDA Quick Start

Getting Started

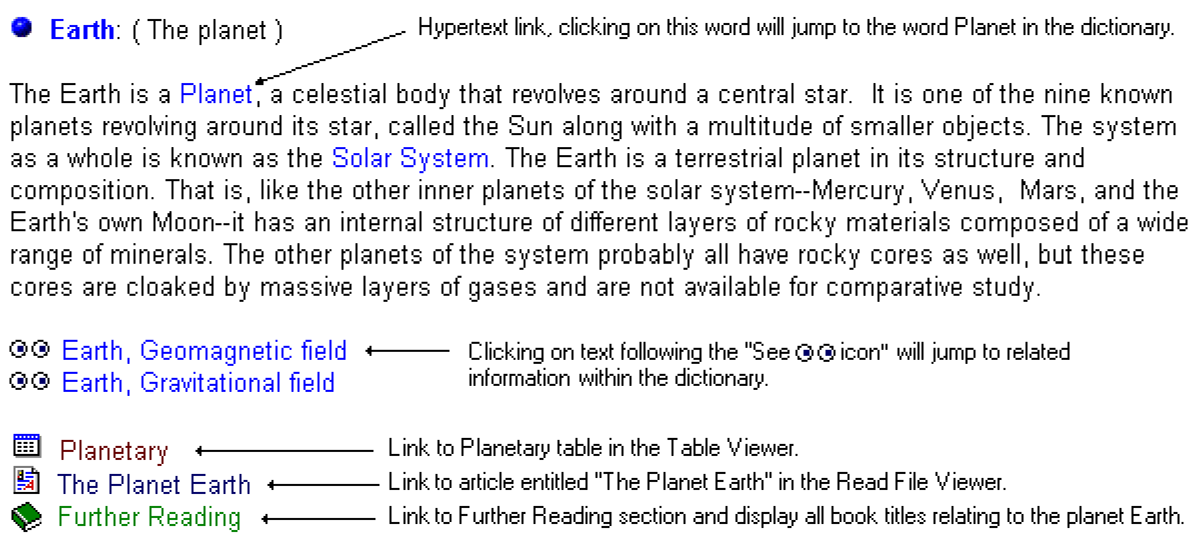
There are many features in the WDA and at first sight you might be wondering just where to start. The following is a guide to getting you started quickly with the minimum of fuss.

The WDA is split into three sections:

1) The Dictionary Section.
2) The Table Viewer Section.
3) The Read File Viewer and Further Reading Section.

All sections work closely together.

The following is an example taken from the dictionary and demonstrates the main features within the dictionary section.



As we can see from the example above, all coloured text's are links to information related to the highlighted term, whether its a table, article, or a selection for further reading.

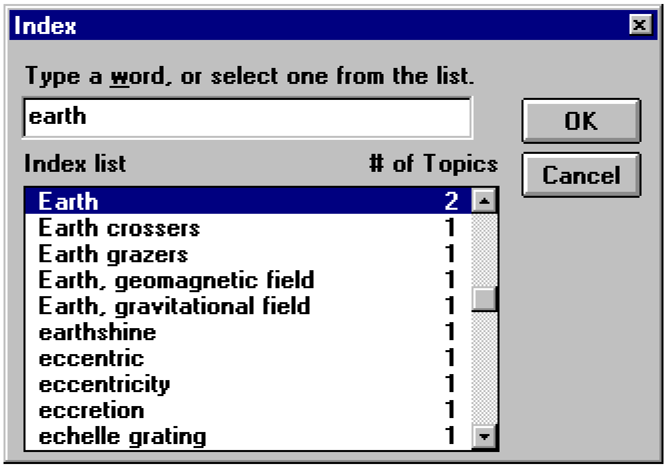
Please Note: The WDA makes extensive use of the go back button When following links, use this button to return to to your original selection.

Ok I got that, so how do we search for a term?

The quickest and easiest way to find a term in the dictionary is to use the **Index** or **search** features from the main button bar.

To make a selection using the Index function

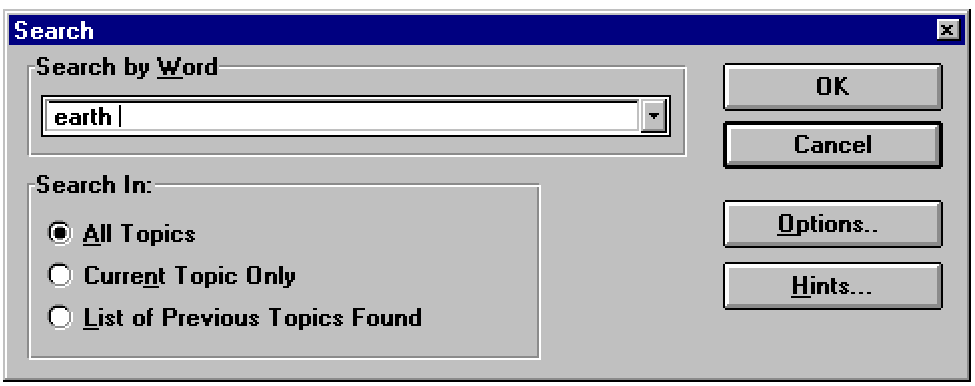
Click on the Index Icon from the main button bar, the Index dialog box will appear.



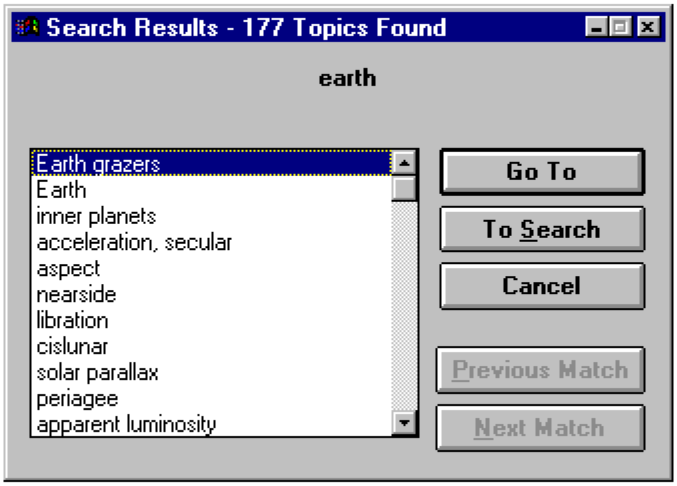
From here it is as simple as typing in a word or part of a word and your desired term should appear at the top of the list. Select your term and click on the **ok** button to display the term in the main window.

To make a selection using the Search function

Click on the Search Icon from the main button bar, the Search dialog box will appear. Type in your word and click on OK.



The Search Results box will appear with a list of all terms containing the word "**Earth**"



As you can see here, the word "**Earth**" is near the top of the list.   Select **Earth** and click on the **Go-To** button to display the term in the main window.

Note: The WDA search feature is very powerful, for a more extensive guide to using this, and all other functions select the help icon from the main menu.

About the WDA

Pulsar Publishing is a company dedicated to designing and producing quality education and reference products for all those interested in the fascinating science of astronomy. Our first such product, **The Windows Dictionary of Astronomy** (WDA) is a comprehensive computerised astronomical dictionary. This user-friendly software package incorporates some 2000 terms together with associated terms incorporating direct hypertext links to related Educational Articles and Further Reading, providing a deeper understanding of astronomy. The WDA should prove of value to those studying astronomy at school, college, university and to amateur and armchair astronomers and will also be a useful general reference for professionals. Keep a look out in the near future for more great titles from Pulsar.

Discounts For Educational Establishments.

Pulsar Publishing is offering special discounts to educational establishments,
i.e. Schools, Colleges and Universities wishing to use the WDA.

For example:

Two copies WDA with up to 10 user license = £99 ($150) inclusive.

Two copies WDA with 11 to 20 user license = £160 ($240) inclusive.

For more information regarding educational discounts contact: **James Webb**

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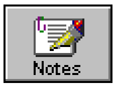
Appending Notes to Topics

The WDA allows you to append your own notes to Terms and Articles.

To append notes

1) Display the term or article of your choice.

2) Click on the **notes** 

icon on the WDA main icon bar.

The annotate dialogue box appears.

3) Type in your notes and click on **Save**. A small green paper clip  appears at the top left of your displayed topic reminding you that there are notes appended to the topic..

To access your notes in the future simply click on the green paper clip and the annotate dialogue box will appear. From here you can Add to, Edit, Copy to clipboard or Delete your notes.

About this demo

The demonstration version of the Windows Dictionary of Astronomy has been created to give all those interested an idea of what to expect from the full version. There are approximately **100 terms** included in this demonstration together with associated links. We have also enabled two tables and two read files for demonstration purposes. The full version carries some **2000 terms** with full access to all Tables, Educational Articles and Further Reading.

How to purchase the full version

Purchasing the full version of the WDA.

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