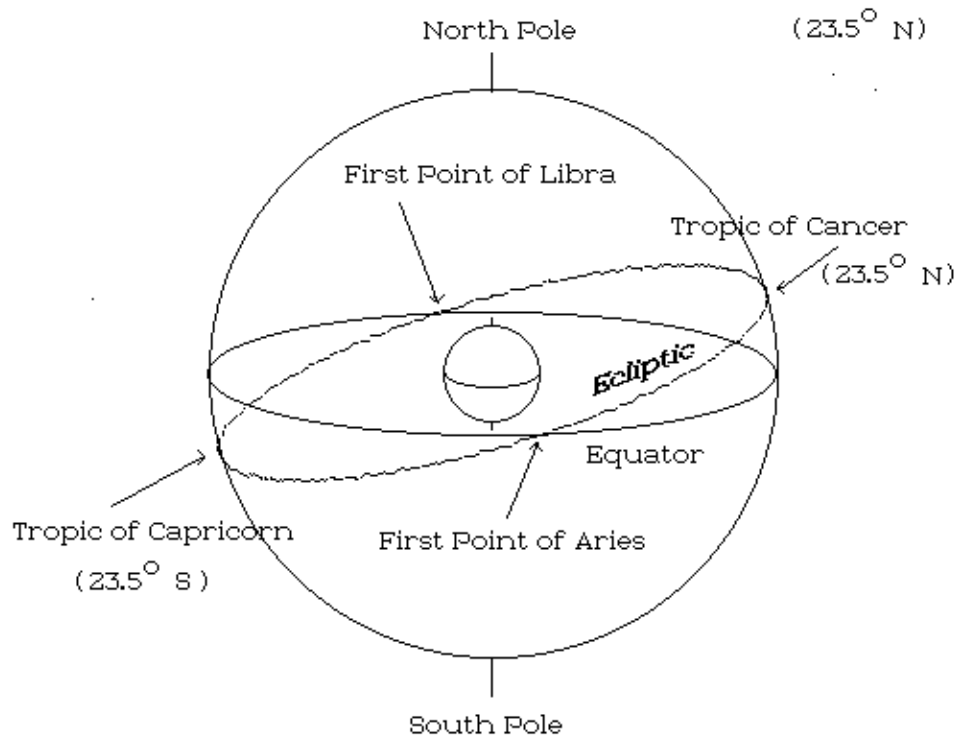


ASTRONOMICAL GLOSSARY



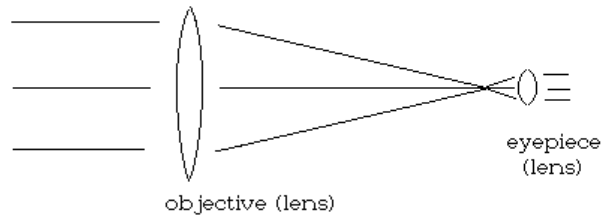
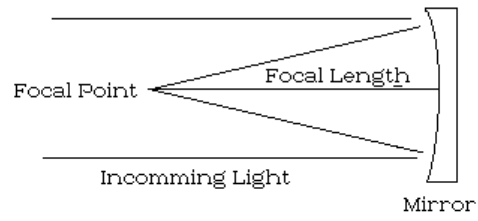
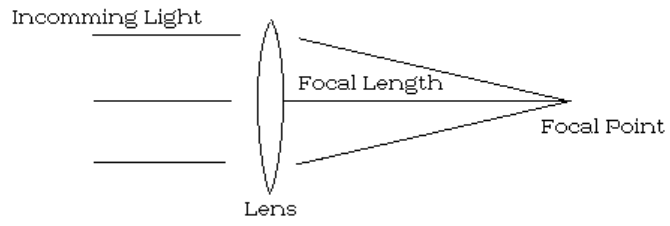
THE CELESTIAL SPHERE, STARS AND CONSTELLATIONS

| | |
|--------------------------|---|
| altitude | The elevation of an object above the horizon in degrees (0 = on the horizon, 90 = zenith). |
| asterism | A group of stars which appear to form a pattern; e.g., the Big Dipper, the Pleiades. |
| azimuth | The degrees around the horizon (north = 0, east = 90, south = 180, west = 270). |
| celestial equator | An imaginary line which divides the celestial into two hemispheres. The celestial equator is always directly above the terrestrial equator. |

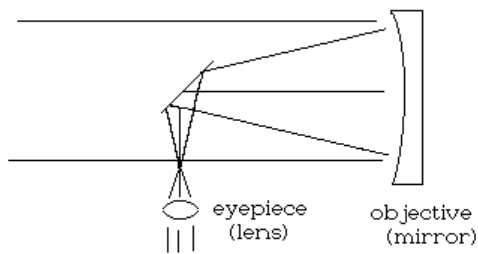
| | |
|-----------------------------|--|
| celestial poles | The celestial poles are directly above the terrestrial poles |
| celestial sphere | An imaginary sphere which appears to encompass the earth and form the dome of the sky. Embedded in the celestial sphere are the "fixed" stars; the "wandering stars", i.e., the planets, appear to follow fixed paths around the celestial sphere. |
| circumpolar | Constellations near the poles which never set (for Southern California, Ursa Minor, Cassiopeia and Cephus, plus large parts of Ursa Major and Draco). |
| constellations | The patterns the "fixed" stars appear to make. Astronomers recognize 88 official constellations which are defined by areas marked off by boundaries on the celestial sphere. |
| declination | Corresponds to latitude on the terrestrial sphere. Marked off in degrees (-90 to 90). |
| ecliptic | The path the sun appears to follow around the celestial sphere. The moon and the naked eye planets are always close to the ecliptic. |
| First Point of Aries | The intersection of the ecliptic and the equator which the sun reaches on March 21 (the Vernal Equinox). |
| First Point of Libra | The intersection of the ecliptic and the equator which the sun reaches about September 22 (the Autumnal Equinox). |
| meridian | The line which splits the sky in half, running through the pole and the zenith. |
| right ascension | Corresponds to longitude on the terrestrial sphere. Marked off in hours (0:00 to 23:59). |
| sidereal time | Time specified by the movement of the celestial sphere. The sidereal time is by definition the line of right ascension currently on the meridian. |

| | |
|-----------------------------|---|
| solar time | Time reckoned by the position of the sun (noon = sun on the meridian). |
| The Autumnal Equinox | The time at which the sun reaches the First Point of Libra (about September 22). |
| The Summer Solstice | The time at which the sun reaches the Tropic of Cancer (about June 23). |
| The Vernal Equinox | The time at which the sun reaches the First Point of Aries (about March 21). |
| The Winter Solstice | The time at which the sun reaches the Tropic of Capricorn (December 21). |
| Tropic of Cancer | The most northerly declination reached by the sun around June 23 (the Summer Solstice). |
| Tropic of Capricorn | The most southerly declination reached by the sun near December 21 (the Winter Solstice). |
| zenith | The point on the celestial sphere directly overhead for an observer. |
| zodiacal | The set of 12 constellations through which the ecliptic passes (Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpius, Sagittarius, Capricornus, Aquarius and Pisces). |

LENSES, MIRRORS AND TELESCOPES



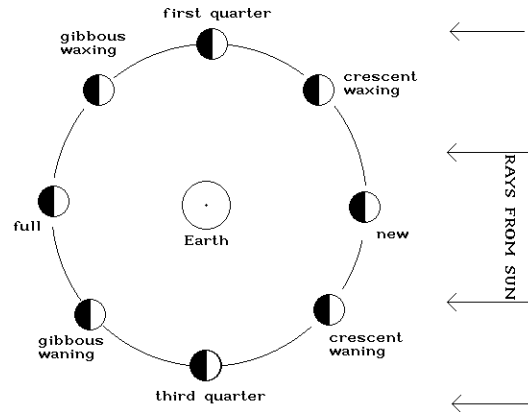
REFRACTING TELESCOPE



REFLECTING TELESCOPE

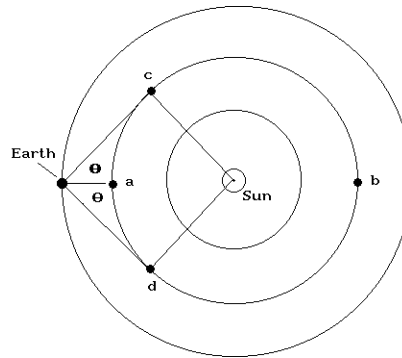
| | |
|------------------------------|--|
| Alt-Azimuth mount | A telescope mounting with up-and-down (altitude) and right-to-left (azimuth) movements. |
| aperture | The diameter of the objective. |
| catadioptric | A telescope which uses both a lens and a mirror for the objective. The best known design for a catadioptric is known as a Schmidt-Cassegrain. |
| Equatorial mount | A telescope mounting with one axis parallel to the axis of the earth. |
| eyepiece | A small lens or combination of lenses use to examine the image produced by the objective |
| field of view | How much sky (in degrees) is visible in the eyepiece. |
| focal length | The distance from a lens or the surface of a mirror to the focal point. |
| focal point | The point behind a lens (or in front of a mirror) where all parallel light rays converge. |
| focal ratio | The focal length of the lens or mirror divided by its diameter. Usually given as "f/10" meaning the focal length is 10 times the aperture. |
| light gathering power | A measure of how much brighter celestial objects look in a telescope. The larger the diameter of the objective, the greater the light gathering power. |
| magnification | A measure of how much larger objects appear in a telescope. The magnification is given by the focal length of the objective divided by the focal length of the eyepiece. |
| objective | The main optical element of a telescope. It can be either a lens or a mirror. |
| reflector | A telescope whose objective is a mirror. |
| refractor | A telescope whose objective is a lens. |
| resolution | A measure of how sharp images appear in a telescope. In general, the larger the aperture, the greater the resolution. |

PHASES OF THE MOON



| | |
|------------------------|---|
| crescent waning | rises before dawn; visible in the eastern before sunrise. |
| crescent waxing | visible in the western sky at sunset; sets before midnight. |
| first quarter | rises at noon; on the meridian at sunset; sets at midnight. |
| full moon | rises at sunset; visible all night; sets at dawn. |
| gibbous waning | rises after sunset; in eastern half of sky before midnight; sets after sunrise. |
| gibbous waxing | rises in afternoon; in the eastern half of sky at sunset; sets before dawn. |
| new moon | invisible - rises with the sun |
| terminator | the line which divides the moon into illuminated and dark areas. |
| third quarter | rises at midnight; on the meridian at dawn; sets at noon. |

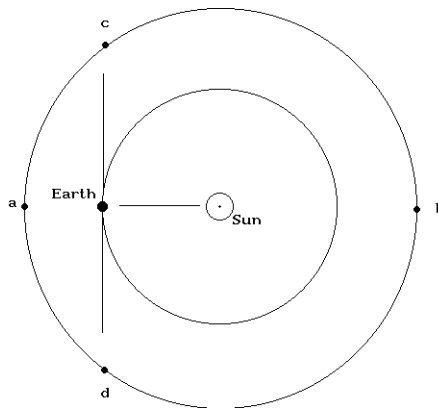
PLANETARY CONFIGURATIONS



Inferior Planet

inferior conjunction
greatest eastern elongation
greatest western elongation
superior conjunction

position (a)
 position (c)
 position (d)
 position (b)

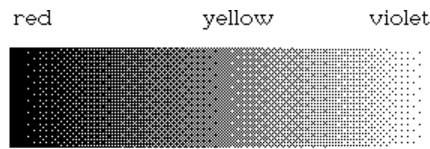


Superior Planet

aphelion
conjunction
eastern quadrature
opposition
perihelion
western quadrature

maximum distance from the sun
 position (b)
 position (c)
 position (a)
 minimum distance from the sun
 position (d)

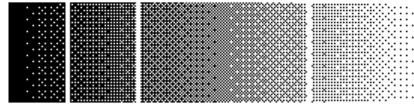
STARS AND DEEP SKY OBJECTS



Continuous Spectrum
(from hot solid, liquid or gas under high pressure)



Emission Spectrum
(from hot gas)



Absorption Spectrum
(hot solid, liquid or gas under pressure + cooler gas)

| | |
|----------------------------|--|
| absolute magnitude | The magnitude a star would have at a distance of 10 parsecs |
| absorption spectrum | A continuous spectrum with superimposed dark lines. |
| apparent magnitude | The magnitude of a star as seen from the Earth |
| binary | A double star system with the stars bound to each other by gravity. |
| color index | The magnitude of a celestial object in "blue" light (short wavelengths) minus its magnitude in "red" light (long wavelengths). Often given as B-V (blue -visual). Negative color indices indicate blue light while positive color indices indicate red light. |
| continuous spectrum | A continuous band of color from red to violet with no colors missing. |

| | |
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| deep sky objects | A term referring to any object outside the solar system |
| diffraction grating | A diffraction grating consists of a transparent medium with thousands of closely spaced lines scribed on its surface. When light passes through these slits it is separated into constituent colors by diffraction and interference. |
| diffuse nebula | A large cloud of dust and gas in which new stars form. Diffuse nebulae are usually illuminated by nearby stars and are composed mostly of hydrogen. |
| distance modulus | The absolute magnitude minus the apparent magnitude. |
| electromagnetic radiation | Arises from subatomic particles (e.g., electrons) changing energy states. The complete electromagnetic spectrum encompasses radio, microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays. These regions of the spectrum differ only by wavelength. |
| elliptical galaxy | A galaxy which is basically a ellipsoidal or globular aggregate of stars. |
| emission spectrum | Discrete lines of color with many colors missing. |
| galaxy | A large aggregate of stars and nebulae, forming the basic "building block" of the universe. Each galaxy contains upward of 100,000,000,000 stars, while the universe contains hundreds of billions of galaxies. |
| globular cluster | A tight ball of stars (from 10,000 to 1,000,000) which form a "halo" outside most galaxies |
| HR diagram | Plots the absolute magnitude of stars versus their color, temperature or spectral classification (all equivalent) |

| | |
|--|---|
| Hubble constant | the slope of the line plotted in the Hubble diagram, usually given by H. The reciprocal of H ($1/H$) is equal to "Hubble Time", the maximum possible age of the universe. |
| Hubble diagram | A graph which plots the distance to a galaxy versus its velocity of recession (determined by the "red shift" of its spectrum) |
| inverse square law | Any physical quantity (such as the strength of the gravitational field or the brightness of a luminous object) which varies inversely as the square of the distance. For example, if you double the distance between yourself and a lamp, the brightness of the lamp will decrease by a factor of 4. |
| Kirchoff's Three Laws of Spectroscopy | <ol style="list-style-type: none"> 1) A continuous spectrum is produced by a hot solid, liquid or gas under high pressure. 2) An emission spectrum is produced by a hot gas. 3) An absorption spectrum is produced by hot solid, liquid or gas under high pressure surrounded by a cooler gas. |
| light year | A unit of distance defined as the distance that light covers in one year, traveling at its vacuum velocity of 186,000 miles (or 300,000 km) per second. |
| magnitude | The brightness of a star on a descending scale; i.e., the smaller the number the brighter the star. Adjacent magnitudes differ by a factor of 2.5. |
| main sequence | The central region on the HR diagram where more than 90% of all stars fall. Roughly, for stars on the main sequence, brightness (absolute magnitude) varies directly with temperature. |
| Milky Way | The formal name of the galaxy in which we live. |

| | |
|--------------------------------|--|
| OBAFGKM | The spectral classification going from violet and 25,000K (O) to red and 2,000K (M) |
| open cluster | A loose aggregate of stars often found in the spiral arms of galaxies and they are often associated with nebulosity forming new stars. |
| parsec | A unit of distance. One parsec is equal to 3.26 light years. Technically, a parsec is defined as that distance at which a star has a parallax angle of 1 second of arc. |
| planetary nebula | A circular cloud of gas in interstellar space, sometimes resembling a faint planet. Planetary nebulae are the remains of stars of sun-like mass which have died a non-violent death. |
| prism | A triangular piece of transparent material, usually glass. Different wavelengths travel at different velocities through transparent media. Thus, light passing through a prism is separated into constituent colors. |
| red giant | A star off the main sequence which is both cool (around 2,500K) and bright (absolute magnitude around -6) |
| spectral classification | The sun and stars have absorption spectra. However, these spectra are not identical, and stars can be sorted into groups based on the appearance of their spectra. These groups are known as spectral classes. |
| spiral galaxy | A galaxy which has a spiral or "whirlpool" structure. |
| wavelength | Wavelength is the distance from crest to crest of a wave. Electromagnetic radiation ranges from radio waves many meters long to gamma rays with wave lengths on the order of fractions of a nanometer. For visible light long wavelengths (700 nm) are red, medium wavelengths (600 nm) are yellow, and short wavelengths (400 nm) are violet. |

white dwarf

A star off the main sequence which is both hot (above 10,000K) and dim (absolute around 5)

zero age main sequence

A main sequence plot which has all major classes from O to M. Any cluster of stars which has all of these classes must be very young, since the hottest stars last only a few million years.