💼 Symbols & Reference

☉ USEFUL UNITS

Earth diameter =	13,000 km
Moon diameter=	3,500 km
Mean Earth-Moon distance =	380,000 km
Mean Earth-Sun (1 AU) =	150 million km
Sun diameter =	1.4 million km
Temperature of the Sun's photosphere =	5,800 K

🌐 SKY CHART

☉	The Sun	☊	Ascending node
☽	Moon: First Quarter, Waxing	☋	Descending node
○	Moon: Full	☌	Conjunction
☾	Moon: Last Quarter, Waning	☍	Opposition
●	Moon: New	□	Quadrature
☿	Mercury	δ	Declination
♀	Venus	α	Right Ascension
⊕	Earth	☌	Double Star
♁	Earth (Alternative)	◉	Variable Star
♂	Mars	⬭	Galaxy
♃	Jupiter	⊕	Globular Cluster
♄	Saturn	○	Open Cluster
♅	Uranus	⎔	Planetary Nebula
♆	Neptune	▱	Diffuse Nebula
♇	Pluto	◌	Quasar
☄	Comet		
★	Star		

⚛ SCIENTIFIC

☉	Solar Masses	r	Radius	D / d	Distance
λ	Wavelength	T	Time regarding Orbit	c	Speed of light (300,000 km/s)
π	Parallax	M	Absolute Magnitude	pc	Parsec
²	Square	m	Apparent magnitude	K	Kelvin
³	Cube	M	Messier object, e.g. M31	α	Right Ascension
√	Square Root	M	Mass	δ	Declination
∛	Cube Root	v	Velocity	L	Luminosity
P	Period	H0	Hubble constant		

6ᴐ ACRONYMS / ABBREVIATIONS

You may find some abbreviations used on other web sites you visit. These are some of the most common.

AU	Astronomical Unit		KAO	Kuiper Airborne Observatory
BAe	British Aerospace		KSC	Kennedy Space Centre
BST	British Summer Time		NASA	National Aeronautics and Space Administration
CCD	Charge-Coupled Device		RAS	Royal Astronomical Society
ESA	European Space Agency		SCT	Schmidt-Cassegrain Telescope
GMT	Greenwich Mean Time		SETI	Search for ExtraTerrestrial Intelligence
GPS	Global Positioning System		SOHO	Solar Heliospheric Observatory
H-R	Hertzsprung-Russell Diagram		UTC	Coordinated Universal Time
HST	Hubble Space Telescope		VLA	Very Large Array
JPL	Jet Propulsion Laboratory		VLT	Very Large Telescope

- [Wikipedia](#) List of astronomy acronyms
- [Glen Petitpas](#) Dumb Or Overly Forced Astronomical Acronyms Site (or DOOFAAS)

⇅ GREEK ALPHABET

α Alpha	η Eta	ν Nu	τ Tau
β Beta	θ Theta	ξ Xi	υ Upsilon
γ Gamma	ι Iota	o Omicron	φ Phi
δ Delta	κ Kappa	π Pi	χ Chi
ε Epsilon	λ Lambda	ρ Rho	ψ Psi
ζ Zeta	μ Mu	σ Sigma	ω Omega

☆ CONSTELLATIONS

Constellation	Abbrv.	English
Andromeda	AND	Chained Lady
Antlia	ANT	Air Pump
Apus	APS	Bird of Paradise
Aquarius	AQR	Water Bearer
Aquila	AQL	Eagle
Ara	ARA	Altar
Aries	ARI	Ram
Auriga	AUR	Charioteer
Boötes	BOO	Herdsman
Caelum	CAE	Engraving Tool
Camelopardalis	CAM	Giraffe
Cancer	CNC	Crab
Canes Venatici	CVN	Hunting Dogs
Canis Major	CMA	Larger Dog
Canis Minor	CMI	Smaller Dog
Capricornus	CAP	Water Goat
Carina	CAR	Keel
Cassiopeia	CAS	Queen
Centaurus	CEN	Centaur
Cepheus	CEP	King
Cetus	CET	Whale / Sea Monster
Chamaeleon	CHA	Chameleon
Circinus	CIR	Compasses
Columba	COL	Dove
Coma Berenices	COM	Berenices Hair
Corona Australis	CRA	Southern Crown
Corona Borealis	CRB	Northern Crown
Corvus	CRV	Crow, Raven
Crater	CRT	Cup
Crux	CRU	Southern Cross
Cygnus	CYG	Swan
Delphinus	DEL	Dolphin
Dorado	DOR	Swordfish
Draco	DRA	Dragon
Equuleus	EQL	Little Horse
Eridanus	ERI	River
Fornax	FOR	Furnace
Gemini	GEM	Twins
Grus	GRU	Crane
Hercules	HER	Hero; Hercules
Horologium	HOR	Clock
Hydra	HYA	Water Serpent
Hydrus	HYI	Water Snake
Indus	IND	Indian

Constellation	Abbrv.	English
Lacerta	LAC	Lizard
Leo	LEO	Lion
Leo Minor	LMI	Smaller Lion
Lepus	LEP	Hare
Libra	LIB	Scales
Lupus	LUP	Wolf
Lynx	LYN	Lynx
Lyra	LYR	Lyre
Mensa	MEN	Table
Microscopium	MIC	Microscope
Monoceros	MON	Unicorn
Musca	MUS	Fly
Norma	NOR	Square
Octans	OCT	Octant
Ophiuchus	OPH	Serpent Bearer
Orion	ORI	Hunter; Orion
Pavo	PAV	Peacock
Pegasus	PEG	Winged Horse
Perseus	PER	Perseus the Hero
Phoenix	PHE	Phoenix
Pictor	PIC	Easel
Pisces	PSC	Fishes
Piscis Austrinus	PSA	Southern Fish
Puppis	PUP	Stern
Pyxis	PYX	Compass
Reticulum	RET	Net
Sagitta	SGE	Arrow
Sagittarius	SGR	Archer
Scorpius	SCO	Scorpion
Sculptor	SCL	Sculptor
Scutum	SCT	Shield
Serpens	SER	Serpent
Sextans	SEX	Sextant
Taurus	TAU	Bull
Telescopium	TEL	Telescope
Triangulum	TRI	Triangle
Triangulum Australe	TRA	Southern Triangle
Tucana	TUC	Toucan
Ursa Major	UMA	Greater Bear
Ursa Minor	UMI	Smaller Bear
Vela	VEL	Sails
Virgo	VIR	Maiden
Volans	VOL	Flying Fish
Vulpecula	VUL	Fox

ANGLES

- Arc minute ' =   1/60th of a degree
- Arc second " =   1/3600th of a degree
- 1° =   4 minutes
- 15° =   1 hour

APPARENT / MEAN TIME

Apparent = 'Real Sun time'
Mean = ' Human time'

ASTRONOMICAL UNIT (AU)

Mean average distance from Earth to the Sun is 149,600,000 km, normally rounded to **150,000,000 km**. This is called 1 Astronomical Unit, or AU, a standard number in astronomy.

CIRCUMPOLAR STARS

The formula for working out if a star is circumpolar or not is
D >= 90° - L

D = Declination
> = = Greater than or equal to
L = Latitude

COORDINATE SYSTEM - EQUATORIAL (RA/DEC)

Right Ascension: How far an object is along the celestial equator from the first point of Aries (where the Sun crosses the Celestial Equator at the Vernal Equinox). Measured in hours (h), minutes (m) and seconds (s) and is abbreviated as RA or α. *Arcturus: RA: 14h 15m 39.7s*

Declination: How far north and south an object is from the Celestial Equator measured in degrees (°), arc minutes (') and arc seconds (") and is abbreviated as dec (δ). *Arcturus: Dec: +19° 10'56"*

COORDIANTE SYSTEM - HORIZON (ALT/AZ)

Altitude
How high an object is above the horizon from 0 degrees at the horizon to 90 degrees at the zenith

Azimuth
How far an object is eastwards in degrees from north

DISTANCES

- 1 AU = 150,000,000 (1.5 x 108)
- 1 Light Year = 9,460,000,000,000 km (9.46 x 1012)
- 1 Parsec = 3.26 light years

DRAKE EQUATION

N = R* x **f_p** x **n_e** x **f_l** x **f_i** x **f_c** x **L**

- *N*   number of civilizations in our galaxy with which communication might be possible;
- *R**   average rate of star formation in our galaxy
- *f*p   fraction of those stars that have planets
- *n*e   average number of planets that can potentially support life per star that has planets
- *f*ℓ   fraction of the above that go on to develop life at some point
- *f*i   fraction of the above that go on to develop intelligent life
- *f*c   fraction of civilizations that develop a technology that releases detectable signs of their existence into space
- *L*   length of time such civilizations release detectable signals into space.

EQUATION OF TIME

EOT =   apparent solar time – mean solar time

Mean solar time =   apparent solar time – EOT

Apparent solar time =   Mean solar time + EOT

HUBBLE'S LAW

v = Hd

v = velocity
H = Hubble Constant
d = distance

INVERSE SQUARE LAW

Multiply by the square

Example: Planet A is twice as near to the Sun as Planet B. It receives four times as much light as Planet B.
2 x 2 = 4.

KEPLER'S LAWS

1. Planets move in **elliptical orbits** around the Sun.

2. The Sun-planet line sweeps out **equal areas in equal times**. Planets move faster when they are nearer the Sun (perihelion) and slower when they are further away (aphelion).

3. $T^2 = r^3$ (Approximate value)

T = Period/ Time it takes to orbit the Sun
r = mean radius from Sun in AU

LATITUDE & LONGITUDE

Latitude: North Pole: 90°N | Equator: 0° Latitude | South Pole: 90°S
Longitude: The measurement east or west of the prime meridian:
4 minutes = 1 degree of longitude, 1 hour = 15 degrees of longitude

- Greenwich Mean Time Global Time
- Go somewhere Latitude / Longitude Finder

LIGHT YEAR

Light year (l.y.) = the distance travelled by light in a vacuum in 1 year (63 240 AU)

MAGNIFICATION / FOCAL LENGTH / RESOLUTION

Magnification =
$$\frac{f_o \text{ (Focal length of the objective element)}}{f_e \text{ (Focal length of the eyepiece)}}$$

Eyepiece focal length =
$$\frac{\text{Objective focal length}}{\text{Magnification}}$$

Objective focal length =   Magnification *multiply* Eyepiece focal length

Resolution =
$$\frac{\text{Wavelength}}{\text{Objective diameter}}$$

MAGNITUDE

M = Absolute Magnitude
m = Apparent Magnitude
d = distance in parsecs

To work out Absolute Magnitude   **M = m + 5 - 5 log d**

To work out Apparent Magnitude   **m = M-5+5 log d**

Difference in Magnitude	Brightness Ratio
1	2.5
2	6.25
3	16
4	40
5	100

MOON PHASES

Day	Phase
0	● New Moon
7	◑ Waxing Half Moon (1st quarter)
14	○ Full Moon
22	◐ Waning Half Moon (3rd quarter)
29	● New Moon

POWER & LUMINOSITY

Watt (W) = Joule per second

PARALLAX

D = Distance
π = Parallax Angle

$$D = \frac{1}{\pi}$$

π = D/1

PARSEC

Parsec (pc) = the distance at which a star would have parallax of 1 second of arc (3.26 light years.)

POWERS OF 10

Large or Small number can be abbreviated.

$10^{-2} = 1/(10 \times 10) = 0.01$
$10^{-1} = 1/10 = 0.1$
$10^{0} = = 1$
$10^{1} = 10 = 10$
$10^{2} = 10 \times 10 = 100$
$10^{3} = 10 \times 10 \times 10 = 1000$
$10^{6} = 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1,000,000$
M = Mega = Million
K = Kilo = Thousand

SIDEREAL / SOLAR TIME

Sidereal: An object measured against the background stars
Solar: An object measured against the Sun

SPEED, DISTANCE, TIME

Speed = $\dfrac{\text{Distance}}{\text{Time}}$

Time = $\dfrac{\text{Distance}}{\text{Speed}}$

Distance = Speed x Time

SPEED OF LIGHT

Speed of light = 300,000 km/s Use 24hr clock e.g. *4pm = 16.00 hrs*

TEMPERATURE

- Celsius (°C) - 0°C = 273 K
- Kelvin (K) - 0 K = - 273°C
- Fahrenheit = (9/5) °C + 32

VELOCITY

$$\frac{\lambda - \lambda_0}{\lambda_0} = \frac{v}{c}$$

λ = wavelength
v = recession velocity
c = speed of light