



Temperature

At the 'surface' of the Sun the temperature is 6,400 Celsius, if you thought this was hot, at the core, right in the centre of the Sun the temperature is a massive 15.6 million Celsius!!

Rotation

About 25 days

Size

1,391,940 km ● Earth

Distance

If you could fly to the Sun in a Jet plane it would take 2 ½ years to get there!

Sun Spots

On the Sun's surface, we can see storms, these are called "sunspots" because they look like dark spots on the Sun's surface.

The Sun

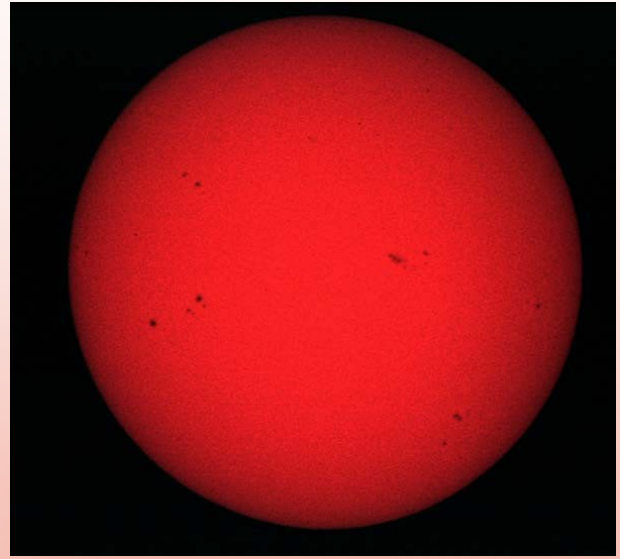


Image CMHAS Member Keith Rickard

The Sun is our closest star and part of the Milky Way galaxy.

The Sun is a very common type of Star called a yellow dwarf star, as stars go it's 'medium' in size.

The Sun is about 4.5 billion years old and will last for another 4.5 billion years.

The centre, or core, of the Sun is very, very hot. A process called "nuclear fusion" takes place there, this changes Hydrogen into helium and releases energy, which make the Sun shine.

Streams of gas particles known as the solar wind also flow out from the Sun.

The Sun also produces big explosions called solar flares. These flares shoot particles off the Sun's surface, these can hit the Earth's atmosphere and cause a glow called an aurora or 'Northern Lights'



Distance from Sun

58 Million km from Sun
Closest planet to Sun

Length of year

88 Earth days

Length of day

176 Earth days

Size

4879 km

• Mercury • Earth

Surface Temperature

Average 167 Celsius

Atmosphere

Very, very thin, it almost doesn't have one.

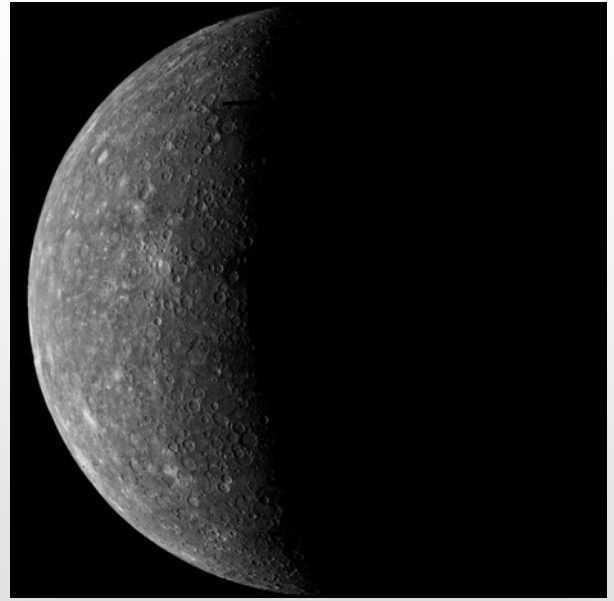
Characteristics

Lots of craters, like the Moon

Moons

None

Mercury



NASA Image

Mercury is very close to the Sun and travels around the Sun faster than any other planet. It was named after Mercury, the swift messenger of the gods in ancient Roman mythology.

Mercury is the smallest planet in our solar system, it is a little bigger than our Moon. It can only be seen from Earth just before sunrise or just after sunset, because it is so close to the Sun.

Mercury has a very thin atmosphere. We would not be able to live there.

The surface of Mercury has craters in it where objects such as meteorites and asteroids have crashed into it.



Venus

The Evening Star

Distance from Sun

108 Million km from Sun
Second planet from Sun

Length of year

224.7 Earth days

Length of day

116.75 Earth days

Size

12104 km



Venus



Earth

Surface Temperature

Average 464 Celsius

Atmosphere

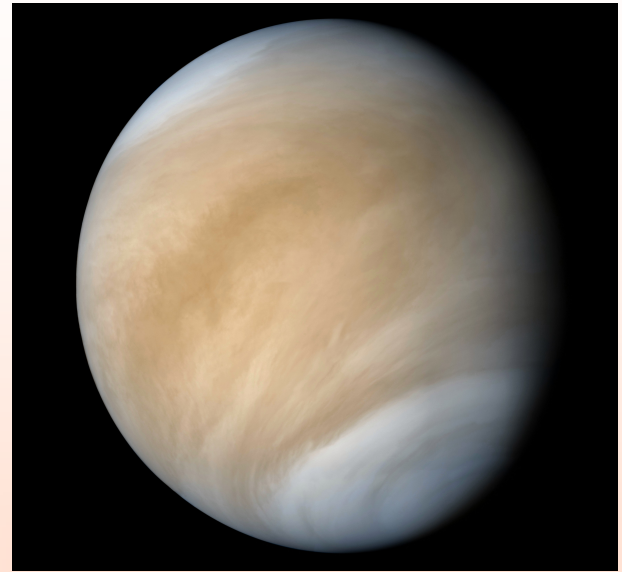
Carbon dioxide, but the pressure is
92 times larger than Earth's

Characteristics

Venus may have had a lot of water
like Earth in its past, but its high
temperature has boiled it all away.
Much of Venus is covered with lava
flows.

Moons

None



NASA Image

Venus and Earth are almost the same
size.

Venus gets so hot that it could melt
lead. It has very thick, rapidly spinning
clouds covering its whole surface. The
clouds hold heat in like a blanket
keeping Venus hot. These clouds also
reflect a lot of sunlight, making it look
very bright to us here on Earth.

Much of Venus' surface is covered
with old Lava flows and it has several
large inactive volcanoes.

Venus is unusual because it rotates in
a direction opposite that of all of the
other planets and it spins very slowly
as it orbits the Sun, it's day is longer
than its year.



Earth

Distance from Sun

150 Million km from Sun
3rd planet from Sun

Length of year

365.25 Earth days

Length of day

24 Hours

Size

12756 km

Surface Temperature

Average 15 Celsius

Atmosphere

Mainly Nitrogen, with 1/5th Oxygen a tiny amount of Carbon dioxide

Characteristics

The surface is mainly covered with water, there are volcanoes, mountains, deserts and ice caps.

Moons

Number of moons 1



NASA Image

Earth is the third closest planet to the Sun, we live here! It has an atmosphere made up of mainly nitrogen and oxygen. The atmosphere gives us air to breathe.

The Earth circles around (orbits) the Sun. It takes a year to go right around the Sun. The Earth also spins and it takes one day to spin around one complete time. The Earth's axis is tilted a little and this is what is responsible for us having seasons. Otherwise, the temperature would be similar all year.

The Moon circles the Earth



Phases

The Moon reflects light from the Sun, it appears to change shape but what we actually see is the moon lit differently because of it's position, we use some special words to describe different phases of the moon.



New Moon (the moon is in shadow and can't be seen)

First quarter

Last quarter

Full Moon

Gibbous (the moon is more than half illuminated)

Crescent (the moon is less than half illuminated)

Through a small telescope details such as those below can be seen

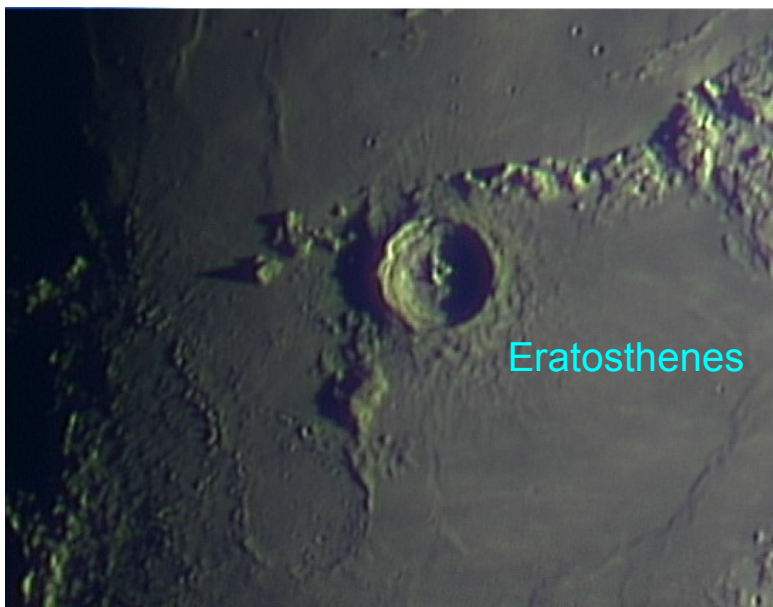


Image Simon Dawes

The Moon



Image Simon Dawes

The Moon is 4.3 billion years old. It takes 27 days, 7 hours and 43 minutes to circle (orbit) the Earth, but because the Earth is orbiting the Sun the Moon completes a full cycle of its phases in 29.5 days.

The Moon is 384.4 thousand Km from the Earth it would take 130 days travelling by car to get to the moon!

The Moon is 3476km in diameter

The Moon has no atmosphere and no water, there is no wind or weather on the moon.

The footprints left there by the Apollo astronauts will remain there for millions of years.

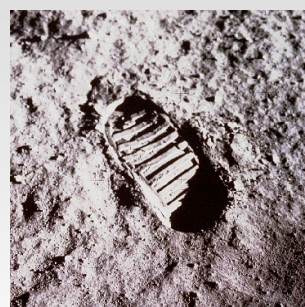


Image NASA



Distance from Sun

227.9 Million km from Sun
4th Planet from Sun

Length of year

687 Earth days

Length of day

24.6 Hours

Size

6792 km

● Mars ● Earth

Surface Temperature

Average -65 Celsius

Atmosphere

Very thin, pressure is 1/200th that of Earth's, Mainly nitrogen with a little carbon dioxide

Characteristics

The surface of Mars is the colour of rust. Mars has some of the deepest valleys and highest mountains in our solar system

Moons

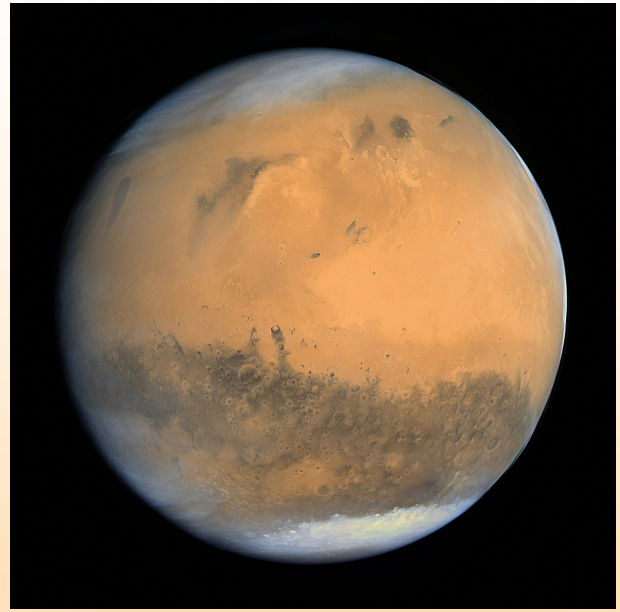
Two very small moons, probably captured asteroids

Phobos 13 miles diameter

Deimos 7.5 miles diameter

Mars

The Red Planet



NASA Image

Mars is a cold, dry place, there is water, but this is permanently frozen.

Mars has polar ice caps that can be seen through a telescope

Space missions by NASA have looked at the Martian soil and found it to contain a lot of iron, this is what gives Mars its red colour.

Mars has many craters which were formed by meteorites or asteroids hitting it.

Mars also has some of the tallest volcanoes and some of the deepest valleys in our solar system.

Mars has two moons, Phobos and Deimos which look a bit like potatoes, scientists think these moons were once asteroids captured by Mars' gravitational pull.



Distance from Sun

778.6 Million km

5th planet from Sun

Length of year

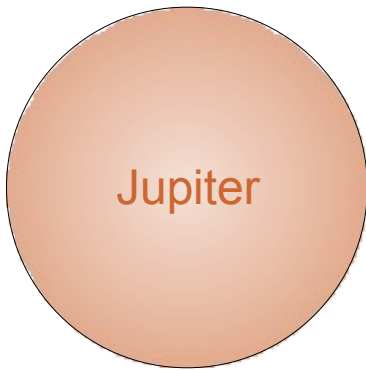
4331 Earth days (12 years 57 days)

Length of day

9.9 Hours

Size

142,984 km (11 time the size of the Earth)



Atmosphere

Jupiter is about 90% Hydrogen and 10% Helium

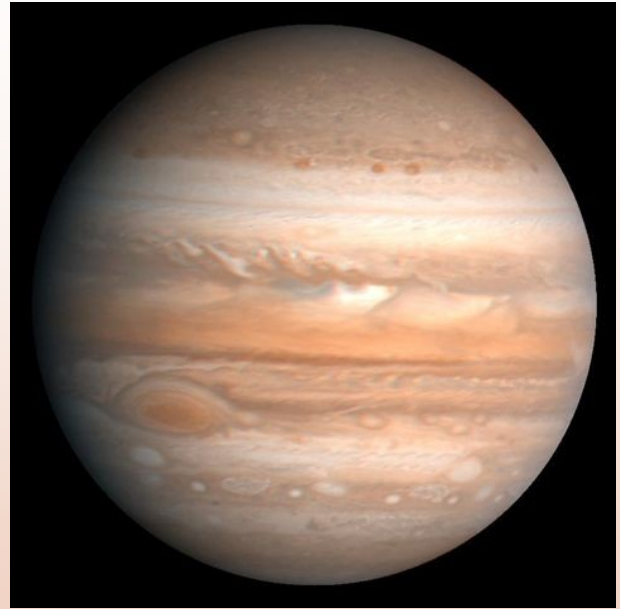
Characteristics

Jupiter is a gas planet so doesn't have a surface, it is so big all the other planets can fit inside it!

Moons

63 are known, but most of these are very small. Jupiter's 4 largest moons, Io, Europa, Ganymede and Callisto can be seen in a small telescope or binoculars.

Jupiter



NASA Image

Jupiter is a large gas planet that we call a gas giant, its clouds circle the planet causing them to change in appearance daily. Huge storms circle the planet, one of these 'the great red spot' has lasted for hundreds of years and is so large the Earth would fit inside it!

Jupiter is made mostly of hydrogen and helium gases.

Jupiter is unusual because it actually gives off two times more heat than it gets from the Sun.

Jupiter shines very brightly in the night sky this is because of its large size.

Pictures taken by space probes have shown thin rings around Jupiter.

Jupiter has 63 moons, One of Jupiter's moons, Io, has active volcanoes on it. Areas on Io that are near the volcanoes are very, very hot, another of Jupiter's moons, Europa, is covered in ice and scientists believe there might be water under the ice where life might develop.

Jupiter has a very faint ring that can only be seen from space.



Saturn

Distance from Sun

1433.5 Million km

6th planet from Sun

Length of year

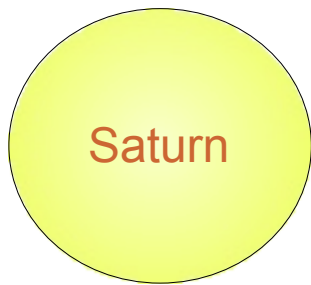
10,747 Earth days (29 ½ years)

Length of day

10.7 Hours

Size

120,536 km (9 times the size of the Earth)



Atmosphere

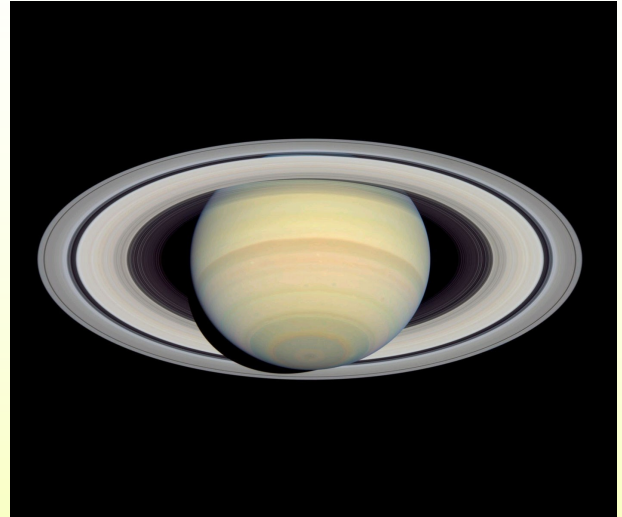
Saturn is about 75% Hydrogen and 25% Helium

Characteristics

Saturn is a gas planet so doesn't have a surface.

Moons

Saturn has 60 moons, but most of these are very small. Saturn's largest moon is Titan (which is larger than Mercury) can be seen in a small telescope



NASA Image

Saturn is a very large planet, called a gas giant, it spins so fast that it looks slightly squashed.

It's windy on Saturn, and the winds can blow at a massive 1,800 kilometres per hour!

White spots can sometimes be seen on Saturn these are storms, similar to the Great Red Spot on Jupiter.

Saturn is surrounded by over 1000 rings made of ice and dust, these rings aren't solid but more like rubble with individual particles ranging from the size of pebbles to the size of houses!

The ring, which can be seen in small telescopes, is probably the remains of a moon or moons destroyed by comets or meteorites hitting it.



Uranus

Distance from Sun

2872.5 Million km

7th planet from Sun

Length of year

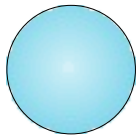
30589 Earth days (83 $\frac{3}{4}$ years)

Length of day

17.2 Hours

Size

51118 km (4 times the size of the Earth)



Uranus



Earth

Atmosphere

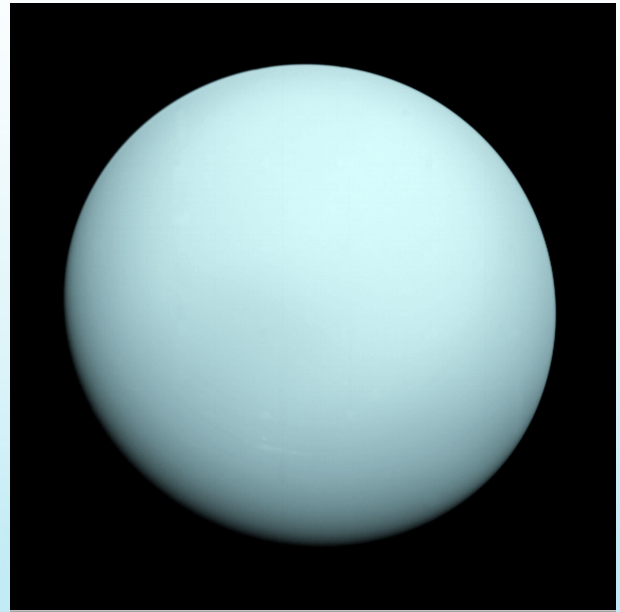
Mainly Hydrogen and Helium

Characteristics

Uranus is an ice giant with a thick cold atmosphere.

Moons

27 moons are known, the first four to be discovered were names after Shakespearian characters called Aerial, Umbriel, Titania and Oberon



NASA Image

Uranus is unique in that it sits on it's side because of this, its poles are sometimes pointed almost directly at the Sun, so although it rotates once in 17.2 hours, one side can stay in daylight for 42 years!

Uranus' atmosphere is made from hydrogen, helium and methane and it is very cold, it's methane that gives Uranus it's cool blue colour.

Uranus' fast rotation results in winds that blow at up to 600 kilometres per hour!

Uranus has a ring system like Saturn but it is very faint and can only be seen in the largest telescopes

Uranus has 27 moons, some of these are less than 100 kilometres wide and as black as coal.



NASA Image



Distance from Sun

4495.1 Million km

8th planet from Sun

Length of year

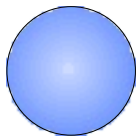
59,800 Earth days (164.8 years)

Length of day

17.2 Hours

Size

49,528 km (3.9 times the size of the Earth)



Neptune ● Earth

Atmosphere

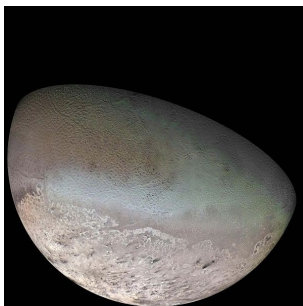
Mainly Hydrogen and Helium

Characteristics

Neptune is an ice giant with a thick cold atmosphere.

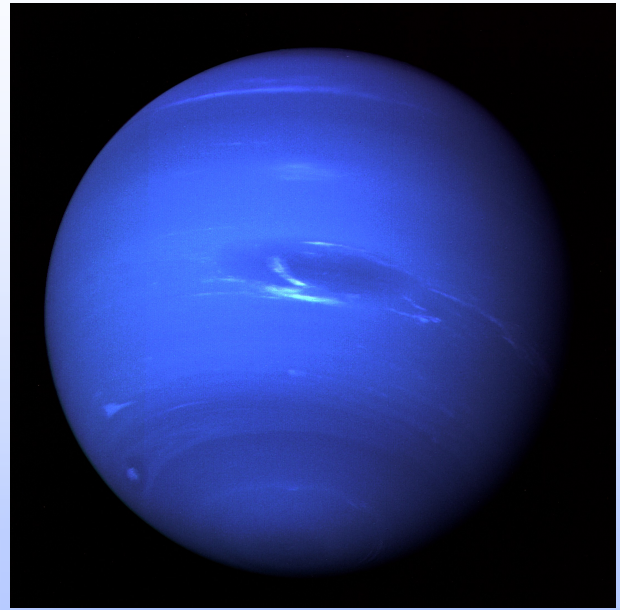
Moons

13 are known, the largest is called Triton



NASA Image

Neptune



NASA Image

Neptune is a large gas planet, sometimes also known as an Ice Giant, that look like big blue-green ball.

Neptune has winds that blow at over 2000 kilometres per hour! It has large, dark circles on its surface which, like Jupiter's Great Red Spot are thought to be storms

Neptune, like Saturn has rings but they are very faint and can only be seen by the largest telescopes.

Neptune has 13 moons one, Triton orbits the planet in the opposite direction to Neptune's other moons.

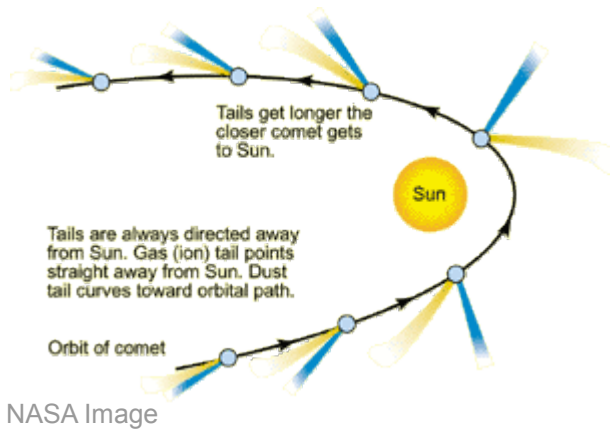
Neptune is the farthest planet from the Sun.



Comets

What is a Comet?

A comet is made of dirty ice, dust and gas, as a comet passes close to the Sun it warms up and the ice begins to melt causing a trail of gas and dust we call the 'tail'. The tail always points away from the Sun, regardless of the direction the comet is going in.



A comet has two tails, one made of gas the other of dust, the gas tail looks blue in colour while the dust tail is yellowish. Every time a comet comes close to the Sun, a part of it melts, eventually it will completely disappear.

Some comets take thousands of years to circle the Sun



T. Rector (University of Alaska Anchorage), Z. Levay and L. Frattare (Space Telescope Science Institute) and National Optical Astronomy Observatory/Association of Universities for Research in Astronomy/National Science Foundation

Comets, like planets, do not give off any light of their own, so what we see is sunlight reflected off them.

A few comets come close enough to the Earth for us to see them with our eyes. Halley's Comet, for example, can be seen from Earth every 76 years.

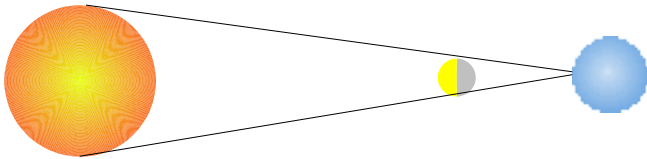
Unfortunately light pollution in towns make it very difficult to see even the brightest of these wonderful objects.

Long ago, the sight of a comet frightened people, with its bright head and long, wispy tails, comets did not look like anything else in the sky and were thought to mean the coming of hard times or bad luck for the rulers.



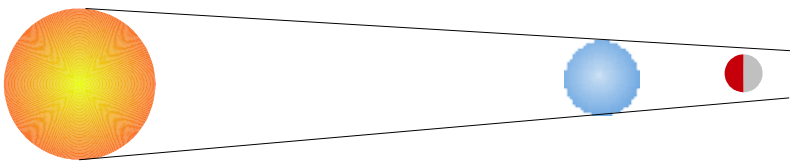
Total Solar Eclipse

If the Moon is perfectly aligned with the Sun the Moon appears to cover the Sun entirely, this is a Solar Eclipse, it happens about once per year and can only be seen on a small part of the Earth



Total Lunar Eclipse

If the Moon moves into the Earth's Shadow then we see a lunar eclipse, these happen about once per year but because the Earth casts a larger shadow on the moon, you don't have to be perfectly lined up to see a lunar eclipse.



Eclipses



Image Mike Rushton

Although the Moon is much smaller than the Sun, it is also much nearer to us, so appears to be about the same size in the sky, if the Sun and Moon line up precisely we get a total solar eclipse, this happens somewhere in the world about once every year, occasionally more often. The next total eclipse that can be seen from the UK is in 2090!

The Moon moves slowly into the Earth's shadow until it is fully eclipsed

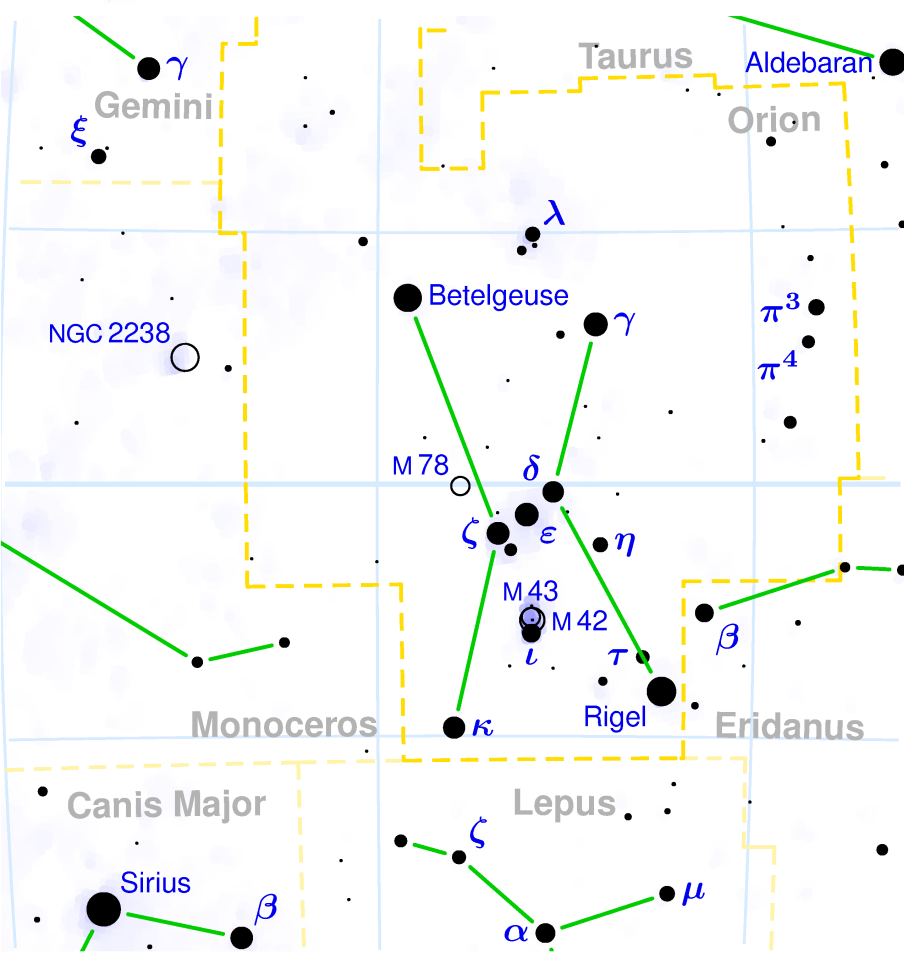


Image Simon Dawes



Orion

The Hunter

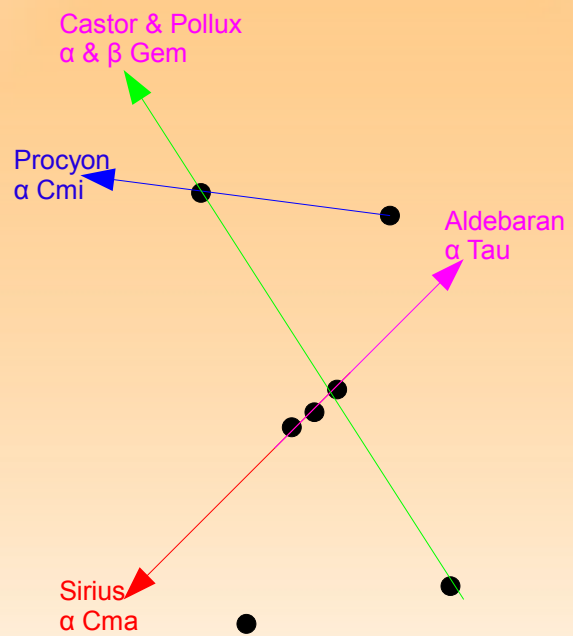
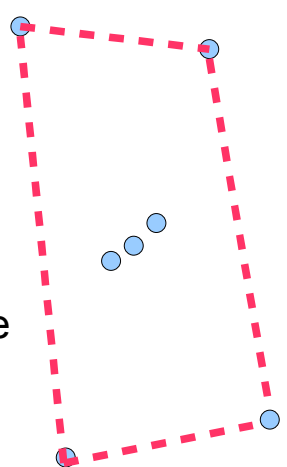


An engraving of Orion from Johann Bayer's Uranometria, courtesy of the US Naval Observatory Library

Orion is a very easy constellation to find, handy for finding other bright stars and their associated constellations. It is best seen in January.

How many stars can you see?

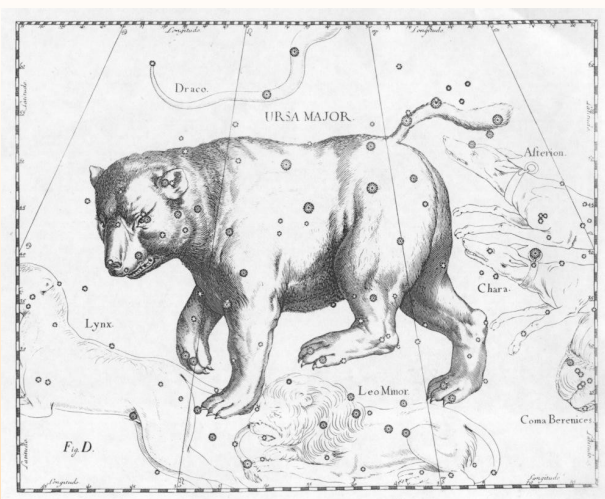
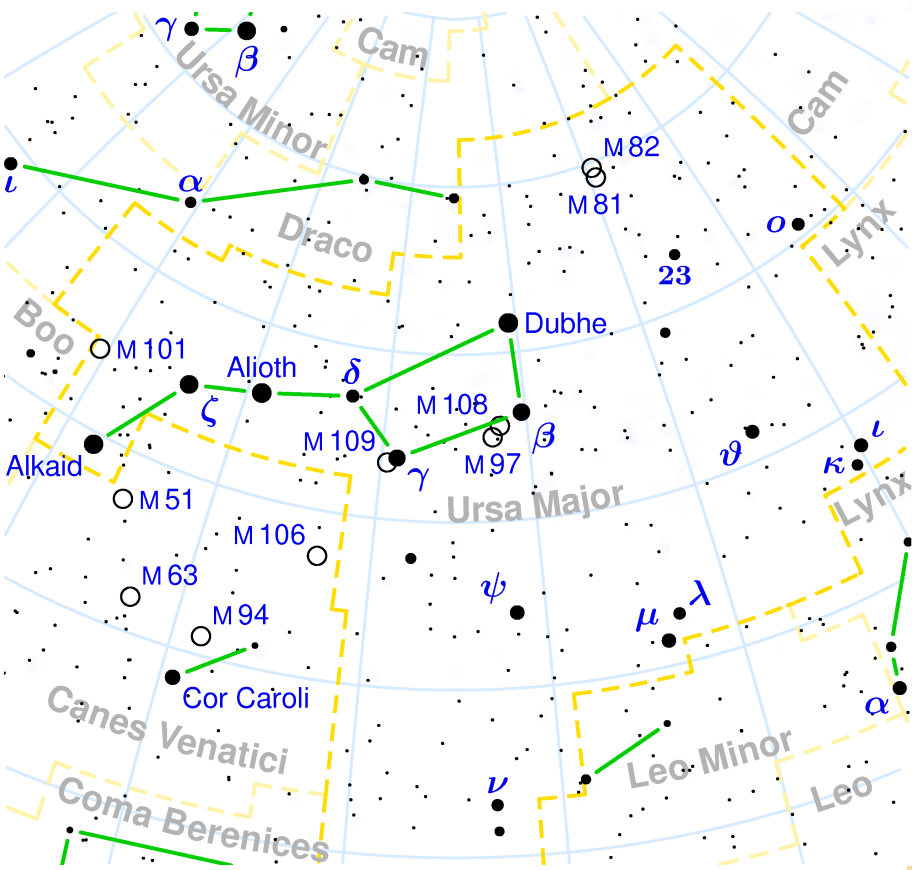
Astronomers count the number of stars they can see inside the red area, if you are in a really dark sky you might see as many as 50 stars, however in towns and cities don't expect to see many more than 10 stars, this is because Poorly designed street lights Light up the sky as well as the Ground so the fainter stars disappear in the glow.





Ursa Major

The Great Bear

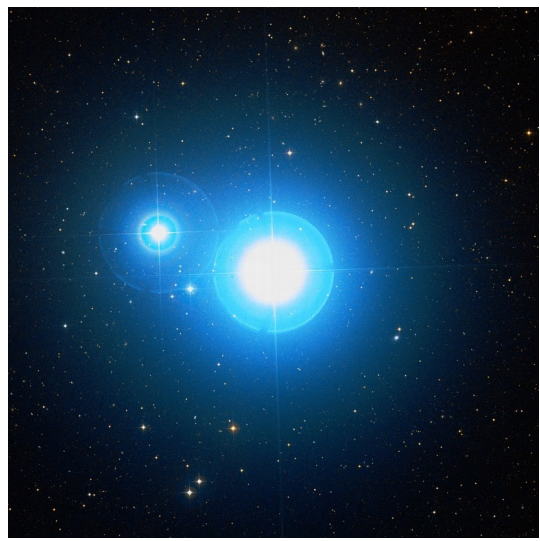


An engraving of Orion from Johann Bayer's Uranometria

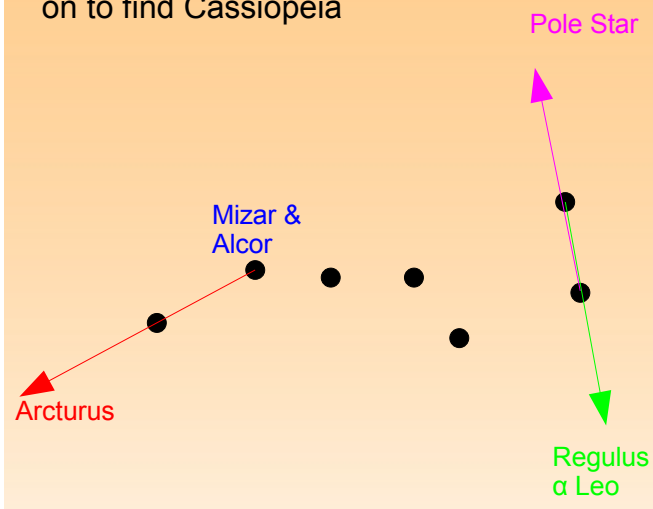
Ursa Major is circumpolar (always above the horizon) but it is best seen in April in UK skies

How Good is your eyesight?

Find the pan handle of the big dipper, look at the second star in (Mizar) can you see the other star (Alcor)? This is called a double star
If your vision Is good you Should easily See Alcor.

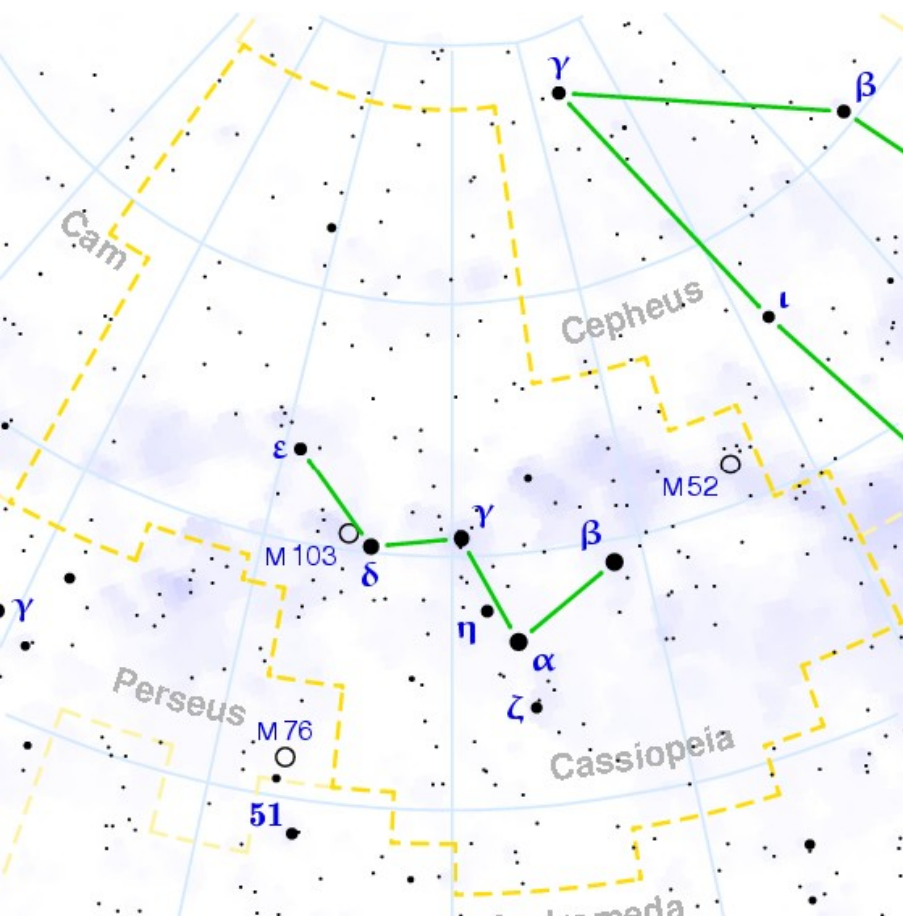


The Plough, or big dipper, is what we call an asterism it is a pattern of stars inside a constellation. The Plough is very useful for finding you way round the sky, follow the pointers to find the pole star, and continue on to find Cassiopeia





Cassiopeia



An engraving of Orion from Johann Bayer's
Uranometria

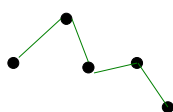
Cassiopeia is best seen in November, but this constellation is circumpolar so is always visible in UK skies.

Can you see the Milky way?

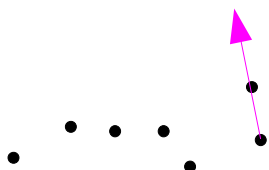
The Milky way passes right through Cassiopeia, it looks like a faint cloud but is really lots and lots of faint, distant stars? If not, remember to have a look for the Milky way passing through Cassiopeia next time you are at a dark site.

Finding Cassiopeia

Cassiopeia is one of the easiest constellations to find, find the big dipper, and follow the pointers to the pole star, once you have found this carry on until you find a W shape in the sky, this is Cassiopeia



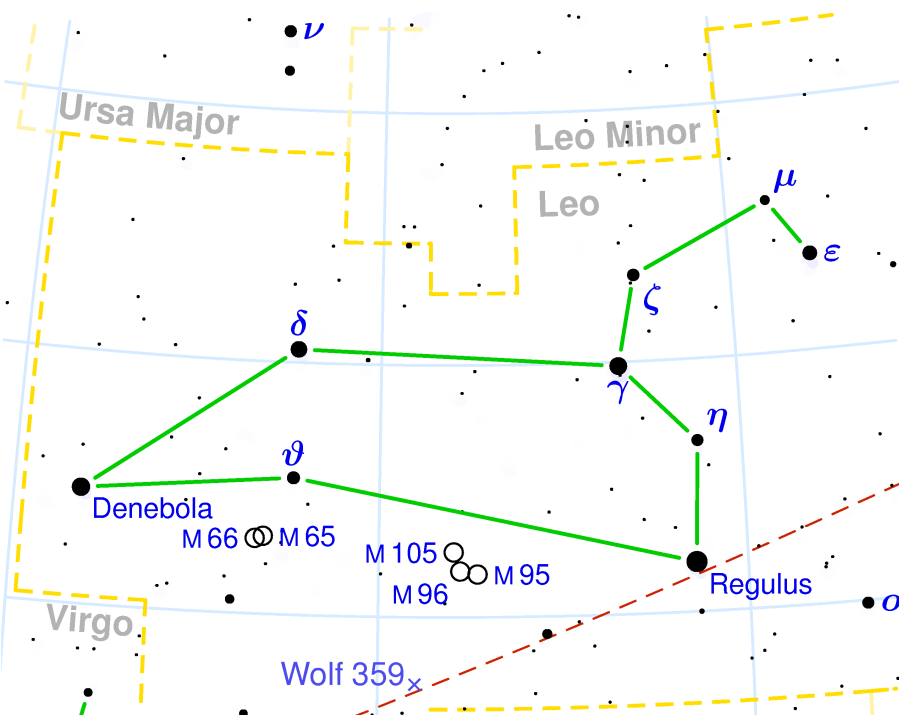
● Pole
Star





Leo

The Lion



An engraving of Orion from Johann Bayer's
Uranometria

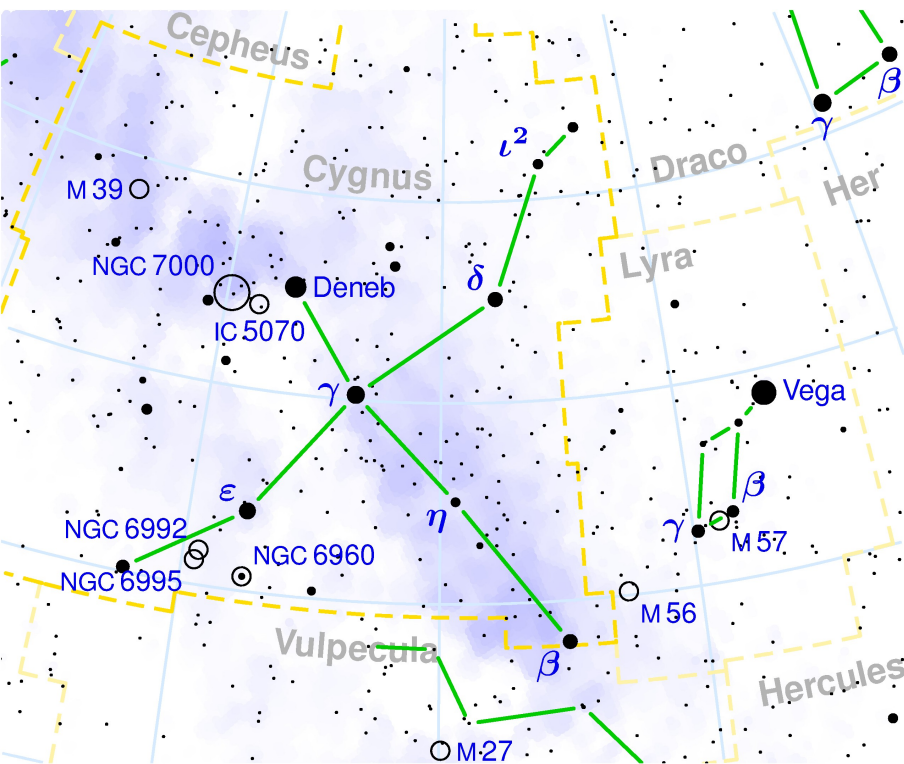
Leo is best seen in April in UK skies

Leo is one of the few
constellations that looks a little
like what it is named after!



Cygnus

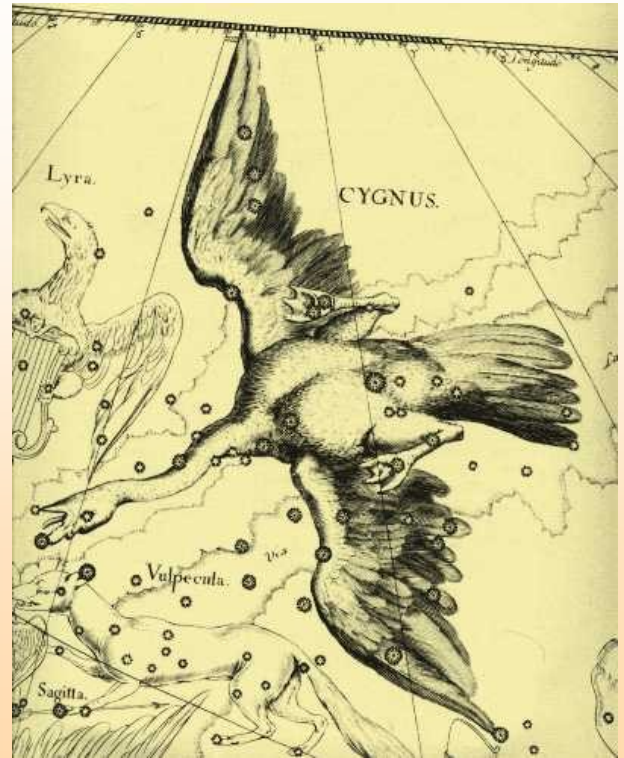
The Swan



Cygnus is one of the few constellations that looks a little like what it is named after!

Albireo

Albireo looks like a single star but through a small telescope you can see it is a double star, one orange and one blue



An engraving of Orion from Johann Bayer's Uranometria

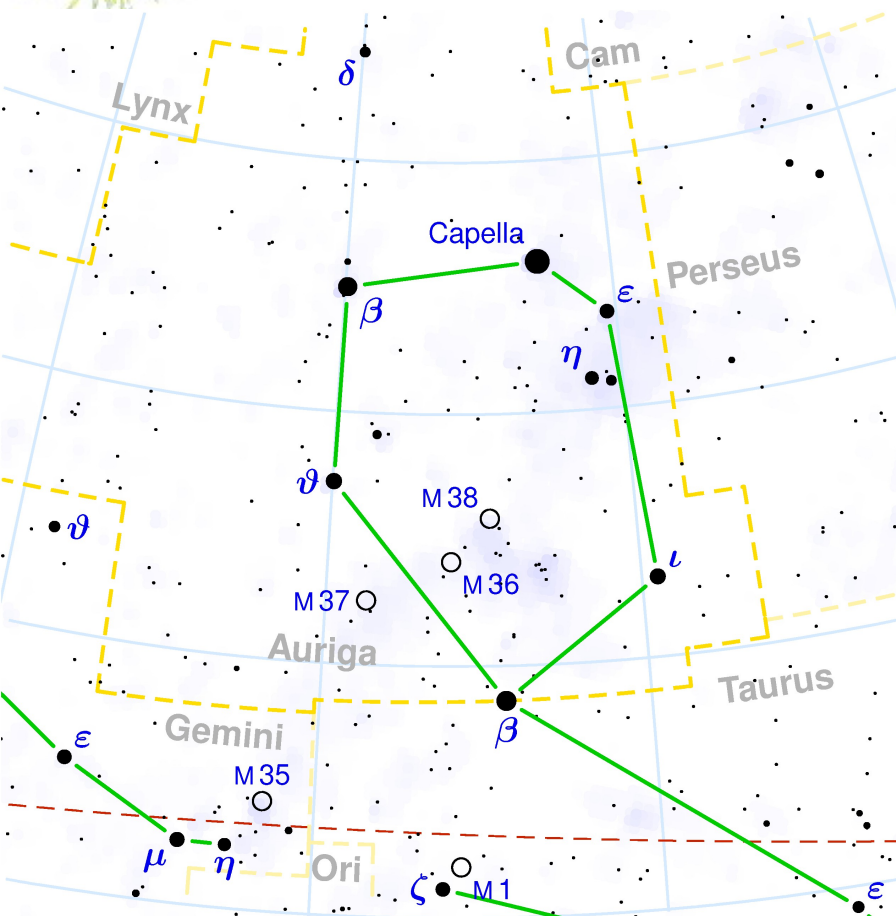
Cygnus is best seen in September

Can you see the Milky way?

The Milky way passes right through Cygnus, it looks like a faint cloud but is really lots and lots of faint, distant stars? If not, remember to have a look for the Milky way passing through Cygnus next time you are at a dark site.



Auriga

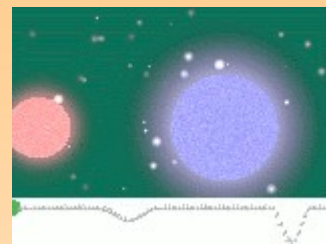


An engraving of Orion from Johann Bayer's
Uranometria

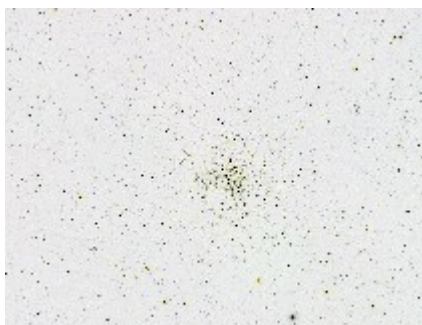
Auriga is best seen in February

Zeta Aurigae is actually two stars that go around each other we know this because as they go around one goes in front of the other blocking some light and making the star fainter, this happens every 972 days.

The main star is a red supergiant star, the companion is a blue star. Zeta Aurigae is approximately 790 light-years from Earth.



Auriga has a number of open clusters (groups of faint stars) that you can see through a telescope.



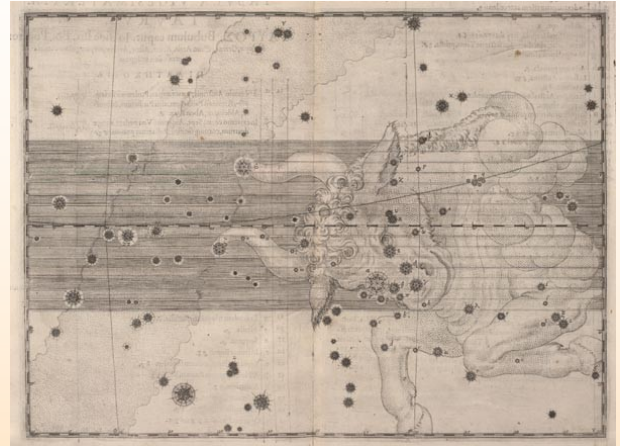
Can you Find Auriga?

Auriga is quite easy to find, first it is an easy pattern of stars to remember, but if you are having trouble finding it look for Orion and continue up until you see Auriga

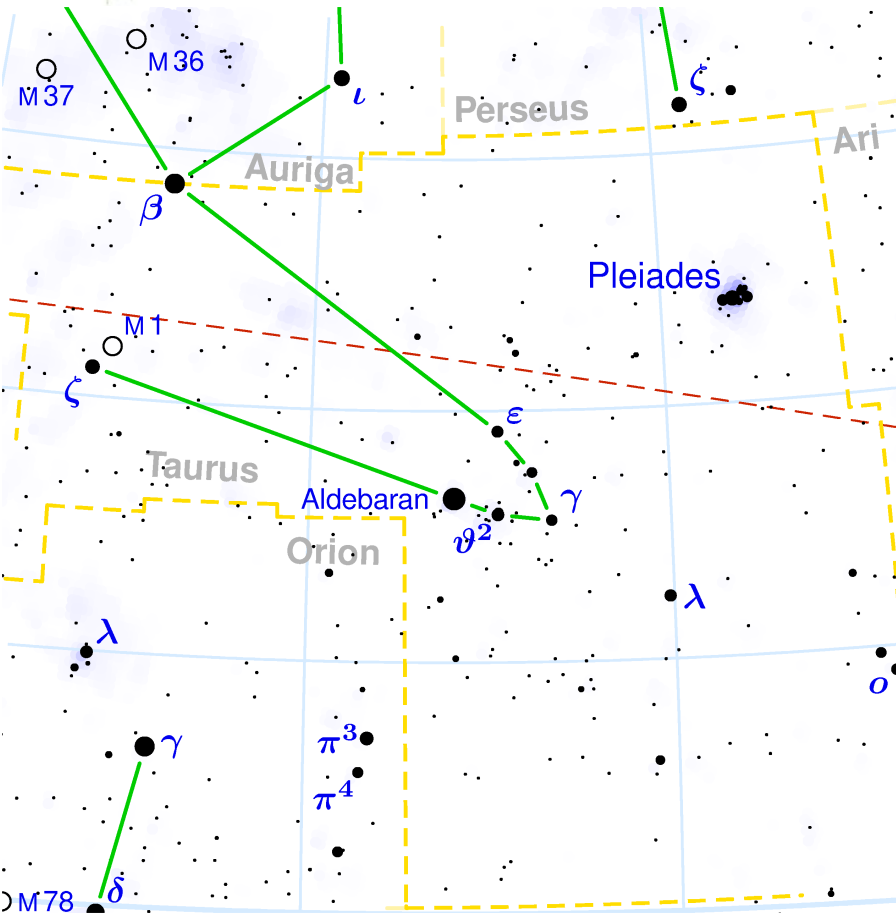


Taurus

The Bull



An engraving of Orion from Johann Bayer's
Uranometria



The Pleiades

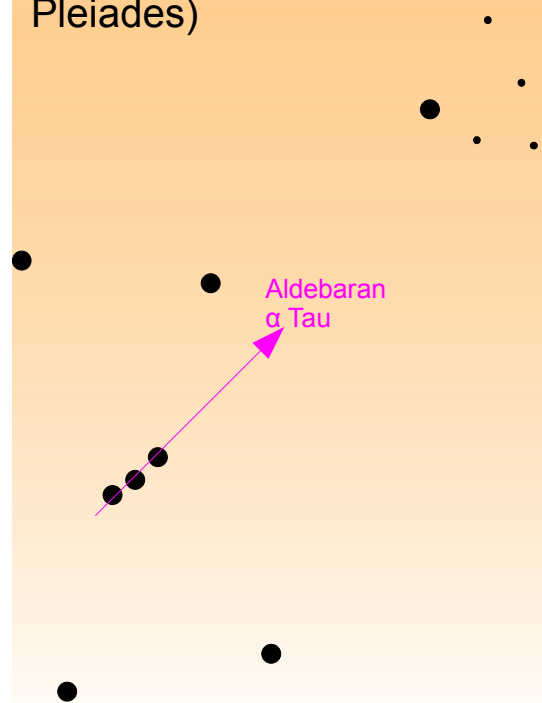
One of the most notable features of Taurus is the Pleiades, this is an 'open cluster' of stars. The Pleiades is also called the 'seven sisters' how many of the sisters can you see?



John Lanoue

Finding Taurus

The easiest part of Taurus to find is the V shaped horns of the Bull, follow the belt stars in Orion up to the first very bright star, this is Aldebaran, continue on to find the seven sisters (also known as the Pleiades)





Aurora

The Northern Lights

Our Sun throws off gas in the form of a solar wind, this gas is travelling really fast and gets funnelled by the Earth's magnetic field to the north and south poles, when these particles of gas hit the Earth's air it makes them glow producing the Northern Lights

Occasionally Northern Lights are visible as far south as London, however if you live in a town the local light pollution from street lights is likely to shine brighter than the Aurora so you need to live away from street lights to get a really good view.



Image CMHAS Member Jean Felles



States Air Force photo by Senior Airman Joshua Strang



Red and green Aurora in Fairbanks, Alaska.
Image by Mila Zinkova



Meteors

Meteor, Meteorite, Meteoroid?

A **meteoroid** is a piece of stone-like or metal-like debris which travels in outer space. Most meteoroids are no bigger than a pebble. Large meteoroids are believed to come from the asteroid belt. Some of the smaller meteoroids may have come from the Moon or Mars.

If a meteoroid falls into the Earth's atmosphere, it will begin to heat up and start to glow. This is called a **meteor**. If you have ever seen a "shooting star", you were actually seeing a meteor. Most of the original object burns up before it strikes the surface of the Earth.

Any leftover part that does strike the Earth is called a **meteorite**. A meteorite can make a hole, or crater, in the ground when it hits it. The larger the meteorite, the bigger the hole..

Common Types of Meteorites

Iron Stone Stony Iron



Find out more about Meteorites on www.spacerocksuk.com



Picture of the Famous 1833 Meteor Storm

Leonid Meteor Shower
November 2001



Image by Jean & Brian Felles



Asteroids

Position of the Asteroid belt

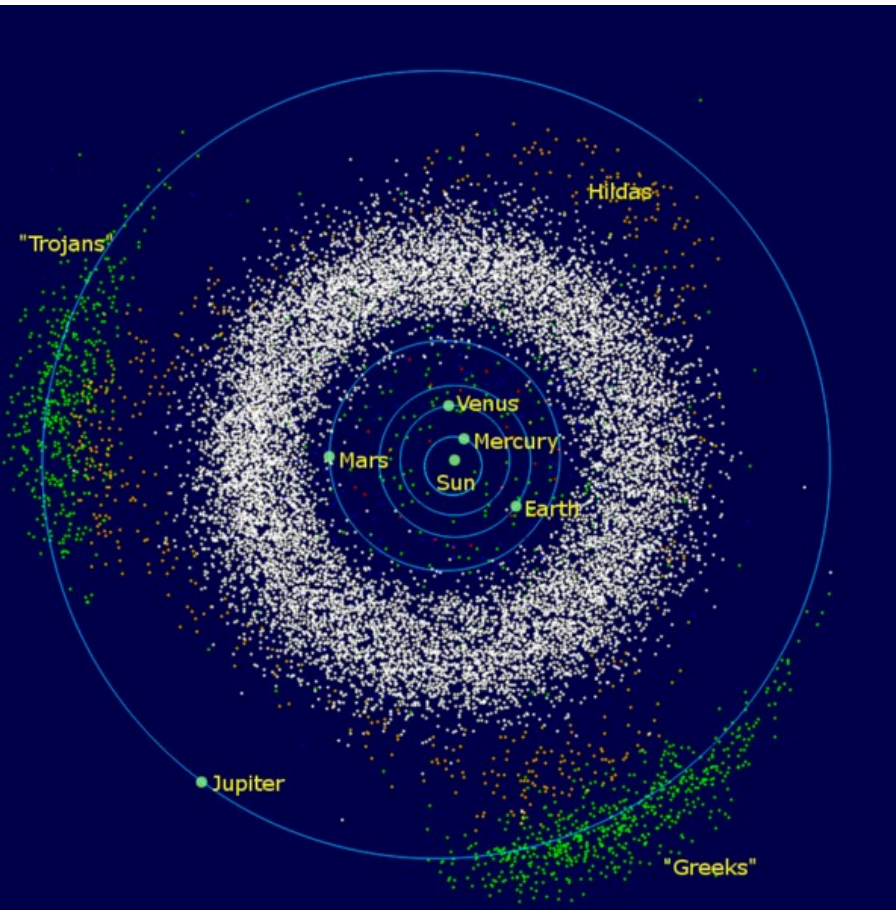


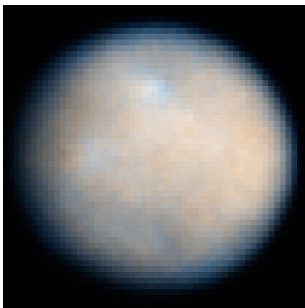
Image NASA

An asteroid is a lump of rock. It can be thought of as what was "left over" after the Sun and all the planets were formed. Most of the asteroids in our solar system can be found orbiting the Sun between the orbits of Mars and Jupiter. This area we call the "asteroid belt".

Asteroids can be a few feet to several hundred miles wide. The belt probably contains at least 40,000 asteroids that are more than 0.5 miles across.

If an asteroid is captured by the gravitational pull of a planet, the asteroid can be pulled out of the belt and go into orbit as a moon around the planet that pulled on it, this is how we think Mars got its moons

Ceres



Once thought to be a planet, then changed to be an asteroid Ceres is now designated as a Dwarf planet (along with Pluto). It is the largest object in the asteroid belt.

Images by NASA
and STScI

