

World Museum Liverpool Planetarium Transcript for 'The Summer Night Sky'

When we gaze into the inky blackness of night, at first there appears to be a random collection of flickering points of light in the sky; but if you look closely you start to see definite patterns begin to emerge. We call these patterns constellations and the sparkling lights are actually stars or suns, millions of light years away.

Amongst these stars can also be found a huge array of planets, nebulae, galaxies and star clusters scattered about the sky just waiting to be discovered like an open box of jewels.

The ancient Greeks first formed star patterns thousands of years ago by making up stories about the groups of stars they could see. The constellations, as they were described in Greek mythology, were mostly named after god-favoured heroes and beasts who received a place in the heavens for all eternity in recognition for their deeds and they were regarded as semi-divine spirits who strode across the sky.

As we move around the Sun, the angle of the earth's tilt causes our seasonal changes and we see different constellations in the night sky throughout these seasons. For instance during the winter months the constellation of Orion stands proudly on guard throughout the night but during summer he is nowhere to be seen. Orion hasn't really gone anywhere we're just looking at the sky from a different position as we orbit around the Sun and Orion makes his way across the sky during the daytime so we can't see him because of the sun's glare.

There are always fascinating objects in the night sky no matter what season we're in, so as it is now summer let's take a journey of wonder and imagination around the summer night sky.

Before you proceed you will need a star map which will help you identify names and shapes of constellations. One of our monthly night-watch sheets will help you with this.

We start off with one of the most well known star patterns of them all the Plough which is easy to recognise as it looks like a saucepan; here is the curved handle and here is the pan. The Plough is actually part of a larger constellation called Ursa Major meaning Great Bear but the Plough is easily recognisable and it is always visible in the night sky it can be very useful as a pointer constellation. For example these two stars are called the pointers and if you draw an imaginary line through them they lead to the north star which always points in the direction north.

Continue on and we come to this "W" shape called Cassiopeia (*cassio-pay-er*) who according to Greek myth was forced to offer up her daughter Andromeda as a sacrifice for insulting the gods. This constellation turns upside down and looks like a letter "M" during the Winter months.

If we look just below the "W", we see a faint fuzzy patch; this is our close galactic neighbour, the Andromeda galaxy which is a huge spiral galaxy containing hundreds of billions of stars and is the furthest naked eye object that we can see.

Because galaxies have a tendency to collide with each other the Milky Way and Andromeda galaxies are on a collision course. They are approaching each other at the rate of about 300.000 km an hour. But don't worry, this cosmic train wreck

won't occur for another 3 billion years or so then after another billion years this complex gravitational dance of two giant spirals will settle down into a single giant elliptical galaxy.

This square of stars is the body of Pegasus the flying horse and these 3 are useful as they point to the Andromeda galaxy.

Let us move our imaginary line to this dominant triangle shape. This is the summer triangle which is made up from stars in three different constellations; Deneb in Cygnus the swan, Vega in Lyra the Lyre and Altair in Aquila the eagle.

Deneb is considered to be one of the most luminous stars that we know of and forms the tail of the swan. These are his wings and this line of stars leads to the head. If we look closely at this star called Albireo we find that it is actually two stars which orbit around each other consisting of a bright orange primary and a blue companion.

Vega is the fourth brightest star in the night sky not because it is big but because it is closer to us than most at roughly 25 light years away. It was also once the north celestial pole star some 12,000 years ago and through precession it will be again in another 12,000 years.

Another prominent feature of the constellation Lyra is the famous ring nebula also known as M57. A small telescope will show just what a beautiful sight this is. Planetary nebulae like this form when medium or low mass stars like our sun exhaust the hydrogen in their cores and they start to inflate and transform into red giants. Instabilities develop in the core causing gaseous shells to be expelled outwards; this shell is then illuminated by ultraviolet energy from the host star.

Altair in Aquila is even closer to us than Vega at 16.8 light years and is flattened at its poles due to its rapid rotation. It takes just 9 hours to complete one full rotation compared to our Sun which takes 25 hours.

This small bright constellation is Delphinus the dolphin and it doesn't take much imagination to see a dolphin leaping from the sea.

Just to the right of the summer triangle is this slightly uneven square which is part of a constellation named after the most famous of the Greek heroes Hercules and this square is called the keystone of Hercules.

This faint group of stars is the beautifully named Corona Borealis which is Latin for the Northern Crown.

This "Y" shaped constellation is Bootes the herdsman whose job was to herd the bears of Ursa Major and Ursa Minor around the sky to keep the celestial sphere turning throughout the night.

The brightest star in this constellation is called Arcturus and is the third brightest star in the night sky. Arcturus is a red giant about 28 times larger and 70 times more luminous than our Sun.

If the sky is dark enough and you are away from city lights you should be able to make out a thin faint band extending from one horizon to the other; this is our home galaxy the Milky Way containing hundreds of billions of stars, and the Sun and its retinue of planets are in one of its spiral arms. It takes the Sun about 200 million years to complete a single orbit around the Milky Way.

The proportions of our galaxy are astounding; it is 150.000 light years wide and has a central bulge which is 16.000 light years thick and a circumference of 300.000 light years; when you consider that one light year is the equivalent to 6 million, million miles it puts into perspective just how enormous the Milky Way galaxy really is.

If you look closely at the night sky especially at certain times of the year you can witness one of Mother Nature's best displays; these are meteors or shooting stars.

Meteors are mostly no bigger than a grain of sand, and while they are travelling through space at incredible speeds they come into contact with our atmosphere which causes friction which in turn heats up the tiny rock until it starts to burn. Periodically we have meteor showers, with hundreds of meteors emanating from the same apparent point in the sky. These showers typically last from a few hours to several days and are caused by debris being expelled by a comets tail. Each day as many as 4 billion meteors, mostly miniscule in size, fall from space.

Occasionally, one of these Meteors will survive to hit the ground. These are called Meteorites. You can see some meteorites on the space gallery after the show.

The Earth turns; the night gives way to a new morning and the only star we can see now, is the Sun. Why not try and familiarize yourself with the constellations by taking one of our night watch sheets on your way out which will not only point out which star patterns you can see this month, but also show you which planets to look out for amongst "The Summer Night Sky".