

# STAR CONSTELLATIONS

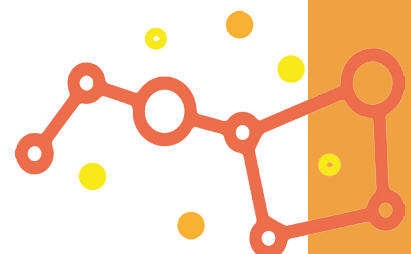
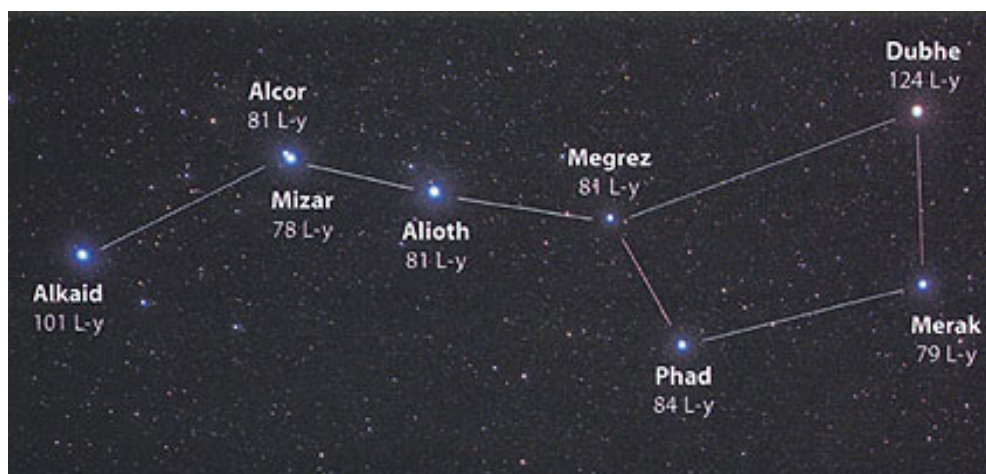
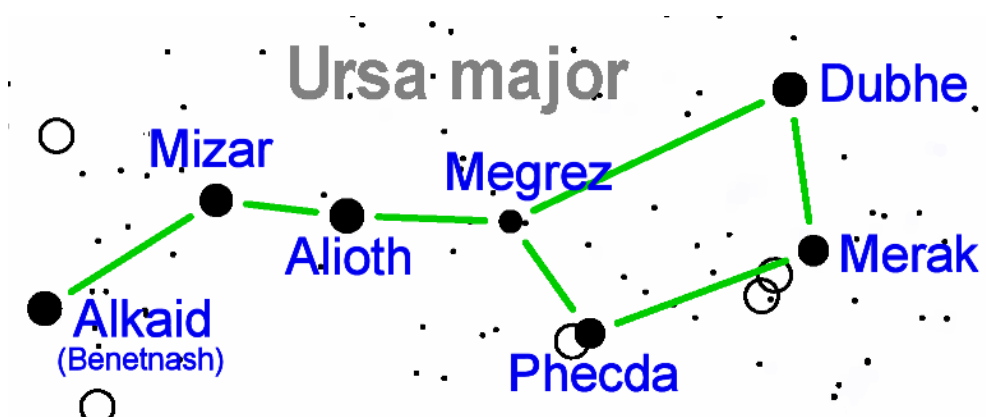
The universe is infinite and still expanding. Stars are not identical and many different ones form constellations. The constellations that we cover in the gold arrow are important because of the Polaris and the cubs must understand its purpose.

Three star constellations are being introduced in this program, however one can work on the *Astronomer's Badge* at the same time.

The plough and Cassiopeia are visible all year round whilst the Orion is only visible between the months of November and April. It is a very interesting session and you can amalgamate a Night Hike when you do this session (or get an astronomer/amateur to do this session)

## Ursa Major

Ursa Major (Latin: Larger She-Bear) is a constellation also known as The Big Dipper (US) or the Plough (UK). In Malta it is sometimes called 'is-siġġu' (the chair).



## How the Big Dipper's stars are moving in space?

Astronomers sometimes speak of the fixed stars, but they know that the stars are not truly fixed. They move in space. Thus the star patterns that we see today will, slowly but surely, drift apart over the long course of time. But even 25,000 years from now, the Big Dipper pattern will look nearly the same as it does today.

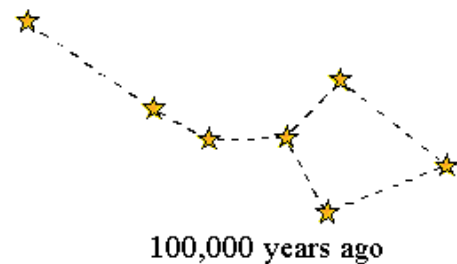
Astronomers have found that the stars of the Big Dipper (excepting the pointer star, Dubhe, and the handle star, Alkaid) belong to an association of stars known as the Ursa Major Moving Cluster. These stars, loosely bound by gravity, drift in the same direction in space.

In 100,000 years, this pattern of Big Dipper stars (minus Dubhe and Alkaid) will appear much as it does today! But there will be some differences, as illustrated in the drawing below:

**The Little Dipper** is a constellation also known as *Ursa Minor* (Latin: Smaller She-Bear).

Like the Great Bear, the tail of the Little Bear may also be seen as the handle of a ladle, hence the name Little Dipper. It was one of the 48 constellations listed by the 2nd century astronomer Ptolemy, and remains one of the 88 modern constellations. Ursa Minor is notable as the location of the north celestial pole, although this will change after some centuries due to the precession of the equinoxes. Equinoxes is the time or date that happens twice a year at which the sun crosses the celestial equator, when day and night are of equal length (about 22 September and 20 March).

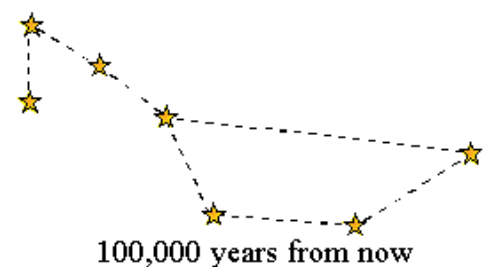
**Polaris, the brightest star** in the constellation, is a yellow-white supergiant and brightest in the night sky, lies nearly in a direct line with the axis of the Earth's rotation "above" the North Pole. It is therefore called the **North Star**. Polaris stands almost motionless in the sky throughout the year, and all the stars of the Northern sky appear to rotate around it. Therefore, it makes an excellent fixed point from which to draw measurements for celestial navigation and for astrometry.



100,000 years ago

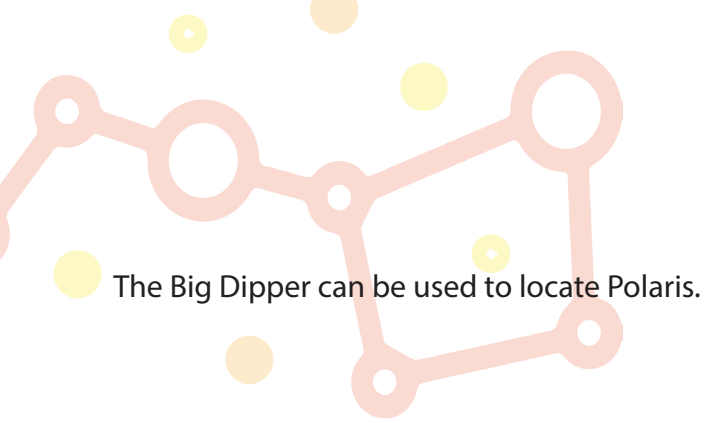


today



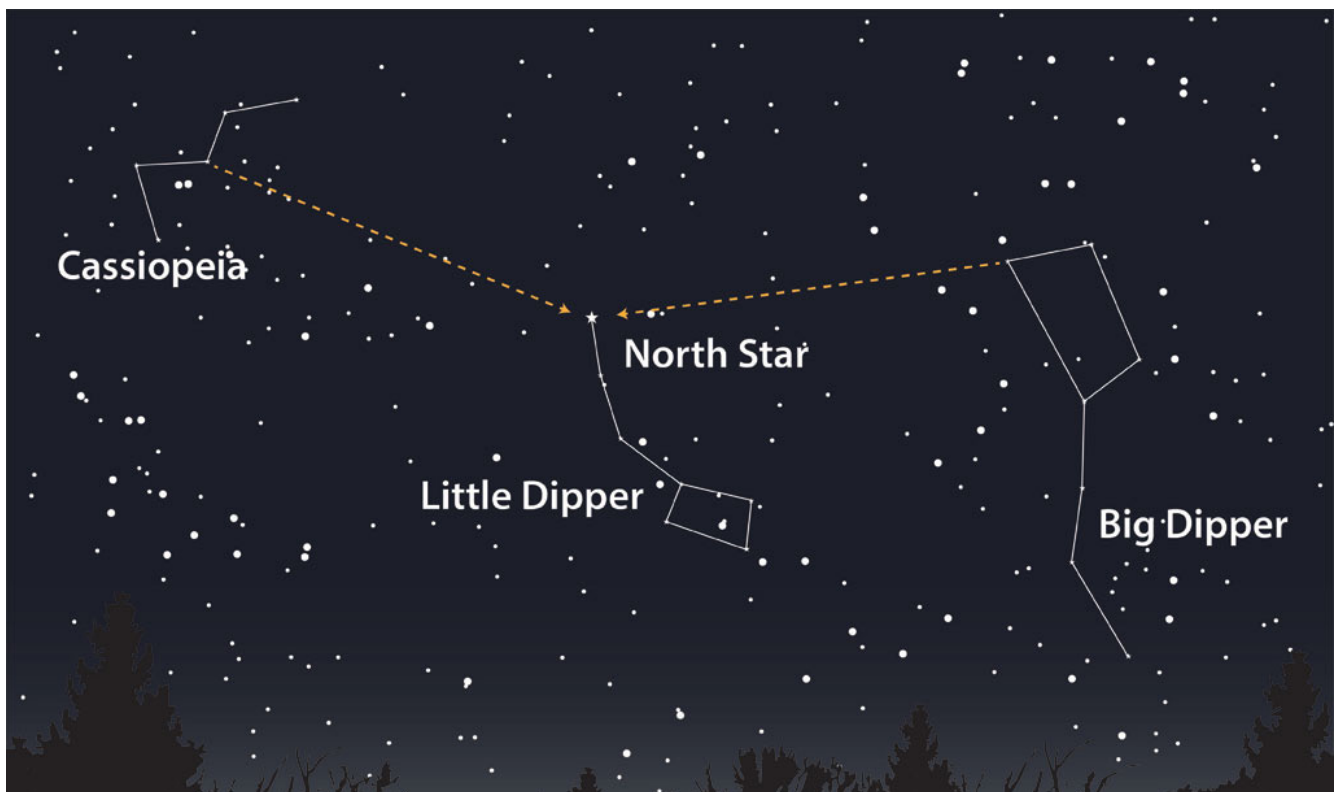
100,000 years from now



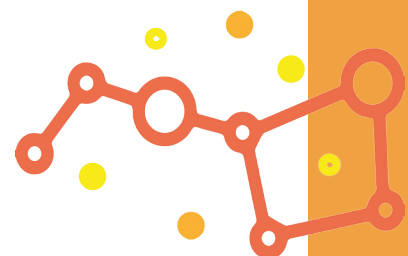


### Cassiopeia

It is opposite the Big Dipper. In northern locations above 34°N latitude it is visible year-round and in the tropics it can be seen at its clearest in from September to early November in its characteristic 'M' shape. Even in low southern latitudes below 25°S it can be seen low in the North.



GOLD ARROW



## Orion's Belt and Orion

It was named after Orion, a hunter in Greek mythology

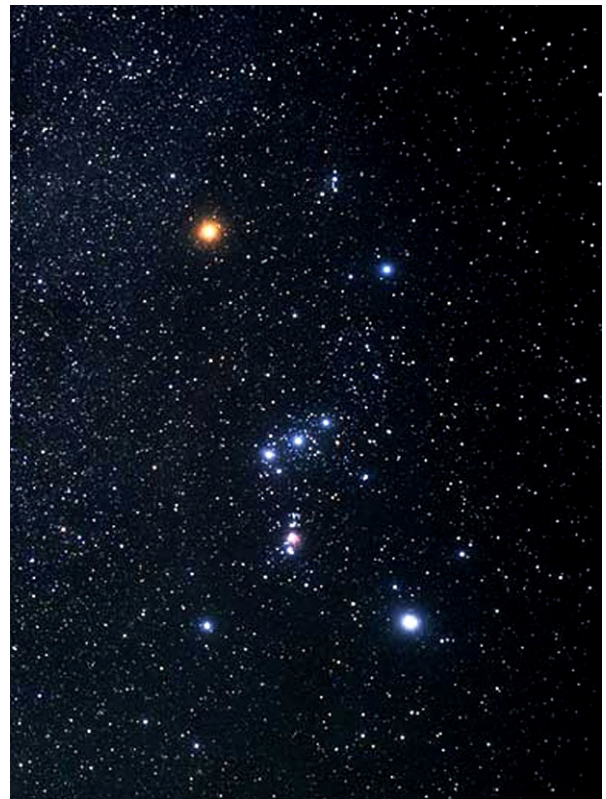
### Belt

Its brightest stars are Rigel and Betelgeuse, a blue-white and a red supergiant, respectively. Orion's Belt consists of the three bright stars Alnitak, Alnilam, and Mintaka.

Alnitak is around 800 light years away from earth and is 100,000 times more luminous than the Sun - much of its radiation is in the ultraviolet range, which the human eye cannot see.

Alnilam is approximately 1,340 light years away from Earth, shines with magnitude 1.70, and with ultraviolet light is 375,000 times more luminous than the Sun.

Mintaka is 915 light years away and shines with magnitude 2.21. It is 90,000 times more luminous than the Sun and is a double star: the two orbit each other every 5.73 days.



### Head

Three stars compose a small triangle that marks the head. The apex is marked by Meissa a hot blue giant of spectral which lies some 1,100 light years distant.

### North Arrow

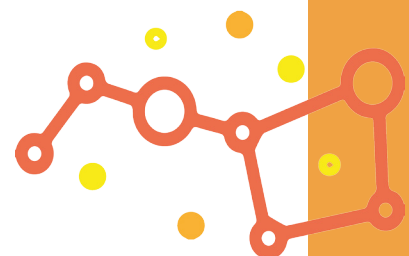
Together the 'Alnitak, Alnilam, & Mintaka', the 'M42, M43' at the lower end form the tail of an arrow while 'Alnilam' form the head of the arrow. All together form an arrow that always points 'NORTH'. Therefore, it is used as navigational guide at night especially in the desert such as Sahara where there are not many natural signs.

### Club

Stretching north from Betelgeuse are the stars that make up Orion's club. Mu Orionis marks the elbow, Nu and Xi mark the handle of the club, and Chi1 and Chi2 mark the end of the club.

### Shield

West from Bellatrix lie six stars which make up Orion's shield.



## Mythology

When Orion is not visible (ie during the summer months), another constellation can be seen: Scorpius. The ancient Greeks thought of several stories why this may be.

One story says that Orion was either bragging that he was the best hunter, or else someone was jealous that he was, so a scorpion was sent to kill him. This it managed to do, so now Orion fears the scorpion, and that's why they are never seen together. Orion is seen during the Winter, while Scorpius is seen during the Summer.

Another story says that Orion and Andromeda, daughter of Queen Cassiopeia, fell in love. Cassiopeia didn't want her daughter to love a common hunter, so she sent a scorpion to kill Orion. Zeus, king of the gods, saw this and punished Cassiopeia: he ordered that she shall sit on a chair, and for 6 months of the year the chair is turned upside-down, so she has to cling to it in order not to fall. (this final part hints towards Cassiopeia, and also Ursa Major/Minor, always being visible, but they change orientation – become upside-down – in winter and summer).



## Suggestions:

This activity should be done outside, ideally with the aid of someone who understand the night sky and can do a fun session with cubs. The aid of a telescope can help the cubs see clearer the distinction between planets (sizes, distances and colors). If one observes the night sky carefully he might even see a satellite orbiting our planet, or a shooting star.

# ACTIVITY FACT SHEET



**Activity:** Star Gazing



**Objective:** Learn some Star Constellations



**Time:** 30 mins – 1hr



**Outline:** This activity can be part of a night hike. Ask the Cubs to look at the night sky, and try to come up with shapes and forms. Then, they can make up a story involving those shapes. This can be done as a Six.

Tell the Cubs that many ancient peoples have done the same thing – most modern constellations are based on the ancient Greek constellations. Give the Cubs the constellation flashcards, and ask them to find the constellations in question. After doing this, point out the significance of the relationship between Ursa Major, Ursa Minor, and Cassiopeia.



**Equipment:** Telescope, constellation flashcards



**Place:** Outdoors (in a dark place- in order to see the stars better)



**Group Size:** Pack









**3rd Parties:** N/A



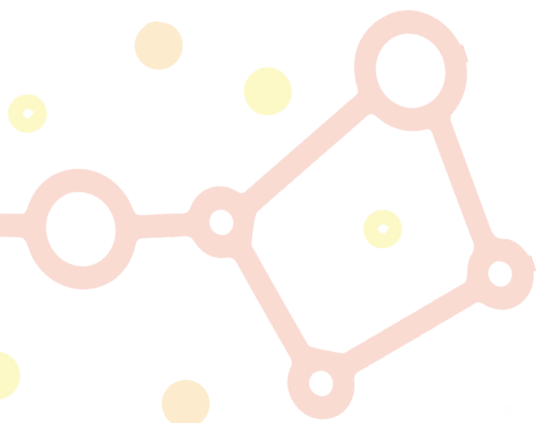
# ACTIVITY FACT SHEET



## During the Activity:

-  – As it is essential to go out and observe the night sky, the cubs will be encouraged to stay together as 1 group. If this activity is done by astronomer/amateur, parents/guardians can also join and enjoy the star gazing activity.
-  – After the explanation is done, the cubs are encouraged to move around and find a particular star constellation in their own six.
-  – The cubs will learn about the universe, galaxy, planets, telescopes and any other subject related material.
-  – Trying to see other constellations or identifying other planets.
-  – By the star gazing activity, the cubs will be able to make a link between spirituality and emotions. This activity may help the cubs to feel happiness and amazement out of the simplicity as well as the complexity of the universes that surround us.
-  – Seeing such a large sky packed with stars some cubs might come up with the questions like; is there any other form of life out there? What created everything? What happens when we die? Such concepts make us think deep that even might influence us. Unfortunately there is no clear answer, but one thing that is for sure is that we are just a tiny piece of the whole Universe.

GOLD ARROW



G13.7

