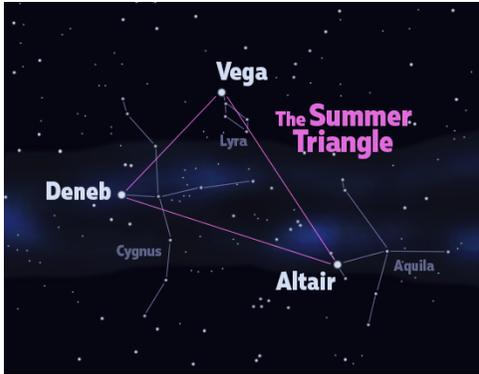


# Kitt Peak Nightly Observing Program

## Splendors of the Universe on YOUR Night!

Many pictures are links to larger versions.

Click here for the [“Best images of the OTOP” Gallery](#) and more information.



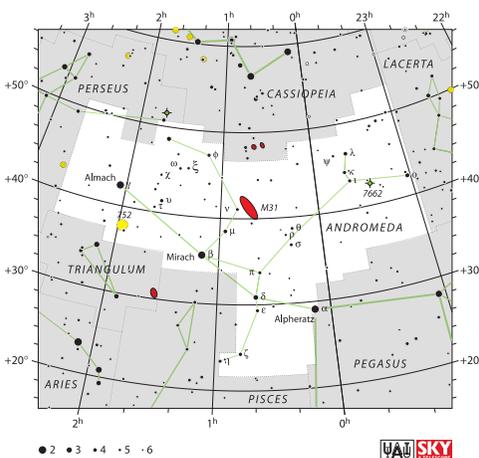
### Summer Triangle

The Summer Triangle is an asterism involving a triangle drawn on the northern hemisphere's celestial sphere. Its defining vertices are the stars Altair, Deneb, and Vega, which are the brightest stars in the constellations Aquila, Cygnus, and Lyra, respectively.



### The Coathanger

Also called Cr 399, or Brocchi's Cluster, this group of stars might remind you of a closet. The stars that make up The Coathanger are not a part of a cluster, but instead, have randomly arranged themselves in a coathanger-like shape. Chaotic stellar orbital motion can sometimes make interesting shapes!

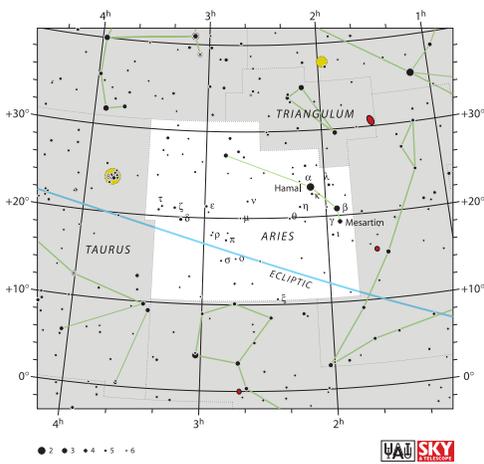


### Andromeda

Andromeda was the princess of myth who was sacrificed by her parents to the sea monster Cetus. Fortunately, the hero Perseus came along to save her, and they were eventually married. The constellation Andromeda is host to the Andromeda Galaxy. Although there are smaller, dwarf galaxies that are closer to our galaxy, Andromeda is the closest big galaxy like our own; in fact, it's bigger.

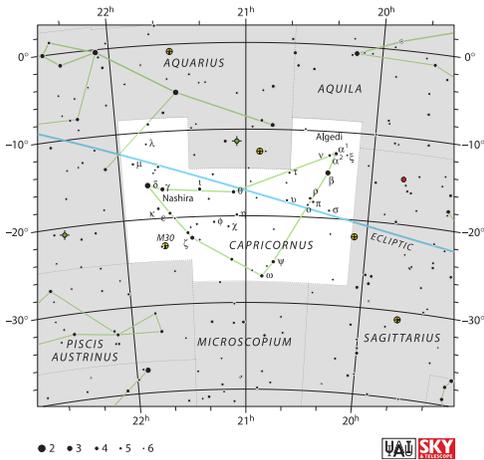
# Aries

Aries is a medium-brightness constellation, but with few stars and an indistinctive shape, which makes it more challenging to recognize.



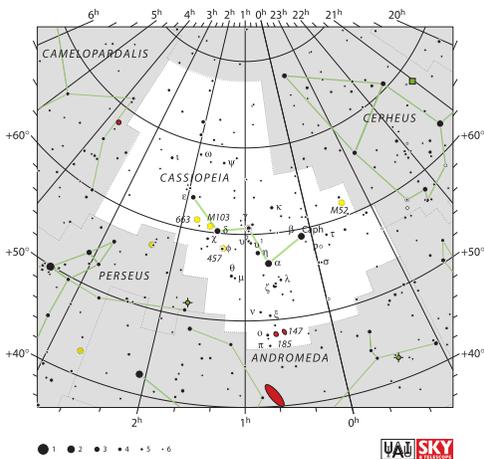
# Capricornus

This faint zodiac constellation's name means "horned goat", and is often depicted as not only a goat, but a sea-goat. It's faint and hard to spot, but is roughly triangular-shaped. Zodiac constellations are the constellations along the ecliptic—the plane of the Solar system. This means planets pass through Capricornus from time to time.



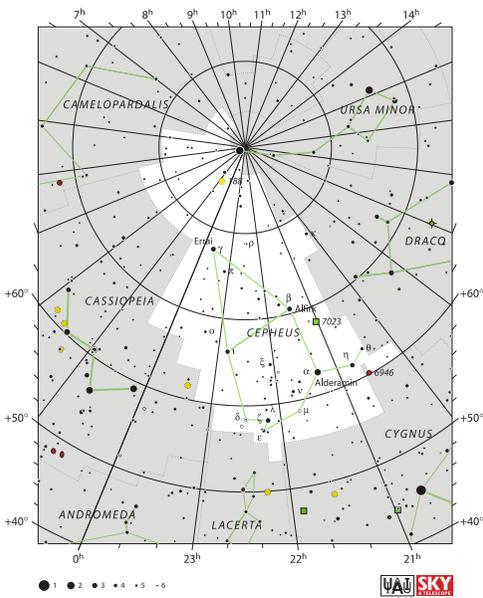
# Cassiopeia

Cassiopeia is widely recognized by its characteristic W shape, though it may look like an M, a 3, or a  $\Sigma$  depending on its orientation in the sky, and your position on Earth. However it's oriented, once you've come to know its distinctive zig-zag pattern, you'll spot it with ease. The plane of the Milky Way runs right through Cassiopeia, so it's full of deep sky objects—in particular, a lot of open star clusters. Cassiopeia is named for the queen from Greek mythology who angered the sea god Poseidon when she boasted that her daughter Andromeda was more beautiful than his sea nymphs.



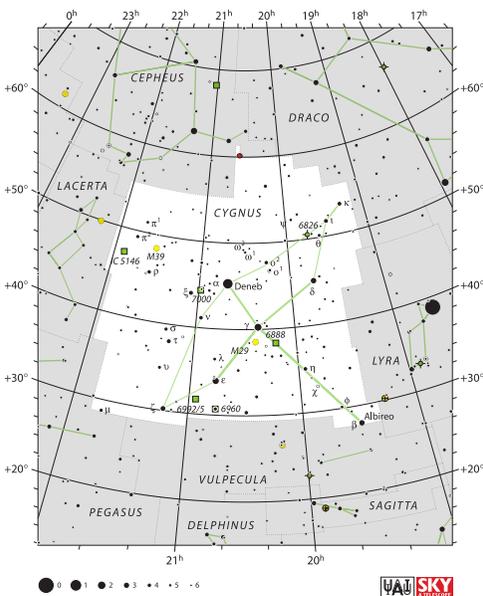
# Cepheus

King Cepheus from Greek mythology was husband to Cassiopeia and father of Andromeda. The brightest stars in the constellation Cepheus seem to form a kind of crooked house, with the roof pointing to the North. This constellation is very near the Celestial North Pole, so it's not visible from the Southern Hemisphere. The star Delta Cephei was the first ever identified cepheid variable star, a very important kind of variable stars that helps astronomers determine distances to nearby galaxies.



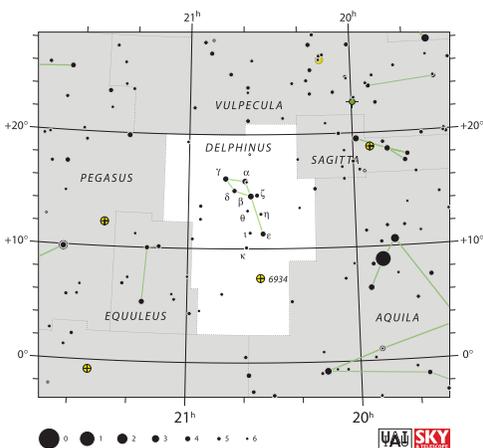
# Cygnus

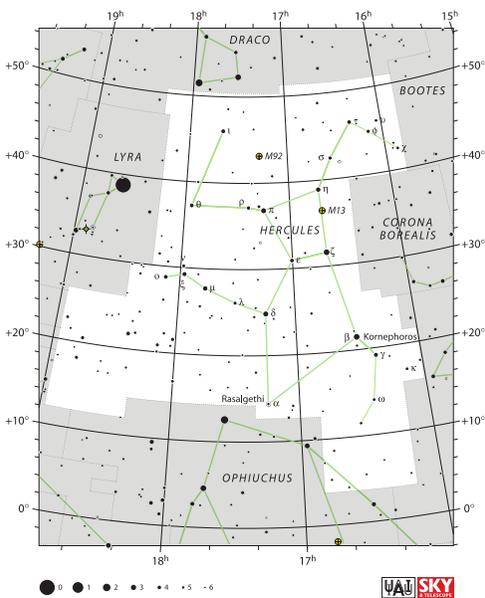
Cygnus is a large constellation, prominent in the Northern Hemisphere. Its name comes from the Greek for "Swan" and can be imagined as a giant, celestial swan, flying overhead, with its wings fully extended. The brightest star in Cygnus is Deneb, which is one of the brightest stars in the sky, and a whopping 800 lightyears away! Deneb is one point of an asterism called the Summer Triangle—three very bright stars that form a large triangle shape prominent in the Northern hemisphere summer skies.



# Delphinus

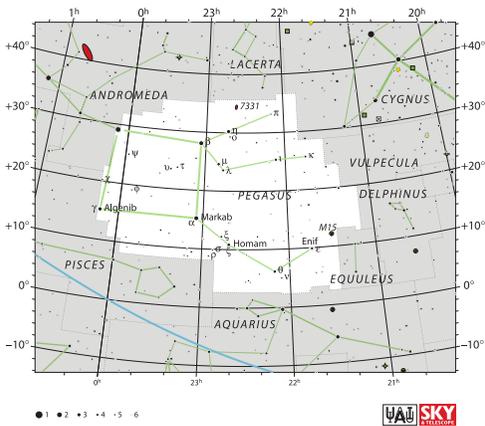
Little Delphinus looks like a tiny celestial dolphin breaching the waves of a vast cosmic sea. It is small and faint, but has a distinctive dolphin shape, and is right in the middle of the plane of the Milky Way.





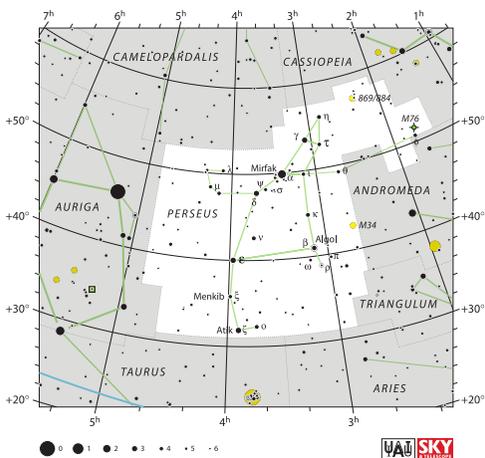
# Hercules

Hercules is named for the famous hero of Greek mythology by the same name. It's one of the larger constellations, but its stars are of only moderate brightness. The Keystone is a well known trapezoid-shaped asterism (association of stars that are not an official constellation) within Hercules. This constellation is host to M13 (Messier 13), a globular star cluster. Otherwise known as the Hercules Globular Cluster, M13 is home to 300,000 stars, and is just over 22,000 light-years away.



# Pegasus

This constellation is named for one of the most beloved creatures of Greek mythology—the winged horse named Pegasus. Within Pegasus is a well known asterism containing the 3 brightest stars in the constellation (+ 1 in Andromeda) called The Great Square of Pegasus. Alpheratz, the brightest star in the square, actually belongs to the constellation Andromeda, but in the past, this star had been considered to belong to both constellations.

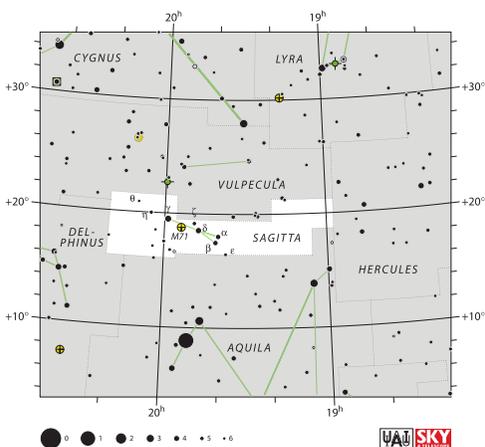


# Perseus

Hero of Greek mythology, Perseus is the character who slayed Medusa and rescued the Princess Andromeda from the sea monster Cetus. This is why you will find the constellations Andromeda, Cetus, and Andromeda's parents Cassiopeia and Cepheus, nearby each other in the sky. Perseus's brightest star is called Mirfak (Arabic for elbow). The plane of the Milky Way runs through Perseus, so there are many deep sky objects to be found.

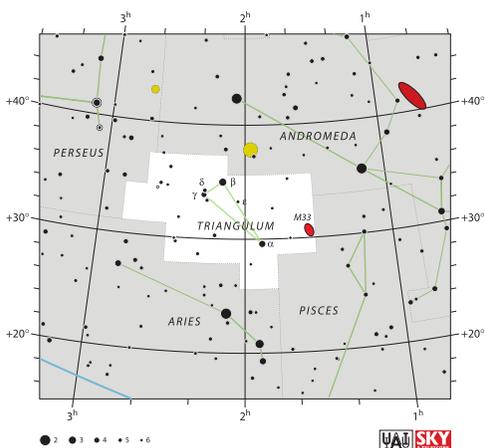
# Sagitta

Sagitta, the arrow, is a small, dim constellation. It is located between the larger, brighter constellations Cygnus (the swan), and Aquila (the eagle). The only notable deep sky object in this small constellation is Messier 71, which is a peculiar globular star cluster.



# Triangulum

Triangulum is a small and simple constellation, and perhaps the only constellation that truly looks like its namesake—a triangle. Within the boundaries of the constellation lies one of our nearest neighbor galaxies—a galaxy known as the Triangulum Galaxy (Messier 33). At only 3 million light-years away, Triangulum is one of our closest neighbors.



# M31 Andromeda Galaxy

The **Andromeda Galaxy** is our nearest major galactic neighbor. It is a spiral galaxy 2,500,000 light-years away, and has a diameter of 220,000 light-years. This galaxy contains as much material as 1.5 trillion suns.



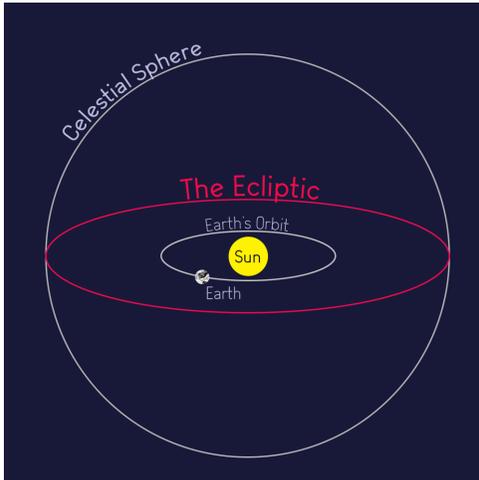
# M33 Triangulum Galaxy

The **Triangulum Galaxy**, like **M31**, is a prominent member of our local group of galaxies. It lies at a distance of 2,900,000 light-years away and is approximately 60,000 light-years across.



## M13 Hercules Globular

**M13**, the "**Great Globular Cluster in Hercules**" was first discovered by Edmund Halley in 1714, and later catalogued by Charles Messier in 1764. It contains 300,000 stars, and is 22,000 light-years away. Light would need over a century to traverse its diameter.



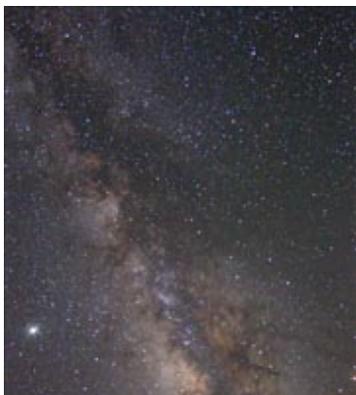
## Ecliptic

The ecliptic is a path in the sky, forming a great circle around the Earth, which the Sun and other planets of the Solar System move along. It is formed where the plane of the Solar System intersects with the Earth's sky.



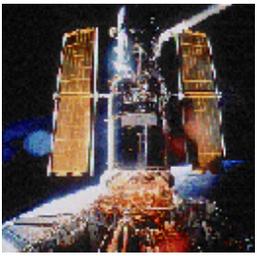
## Meteors

Quick streaks of light in the sky called meteors, shooting stars, or falling stars are not stars at all: they are small bits of rock or iron that heat up, glow, and vaporize upon entering the Earth's atmosphere. When the Earth encounters a clump of many of these particles, we see a meteor shower lasting hours or days.



## Milky Way

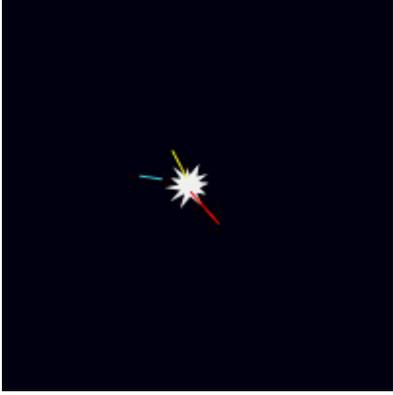
That clumpy band of light is evidence that we live in a disk-shaped galaxy. Its pale glow is light from about 200 billion suns!



## Satellites

Human technology! There are almost 500 of these in Low Earth Orbit (we can't see the higher ones). We see these little "moving stars" because they reflect sunlight.

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## Scintillation

The twinkling of star light is a beautiful effect of the Earth's atmosphere. As light passes through our atmosphere, its path is deviated (refracted) multiple times before reaching the ground. Stars that are near to the horizon will scintillate much more than stars high overhead since you are looking through more air (often the refracted light will display individual colors). In space, stars would not twinkle at all. Astronomers would like it if they could control the effects of this troubling twinkle.

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## Double Cluster

The "**Double Cluster**" (**NGC 884** and **NGC 869**) is a pair of two open star clusters that are a treat for binoculars and telescopes alike. Each is a congregation of many hundreds of stars, around 50-60 light-years in diameter. These clusters are both about 7,500 light-years away.

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## M45 The Pleiades

**M45**, the "**Pleiades**," is a bright, nearby star cluster, in the last stages of star formation. About seven stars stand out as the brightest in the cluster, and is why the cluster is also known as the "**Seven Sisters**," alluding to the Pleiades, or Seven Sisters from Greek mythology. In Japanese, the cluster is known as "**スバル**," "**Subaru**," and is featured as the logo of the automobile manufacturer of the same name. The Pleiades lies about 440 light-years away and is a very young (for an open star cluster) 100 million years old.

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## Moon

The same side of the Moon always faces Earth because the lunar periods of rotation and revolution are the same. The surface of the moon is covered with impact craters and lava-filled basins. The Moon is about a fourth of Earth's diameter and is about 30 Earth-diameters away.

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## Saturn

Saturn, the second-largest planet in the Solar System, is known for its showy but thin rings made of ice chunks as small as dust and as large as buildings. Its largest moon, Titan, has an atmosphere and hydrocarbon lakes; at least 61 smaller moons orbit Saturn.

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## Double Double ( $\epsilon$ Lyr)

The **Double-Double** ( $\epsilon$  Lyrae) looks like two stars in binoculars, but a good telescope shows that both of these two are themselves binaries. However, there may be as many as ten stars in this system! The distant pairs are about 0.16 light-year apart and take about half a million years to orbit one another. The Double-Double is about 160 light-years from Earth.

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## Mizar & Alcor

In the handle of the Big Dipper, **Mizar & Alcor** ( $\zeta$  & 80 Ursae Majoris) or the “Horse & Rider” form a naked-eye double star. They are traveling through space together about 80 light-years away from us, separated by about a light-year. However, it is unknown if they are actually gravitationally bound to each other. A telescope splits Mizar itself into two stars, but these both are again doubles, bringing the total in this system to six.

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## Mu Cephei ( $\mu$ Cep)

**Mu Cephei** ( $\mu$  Cephei), also known as **Herschels Garnet Star**, is a red supergiant star in the constellation Cepheus. It is one of the largest and most luminous stars known in the Milky Way. It appears garnet red and is given the spectral class of M2 Ia. Since 1943, the spectrum of this star has served as one of the stable anchor points by which other stars are classified.

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*Phil Yehle*

Your Telescope Operator and Guide. Thank you for joining me this evening! See you soon!!

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The web page for the program in which you just participated is at [Nightly Observing Program](#). Most of the above images were taken as part of the Overnight Telescope Observing Program. For more information on this unique experience please visit [Overnight Telescope Observing Program](#).

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