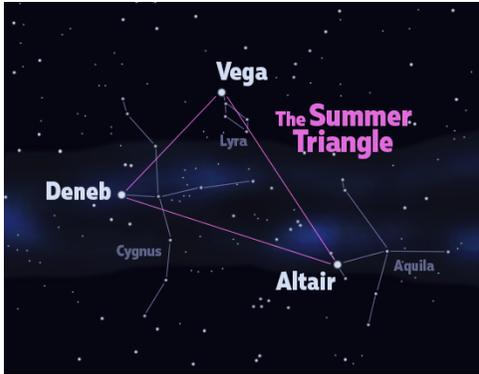


# Kitt Peak Nightly Observing Program

## Splendors of the Universe on YOUR Night!

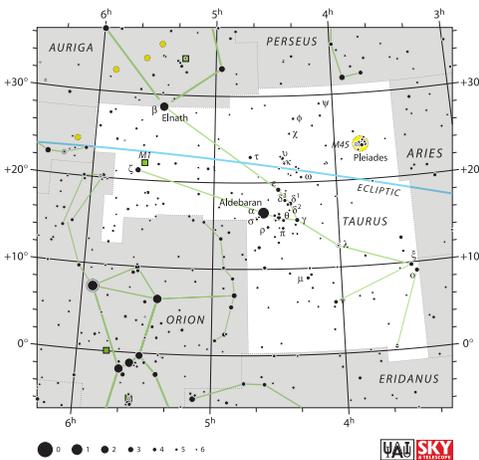
Many pictures are links to larger versions.

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.



## Taurus

You can look to Taurus, the bull, to find the two closest open star clusters to our Solar System. The Pleiades (or, Seven Sisters) is the second closest at 444 light-years away. It's an obvious cluster to even the naked eye. The Pleiades is named for the seven daughters of Atlas and Pleione of Greek Mythology. To the left of the Pleiades, the Hyades (siblings to the Pleiades in mythology) is the closest open star cluster to Earth at 153 light-years away. The Hyades has a characteristic V shape to help identify it.



## M17 Swan Nebula

**M17**, also known as the "**Swan Nebula**," or the "**Omega Nebula**" is a vast cloud of gas—mostly hydrogen, in which clumps of gas are contracting to make new stars. The nebula is 15 light-years across, and 5,500 light-years away.



## 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.

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## M32 (Smaller Satellite of Andromeda)

**M32** is a small, but bright companion galaxy to M31. It orbits M31 much like the Moon orbits the Earth. It lies at the same distance as M31 but is much smaller (6,500 light-years across).

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## M74

At a distance of 32 million lightyears in the constellation Pisces, **M74** is home to about 100 billion stars. It is the archetypical example of a grand design spiral galaxy. Due to its large apparent size, it is the second lowest surface brightness object in Messier's catalogue, and the most difficult one to observe. The spiral structure is only visible through a telescope, when using averted vision under very dark skies.

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## NGC 7331 Milky Way's Twin

At a distance of 40 million light-years away in the constellation Pegasus, **NGC 7331** is similar in size and structure to the Milky Way, and thereby often referred to as "**The Milky Way's Twin**". However, unlike the Milky Way, this galaxy does not have a bar-shaped central buldge. Actually, its central concentration of stars is peculiar in that it rotates in the opposite direction respective to the rest of the spiral disk.

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## 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.

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## M15

**M15** is a distant globular cluster, 33,000 light-years away. It has 100,000 stars, and is one of the oldest known globular clusters, having formed about 12 billion years ago.

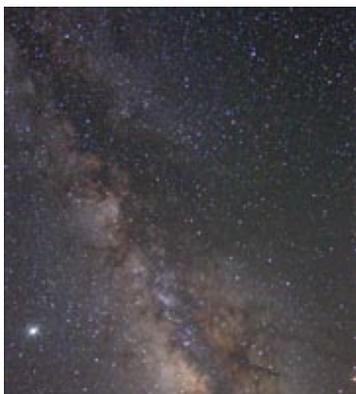
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## Meteors

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.

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## 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!

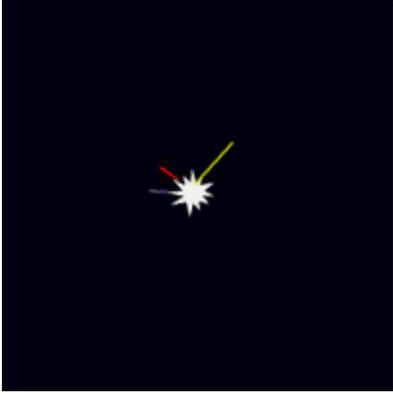
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## Satellites

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.

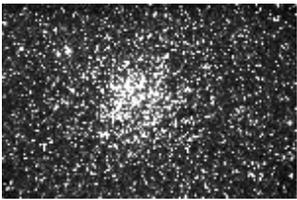
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## Scintillation

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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## M11 Wild Duck Cluster

**M11** is an open star cluster also known as the "**Wild Duck Cluster**," due to its purported prominent V-shape, reminiscent of a flock of wild ducks in flight. This open cluster is 20 light-years in diameter and 6,200 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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## NGC 457 The Owl Cluster

**NGC 457** is an open star cluster in the constellation Cassiopeia. It was discovered by William Herschel in 1787, and lies over 7,900 light-years away from the Sun. It has an estimated age of 21 million years. The cluster is sometimes referred by amateur astronomers as the **Owl Cluster** or **ET Cluster**. The cluster features a rich field of about 150 stars of magnitudes 12-15.

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## M27 (Dumbbell Nebula)

M27: The "Dumbbell Nebula" is the ghost of a star; the ejected outer shell of gas is still illuminated by the star's white-hot core. Herschel named this type of object a "planetary" nebula, just because it looks round.

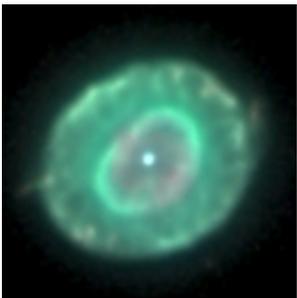
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## M57 (Ring Nebula)

M57: The Ring Nebula. This remnant of a dead star looks exactly as it's name says - a ring or doughnut shape cloud of gas. The nebula is about 2.6 lightyears across and lies about 2,300 lightyears away.

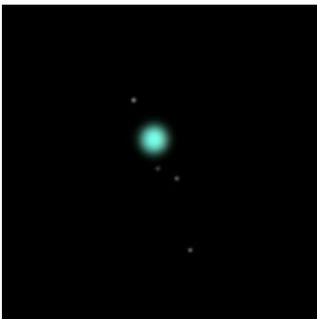
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## NGC 7662 (Blue Snowball)

NGC 7662: A planetary nebula nicknamed the "Blue Snowball." It is a round cloud thrown off by a dying star, expanded to 1.6 lightyears in diameter. The expanding hot gas would have fried any planets orbiting the star.

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## Uranus

Uranus, the seventh planet from the Sun, was discovered by Sir William Herschel in 1781. It has a dark set of rings and at least 27 moons. Uranus's axis of rotation is almost 90 degrees from those of the other planets, as if Uranus has been tipped onto its side.

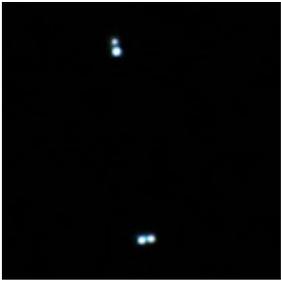
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## Albireo ( $\beta$ Cyg)

Named long before anyone knew it was more than one star, **Albireo** ( $\beta$  Cygni) comprises of a set of stars marking the beak of Cygnus, the swan. Through a telescope, we see two components shining in pale, but noticeably contrasting colors: orange and blue. The difference in color is due to the stars' difference in temperature of over 9000°C! The brighter orange component, Albireo A, is actually a true binary system, though we can't resolve two stars in the telescope. The fainter blue component, Albireo B, may be only passing by, and not gravitationally interacting with Albireo A at all. Albireo is about 430 light-years away.

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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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## 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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*Sara Thompson*

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

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experience please visit [Overnight Telescope Observing Program](#).

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