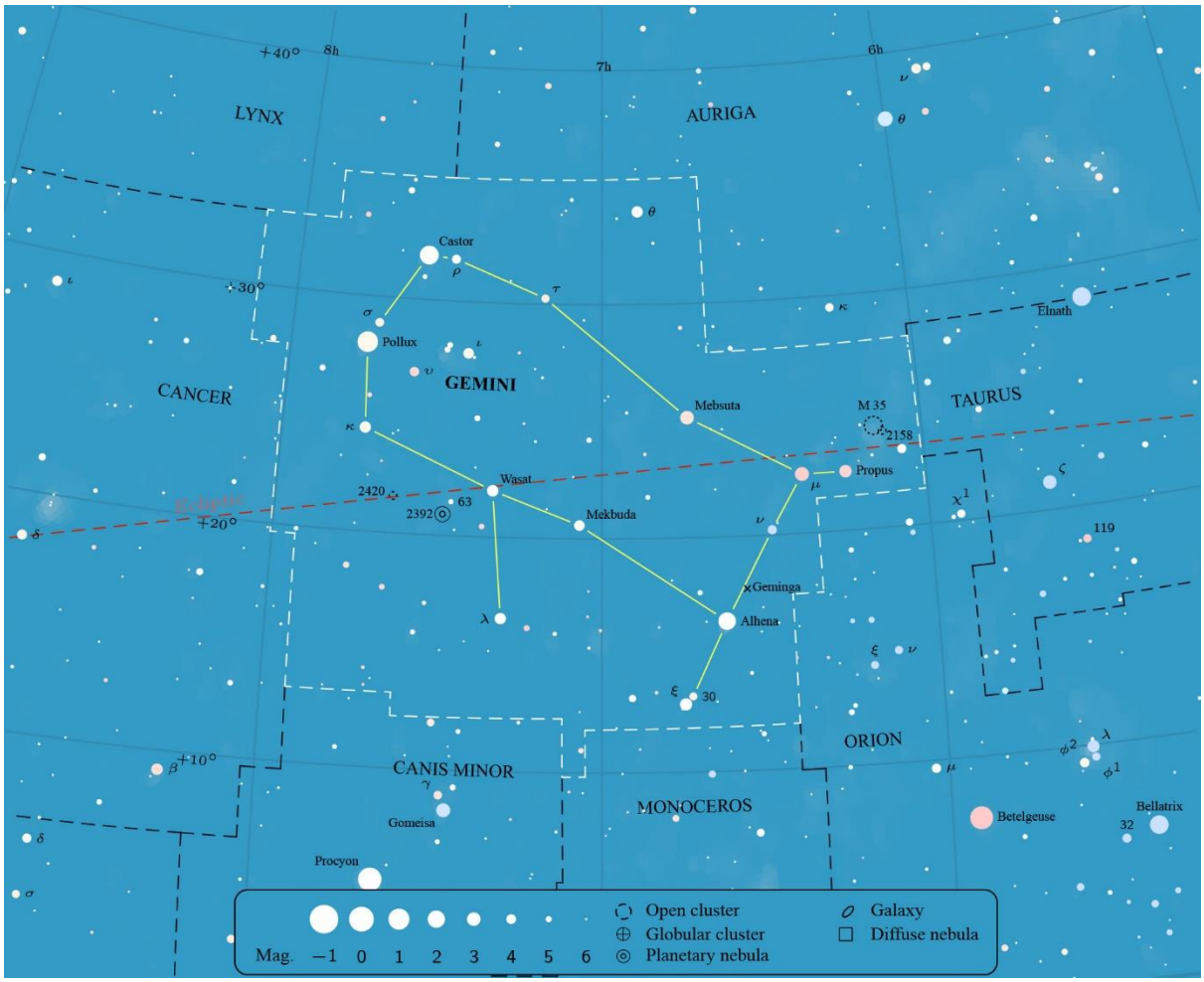
# *GEM* GEMINI *GEMINORUM*




Gemini is one of Ptolemy's original constellations and one of the 12 traditional zodiac constellations. It occupies a position on the ecliptic close to position of the Sun at the June solstice. The Sun lies within its borders from June 22nd until July 21st.

In Greek mythology Gemini represents the twins Castor and Pollux the sons of Leda, a queen of Sparta. Although they shared the same mother Castor was the son of Tyndareus, the king of Sparta, while Pollux was the son of Zeus who had seduced Leda. When the mortal Castor died, Pollux was inconsolable and begged Zeus to make his brother immortal. Zeus obliged and reunited them among the stars.

One of the brightest gamma sources in the sky – named Geminga (derived from a word meaning "It's not there" in Milanese dialect of Lombard) – lies within Gemini. For 20 years the cause wasn't known until a neutron star was discovered in 1991. Geminga is the remnant of supernova explosion 300,000 years ago. The distance is just 800 light-years.

## STARS

α Geminorum (**Castor**, mag. +1.6) is the second brightest star in Gemini. Telescopes reveal Castor to be a binary consisting of two stars of slightly unequal brightness. The separation is about 6 arcseconds. Spectroscopic studies revealed each component to be a close binary pair. Telescopes reveal a 10th magnitude companion separated by 73 arcseconds; spectroscopic studies have shown that this too is a close binary comprised of a pair of red dwarf stars. Castor is apparently a system of 6 stars. The distance is about 51 light-years.

**Figure 1 The open cluster M 35 in Gemini. The smaller, more distant open cluster NGC 2158 is visible just above and to the right of the central regions.**

β Gem (**Pollux**, mag. +1.3) is the brightest star in Gemini. It is an orange giant star and the closest example to the Sun. The distance is about 34 light-years.

γ Gem (**Alhena**, mag. +1.9) is a white subgiant star at a distance of about 109 light-years.

δ Gem (**Wasat**, mag. +3.5) is a binary star comprising two components separated by 5 arcseconds. The secondary is magnitude +8.2 and the period is in excess of 1,000 years. The distance to the star is about 59 light-years.

ε Gem, (**Mebsuta,** mag. +3.1) is a yellow supergiant at an estimated distance of 840 light-years. It forms an optical double with wide 9$^{th}$ magnitude companion separated by 111 arcseconds.

ζ Gem (**Mekbuda**) is a yellow supergiant and a Cepheid variable star whose brightness changes from mag. +3.6 to +4.2 over a period of 10.2 days. It also forms an optical double with a wide, 8$^{th}$ magnitude companion. The distance is estimated to be 1,200 light-years.

η Gem (**Propus**) is a semi-regular variable star whose brightness fluctuates between mag. +3.1 and +3.9 over a period of roughly 233 days. It is a suspected triple star system. The primary is a red giant star whose pulsations are the source of the variability mentioned. Spectroscopic studies suggest it has a close companion but very little is known about this star. A more distant companion has been resolved visually with a separation of about 1 arcsecond – a 6$^{th}$ magnitude yellow dwarf with an orbital period of nearly 500 years. The distance is roughly 380 light-years.

κ Gem (mag. +3.6) is a double star for larger telescopes. The companion is 8th magnitude and the separation is about 7 arcseconds. The distance is around 143 light-years.

ν Gem (mag. +4.1) is an easy double star for binoculars and telescopes. The companion is 8th magnitude and the separation is about 112 arcseconds. The distance is estimated to be about 550 light-years.

μ Gem (mag. +2.9v) is a red giant star and irregular variable whose brightness fluctuates between mag. +2.8 and +3.0. The distance is estimated to be about 230 light-years.

**Figure 2 The Eskimo Nebula (NGC 2392) is a planetary nebula in Gemini.**

## DEEPSKY OBJECTS

**M 35** (mag. +5.1) is a large open cluster visible easily with binoculars and low powers on any telescope. The cluster contains about 300 stars spread over an area of sky as large as the moon. M 35 is located about 2 degrees northwest of the star η (eta) Geminorum. The cluster is about 3,900 light-years away.

**NGC 2158** (mag. +8.6) is an open cluster situated just southwest of the core of M 35. It appears as a small smudge of light in the same field of view as M 35 through small telescopes. Larger apertures may resolve the stars of the cluster. NGC 2158 is actually much more remote than M 35 – roughly 13,000 light-years away.

**NGC 2392** (mag. +8.6) is a planetary nebula known as the Eskimo Nebula because of the resemblance to a face in a parka hood. The nebula is located just over 2 degrees southeast of the star Wasat and it measures just 48 arcseconds in diameter (comparable to Jupiter at opposition). Best viewed with moderate to large instruments at high magnification to resolve the disk well enough to see contrast variations. The central star is magnitude +10.1. The estimated distance to the nebula is 6,500 light-years.

**NGC 2420** (mag. +8.3) is a rich, compressed open cluster measuring 1/3 of a moon diameter. Faintly visible in large binoculars and best seen with telescopes. The distance is about 10,000 light-years.