

# The Evening Sky Map

FREE\* EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

## Sky Calendar – December 2018

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- 3 Moon near Spica (morning sky) at 9h UT.
- 3 Moon near Venus (41° from Sun, morning sky) at 21h UT. Mag. -4.7.
- 5 Moon near Mercury (17° from Sun, morning sky) at 22h UT. Mag. 0.9.
- 7 New Moon at 7:21 UT. Start of lunation 1187.
- 7 Mars 0.04° NNW of Neptune (88° from Sun, evening sky) at 14h UT. Mags. 0.1 and 7.9.
- 9 Moon near Saturn (evening sky) at 5h UT. Mag. 0.5.
- 12 Moon at apogee (farthest from Earth) at 12h UT (distance 405,177 km; angular size 29.5').
- 14 Geminid Meteor Shower peaks at 12:30 UT. Produces bright, medium-speed meteors at its peak (up to 80 meteors/hour). Most reliable meteor shower. Easy to observe (radiant on sky map). Best after midnight.
- 15 Moon near Mars (evening sky) at 2h UT. Mag. 0.2.
- 15 Mercury at greatest elongation west (21° from Sun, morning sky) at 11h UT. Mag. -0.4.
- 15 First Quarter Moon at 11:48 UT.
- 20 Moon near the Pleiades (evening sky) at 16h UT.
- 21 Moon near Aldebaran (evening sky) at 7h UT.
- 21 Mercury 0.8° NNE of Jupiter (20° from Sun, morning sky) at 20h UT. Mags. -0.4 and -1.8.
- 21 December solstice at 22:25 UT. The time when the Sun reaches the point farthest south of the celestial equator marking the start of winter in the Northern Hemisphere and summer in the Southern Hemisphere.
- 22 Full Moon at 17:49 UT.
- 23 Jupiter 5.2° N of Antares (22° from Sun, morning sky) at 20h UT. Mags. -1.8 and 1.0.
- 24 Moon at perigee (closest to Earth) at 9:57 UT (361,062 km; angular size 33.1').
- 25 Moon near Beehive cluster M44 (morning sky) at 5h UT.
- 26 Moon near Regulus (morning sky) at 18h UT.
- 29 Last Quarter Moon at 9:36 UT.
- 30 Moon near Spica (morning sky) at 15h UT.

More sky events and links at <http://Skymaps.com/skycalendar/>

All times in Universal Time (UT). (USA Eastern Standard Time = UT - 5 hours.)



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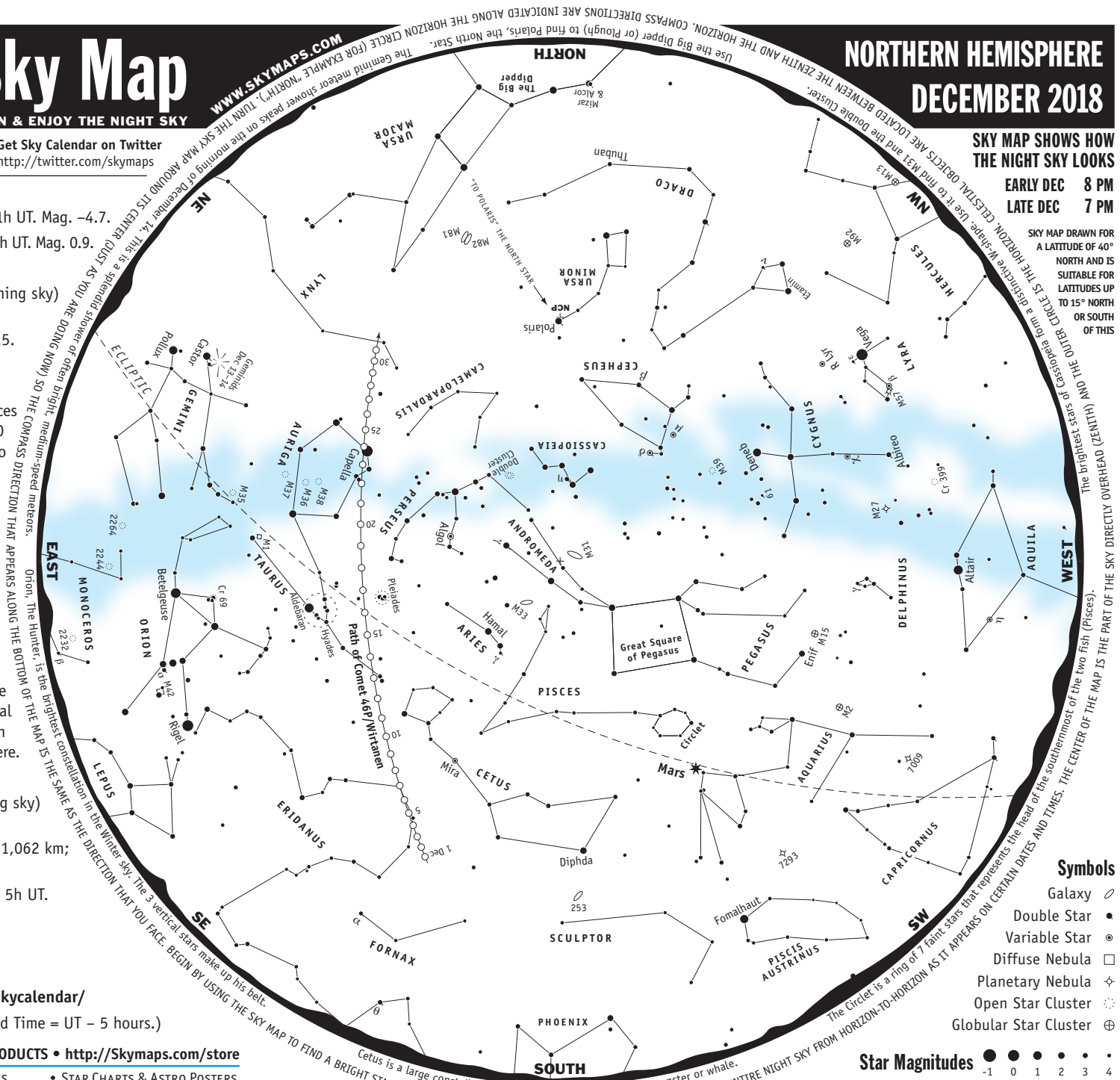
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## NORTHERN HEMISPHERE DECEMBER 2018

SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY DEC 8 PM  
LATE DEC 7 PM

SKY MAP DRAWN FOR A LATITUDE OF 40° NORTH AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS



- ### Symbols
- Galaxy ☾
  - Double Star ●●
  - Variable Star ⊙
  - Diffuse Nebula □
  - Planetary Nebula ☆
  - Open Star Cluster ○
  - Global Star Cluster ⊕

Star Magnitudes ●●●●●  
-1 0 1 2 3 4

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INSTRUCTIONS: THE SKY MAP SHOWS THE ENTIRE NIGHT SKY FROM HORIZON-TO-HORIZON AS IT APPEARS ON CERTAIN DATES AND TIMES. THE CENTER OF THE MAP IS THE PART OF THE SKY DIRECTLY OVERHEAD (ZENITH) AND THE OUTER CIRCLE IS THE HORIZON. CELESTIAL OBJECTS ARE LOCATED BETWEEN THE ZENITH AND THE HORIZON. COMPASS DIRECTIONS ARE INDICATED ALONG THE HORIZON CIRCLE (FOR EXAMPLE, NORTH). TURN THE SKY MAP AROUND ITS CENTER DUST AS YOU ARE DOING NOW) SO THE COMPASS DIRECTION THAT APPEARS ALONG THE BOTTOM OF THE MAP IS THE SAME AS THE DIRECTION THAT YOU FACE. BEGIN BY USING THE SKY MAP TO FIND A BRIGHT STAR PATTERN IN THE SKY.

## About the Celestial Objects

Listed on this page are several of the brighter, more interesting celestial objects visible in the evening sky this month (refer to the monthly sky map). The objects are grouped into three categories. Those that can be easily seen with the naked eye (that is, without optical aid), those easily seen with binoculars, and those requiring a telescope to be appreciated. **Note, all of the objects (except single stars) will appear more impressive when viewed through a telescope or very large binoculars.** They are grouped in this way to highlight objects that can be seen using the optical equipment that may be available to the star gazer.

## Tips for Observing the Night Sky

When observing the night sky, and in particular deep-sky objects such as star clusters, nebulae, and galaxies, it's always best to observe from a dark location. Avoid direct light from street lights and other sources. If possible observe from a dark location away from the light pollution that surrounds many of today's large cities.

You will see more stars after your eyes adapt to the darkness—usually about 10 to 20 minutes after you go outside. Also, if you need to use a torch to view the sky map, cover the light bulb with red cellophane. This will preserve your dark vision.

Finally, even though the Moon is one of the most stunning objects to view through a telescope, its light is so bright that it brightens the sky and makes many of the fainter objects very difficult to see. So try to observe the evening sky on moonless nights around either New Moon or Last Quarter.

## Astronomical Glossary

**Conjunction** – An alignment of two celestial bodies such that they present the least angular separation as viewed from Earth.

**Constellation** – A defined area of the sky containing a star pattern.

**Diffuse Nebula** – A cloud of gas illuminated by nearby stars.

**Double Star** – Two stars that appear close to each other in the sky; either linked by gravity so that they orbit each other (binary star) or lying at different distances from Earth (optical double). Apparent separation of stars is given in seconds of arc (").

**Ecliptic** – The path of the Sun's center on the celestial sphere as seen from Earth.

**Elongation** – The angular separation of two celestial bodies. For Mercury and Venus the greatest elongation occurs when they are at their most angular distance from the Sun as viewed from Earth.

**Galaxy** – A mass of up to several billion stars held together by gravity.

**Globular Star Cluster** – A ball-shaped group of several thousand old stars.

**Light Year (ly)** – The distance a beam of light travels at 300,000 km/sec in one year.

**Magnitude** – The brightness of a celestial object as it appears in the sky.

**Open Star Cluster** – A group of tens or hundreds of relatively young stars.

**Opposition** – When a celestial body is opposite the Sun in the sky.

**Planetary Nebula** – The remnants of a shell of gas blown off by a star.

**Universal Time (UT)** – A time system used by astronomers. Also known as Greenwich Mean Time. USA Eastern Standard Time (for example, New York) is 5 hours behind UT.

**Variable Star** – A star that changes brightness over a period of time.

# NORTHERN HEMISPHERE DECEMBER 2018 CELESTIAL OBJECTS



## Easily Seen with the Naked Eye

|            |     |   |   |
|------------|-----|---|---|
| Altair     | Aql | • | Brightest star in Aquila. Name means "the flying eagle". Dist=16.7 ly.                      |
| Capella    | Aur | • | The 6th brightest star. Appears yellowish in color. Spectroscopic binary. Dist=42 ly.       |
| δ Cephei   | Cep | ☉ | Cepheid prototype. Mag varies between 3.5 & 4.4 over 5.366 days. Mag 6 companion.           |
| Deneb      | Cyg | • | Brightest star in Cygnus. One of the greatest known supergiants. Dist=1,400±200 ly.         |
| Castor     | Gem | • | Multiple star system with 6 components. 3 stars visible in telescope. Dist=52 ly.           |
| Pollux     | Gem | • | With Castor, the twin sons of Leda in classical mythology. Dist=34 ly.                      |
| Vega       | Lyr | • | The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly.                         |
| Rigel      | Ori | • | The brightest star in Orion. Blue supergiant star with mag 7 companion. Dist=770 ly.        |
| Betelgeuse | Ori | • | One of the largest red supergiant stars known. Diameter=300 times that of Sun. Dist=430 ly. |
| Algol      | Per | ☉ | Famous eclipsing binary star. Magnitude varies between 2.1 & 3.4 over 2.867 days.           |
| Fomalhaut  | PsA | • | Brightest star in Piscis Austrinus. In Arabic the "fish's mouth". Dist=25 ly.               |
| Pleiades   | Tau | ☉ | The Seven Sisters. Spectacular cluster. Many more stars visible in binoculars. Dist=399 ly. |
| Hyades     | Tau | ☉ | Large V-shaped star cluster. Binoculars reveal many more stars. Dist=152 ly.                |
| Aldebaran  | Tau | • | Brightest star in Taurus. It is not associated with the Hyades star cluster. Dist=65 ly.    |
| Polaris    | UMi | • | The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist=433 ly.    |

## Easily Seen with Binoculars

|                |     |   |   |
|----------------|-----|---|---|
| M31            | And | ☉ | The Andromeda Galaxy. Most distant object visible to naked eye. Dist=2.5 million ly.          |
| M2             | Aqr | ☉ | Resembles a fuzzy star in binoculars.   |
| η Aquilae      | Aql | ☉ | Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7.166 days. Dist=1,200 ly.         |
| M38            | Aur | ☉ | Stars appear arranged in "pi" or cross shape. Dist=4,300 ly.                                  |
| M36            | Aur | ☉ | About half size of M38. Located in rich Milky Way star field. Dist=4,100 ly.                  |
| M37            | Aur | ☉ | Very fine star cluster. Discovered by Messier in 1764. Dist=4,400 ly.                         |
| μ Cephei       | Cep | ☉ | Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.               |
| Mira           | Cet | ☉ | Famous long period variable star. Mag varies between 3.0 & 10.1 over 332 days.                |
| χ Cygni        | Cyg | ☉ | Long period pulsating red giant. Magnitude varies between 3.3 & 14.2 over 407 days.           |
| M39            | Cyg | ☉ | May be visible to the naked eye under good conditions. Dist=900 ly.                           |
| ν Draconis     | Dra | • | Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 ly.          |
| M35            | Gem | ☉ | Fine open cluster located near foot of the twin Castor. Dist=2,800 ly.                        |
| M92            | Her | ☉ | Fainter and smaller than M13. Use a telescope to resolve its stars.                           |
| ε Lyrae        | Lyr | • | Famous Double Double. Binoculars show a double star. High power reveals each a double.        |
| R Lyrae        | Lyr | ☉ | Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days.                     |
| Cr 69          | Ori | ☉ | Lambda Orionis Cluster. Dist=1,630 ly.  |
| M42            | Ori | ☉ | The Great Orion Nebula. Spectacular bright nebula. Best in telescope. Dist=1,300 light years. |
| M15            | Peg | ☉ | Only globular known to contain a planetary nebula (Mag 14, d=1"). Dist=30,000 ly.             |
| Double Cluster | Per | ☉ | Double Cluster in Perseus. NGC 869 & 884. Excellent in binoculars. Dist=7,300 ly.             |
| 253            | ScL | ☉ | Fine, large, cigar-shaped galaxy. Requires dark sky. Member of Sculptor Group.                |
| Cr 399         | Vul | ☉ | Coathanger asterism or "Brocchi's Cluster". Not a true star cluster. Dist=218 to 1,140 ly.    |

## Telescopic Objects

|               |     |   |  |
|---------------|-----|---|--|
| γ Andromedae  | And | • | Attractive double star. Bright orange star with mag 5 blue companion. Sep=9.8".                |
| 7009          | Aqr | ✦ | Saturn Nebula. Requires 8-inch telescope to see Saturn-like appendages.                        |
| 7293          | Aqr | ✦ | Helix Nebula. Spans nearly 1/4 deg. Requires dark sky. Dist=300 ly.                            |
| γ Arietis     | Ari | • | Impressive looking double blue-white star. Visible in a small telescope. Sep=7.8".             |
| η Cassiopeiae | Cas | • | Yellow star mag 3.4 & orange star mag 7.5. Dist=19 ly. Orbit=480 years. Sep=12".               |
| Albireo       | Cyg | • | Beautiful double star. Contrasting colours of orange and blue-green. Sep=34.4".                |
| 61 Cygni      | Cyg | • | Attractive double star. Mags 5.2 & 6.1 orange dwarfs. Dist=11.4 ly. Sep=28.4".                 |
| γ Delphini    | Del | • | Appear yellow & white. Mags 4.3 & 5.2. Dist=100 ly. Struve 2725 double in same field.          |
| θ Eridani     | Eri | • | Striking blue-white double star. Mags 3.2 & 4.3. Visible in a small telescope. Sep=8.2".       |
| β Lyrae       | Lyr | ☉ | Eclipsing binary. Mag varies between 3.3 & 4.3 over 12.940 days. Fainter mag 7.2 blue star.    |
| M57           | Lyr | ✦ | Ring Nebula. Magnificent object. Smoke-ring shape. Dist=4,100 ly.                              |
| α Orionis     | Ori | • | Superb multiple star. 2 mag 7 stars one side, mag 9 star on other. Struve 761 triple in field. |
| M1            | Tau | ☐ | Crab Nebula. Remnant from supernova which was visible in 1054. Dist=6,500 ly.                  |
| M33           | Tri | ☉ | Fine face-on spiral galaxy. Requires a large aperture telescope. Dist=2.3 million ly.          |
| M81           | UMa | ☉ | Beautiful spiral galaxy visible with binoculars. Easy to see in a telescope.                   |
| M82           | UMa | ☉ | Close to M81 but much fainter and smaller.   |
| M27           | Vul | ✦ | Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist=975 ly.             |