NEW JERSEY
ASTRONOMICAL ASSOCIATION

The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

November 4, 2024

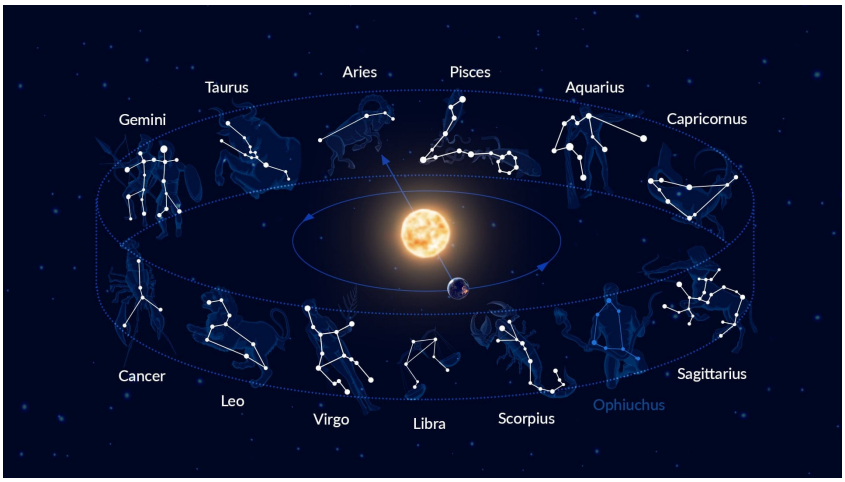
Constellations in the northern hemisphere are typically visible during specific months of the year due to Earth's rotation and orbit. Below is a general list of major northern hemisphere constellations and the best months for viewing them. Note that exact dates can vary slightly based on your location and time of year, and you may see some constellations for a few months before or after these peak times, especially in clearer, darker skies.

Winter (December - February)
Orion - December to February
Taurus - November to March
Gemini - December to April
Auriga - November to March
Canis Major - December to March
Canis Minor - December to March

Spring (March - May)
Leo - March to June
Virgo - April to July
Bootes - April to August
Hydra - March to July
Cancer - February to May
Corvus - April to June

Summer (June - August)
Hercules - May to September
Lyra - June to October
Cygnus - June to November
Aquila - July to October
Scorpius - June to September
Sagittarius - July to October

Autumn (September - November)
Pegasus - September to January
Andromeda - September to February
Pisces - September to December
Aries - October to December
Cassiopeia - August to March
Perseus - October to March



Circumpolar Constellations
(Visible All Year in Northern Hemisphere)
These constellations are located near the North Pole and never set below the horizon for most of the northern hemisphere.

Ursa Major - Visible year-round
Ursa Minor - Visible year-round
Draco - Visible year-round
Cepheus - Visible year-round
Cassiopeia - Visible year-round

NEW JERSEY
ASTRONOMICAL ASSOCIATION

The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

For November 4th, 2024, observing from New Jersey at 8pm to midnight, here are the top 10 brightest stars that can be seen with the naked eye. What are their apparent magnitudes, and azimuth heading and elevation settings.

1. Sirius (Alpha Canis Majoris)
Apparent Magnitude: -1.46
Azimuth: ~120° (Southeast)
Elevation: ~30°

2. Canopus (Alpha Carinae)
Apparent Magnitude: -0.74
Azimuth: ~160° (South-Southeast)
Elevation: ~25°

3. Arcturus (Alpha Boötis)
Apparent Magnitude: -0.05
Azimuth: ~230° (Southwest)
Elevation: ~45°

4. Vega (Alpha Lyrae)
Apparent Magnitude: +0.03
Azimuth: ~300° (Northwest)
Elevation: ~60°

5. Capella (Alpha Aurigae)
Apparent Magnitude: +0.08
Azimuth: ~45° (Northeast)
Elevation: ~40°

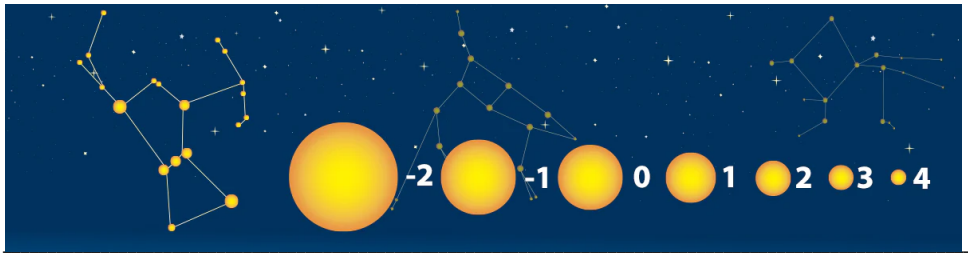
6. Rigel (Beta Orionis)
Apparent Magnitude: +0.12
Azimuth: ~210° (South-Southwest)
Elevation: ~50°

7. Procyon (Alpha Canis Minoris)
Apparent Magnitude: +0.34
Azimuth: ~120° (Southeast)
Elevation: ~20°

8. Achernar (Alpha Eridani)
Apparent Magnitude: +0.46
Azimuth: ~150° (South-Southeast)
Elevation: ~10°

9. Betelgeuse (Alpha Orionis)
Apparent Magnitude: +0.58
Azimuth: ~220° (Southwest)
Elevation: ~40°

10. Hadar (Beta Centauri)
Apparent Magnitude: +0.61
Azimuth: ~180° (South)
Elevation: ~15°



NEW JERSEY
ASTRONOMICAL ASSOCIATION

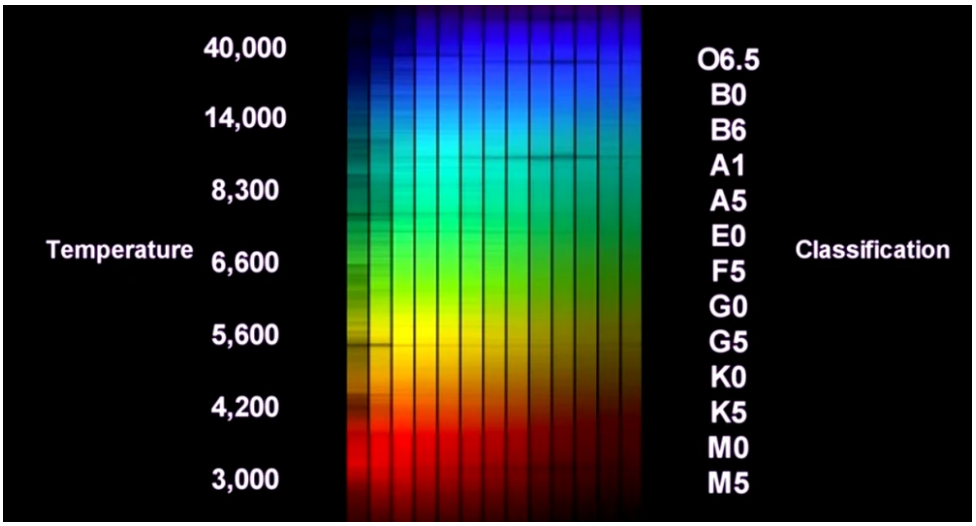
The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

Star Color and Temperature Relationship: The color of a star is directly related to its surface temperature. Hotter stars emit more light at shorter (bluer) wavelengths, while cooler stars emit more light at longer (redder) wavelengths.

Color and Temperature Range:
Blue: The hottest stars, with surface temperatures of 25,000–50,000 K.
White: Hot stars with temperatures of about 10,000–20,000 K.
Yellow: Moderate temperatures, around 5,500–7,500 K (e.g., the Sun).
Orange: Cooler stars, approximately 3,500–5,000 K.
Red: The coolest stars, below 3,500 K.

Star Classification System (Harvard Spectral Classification)
Stars are classified into spectral types based on their temperature and the characteristics of their light (spectra). The system uses letters O, B, A, F, G, K, and M. **This sequence is often remembered by the mnemonic: "Oh Be A Fine Guy/ Girl Kiss Me."**

Spectral Types:
O-type: Blue stars, very hot (30,000–50,000 K).
B-type: Blue-white, hot stars (10,000–30,000 K).
A-type: White stars (7,500–10,000 K).
F-type: Yellow-white stars (6,000–7,500 K).
G-type: Yellow stars, like the Sun (5,500–6,000 K).
K-type: Orange stars (3,500–5,000 K).
M-type: Red stars, the coolest (below 3,500 K).



NEW JERSEY
ASTRONOMICAL ASSOCIATION

The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

Jobs In the Field of Astronomy

1. Astronomer
Educational Requirement: Ph.D. in Astronomy, Astrophysics, or a related field.
Typical Salary: $80,000 - $120,000 per year.

2. Astrophysicist
Educational Requirement: Ph.D. in Astrophysics or a related field.
Typical Salary: $90,000 - $130,000 per year.

3. Observatory Technician
Educational Requirement: Bachelor's degree in Astronomy, Physics, or Engineering; some positions may require a Master's.
Typical Salary: $50,000 - $70,000 per year.

4. Planetarium Director
Educational Requirement: Bachelor's or Master's degree in Astronomy, Education, or a related field.
Typical Salary: $50,000 - $80,000 per year.

5. Data Scientist/Analyst in Astronomy
Educational Requirement: Bachelor's or Master's degree in Astronomy, Physics, Data Science, or Computer Science.
Typical Salary: $70,000 - $100,000 per year.

6. Space Scientist
Educational Requirement: Ph.D. in Astronomy, Astrophysics, Planetary Science, or a related field.
Typical Salary: $80,000 - $120,000 per year.

7. Astronomy Educator/Professor
Educational Requirement: Ph.D. in Astronomy, Astrophysics, or a related field for university positions; Master's for community colleges.
Typical Salary: $60,000 - $120,000 per year, depending on the institution and rank.

8. Research Scientist
Educational Requirement: Ph.D. in Astronomy, Astrophysics, or a related field.
Typical Salary: $80,000 - $120,000 per year.

NEW JERSEY
ASTRONOMICAL ASSOCIATION

The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

9. Satellite Operations Engineer
Educational Requirement: Bachelor's degree in Aerospace Engineering, Astronomy, or a related field.
Typical Salary: $70,000 - $100,000 per year.

10. Science Communicator/Writer
Educational Requirement: Bachelor's degree in Astronomy, Journalism, or a related field; advanced degrees can be beneficial.
Typical Salary: $40,000 - $80,000 per year.

Radio Astronomy

1. Radio Astronomer
Educational Requirement: Ph.D. in Astronomy, Astrophysics, or a related field, with a focus on radio techniques.
Typical Salary: $80,000 - $120,000 per year.

2. Research Scientist in Radio Astronomy
Educational Requirement: Ph.D. in Astronomy, Astrophysics, or a related field.
Typical Salary: $80,000 - $130,000 per year.

3. Instrumentation Engineer
Educational Requirement: Bachelor's or Master's degree in Electrical Engineering, Physics, or a related field.
Typical Salary: $70,000 - $100,000 per year.

4. Radio Frequency (RF) Engineer
Educational Requirement: Bachelor's degree in Electrical Engineering or a related field, often with coursework in RF systems.
Typical Salary: $70,000 - $110,000 per year.

5. Data Analyst/Scientist in Radio Astronomy
Educational Requirement: Bachelor's or Master's degree in Astronomy, Physics, Computer Science, or Data Science.
Typical Salary: $60,000 - $90,000 per year.

NEW JERSEY
ASTRONOMICAL ASSOCIATION

The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

6. Observatory Technician for Radio Telescopes
Educational Requirement: Associate's or Bachelor's degree in Astronomy, Engineering, or a related field.
Typical Salary: $50,000 - $70,000 per year.

7. Astrophysicist (Specializing in Radio Sources)
Educational Requirement: Ph.D. in Astrophysics or a related field, with a focus on radio emission processes.
Typical Salary: $90,000 - $130,000 per year.

8. Science Communicator or Outreach Coordinator
Educational Requirement: Bachelor's degree in Astronomy, Science Communication, or a related field; advanced degrees can be beneficial.
Typical Salary: $40,000 - $70,000 per year.

9. Radio Astronomy Software Developer
Educational Requirement: Bachelor's or Master's degree in Computer Science, Astronomy, or a related field.
Typical Salary: $70,000 - $100,000 per year.

10. PhD/Postdoctoral Researcher
Educational Requirement: Ph.D. in Astronomy or Astrophysics, typically working on specific radio astronomy projects.
Typical Salary: $50,000 - $70,000 per year.

Astrobiology

1. Astrobiologist
Role: Studies the potential for life in the universe, including life on other planets.
Education: Ph.D. in astrobiology, biology, chemistry, or a related field.
Salary: $50,000 - $100,000 per year, depending on experience and location.

2. Planetary Scientist
Role: Researches planetary atmospheres, geology, and potential for life on other planets.
Education: Ph.D. in planetary science, geosciences, or related field.
Salary: $60,000 - $120,000 per year.

NEW JERSEY
ASTRONOMICAL ASSOCIATION

The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

3. Exoplanet Researcher
Role: Studies planets outside our solar system for possible life conditions.
Education: Ph.D. in astrophysics, planetary science, or a similar discipline.
Salary: $55,000 - $100,000 per year.

4. Astrobiology Research Technician
Role: Supports research projects in astrobiology, conducting experiments and data analysis.
Education: Bachelor's or Master's in biology, biochemistry, or environmental science.
Salary: $40,000 - $60,000 per year.

5. NASA or ESA Scientist in Astrobiology
Role: Conducts astrobiological research, possibly for space missions.
Education: Ph.D. in astrobiology, microbiology, or related field.
Salary: $70,000 - $130,000 per year.

6. Microbiologist (in Astrobiology)
Role: Studies extremophiles and microorganisms that could survive in space-like conditions.
Education: Ph.D. in microbiology or biology.
Salary: $50,000 - $90,000 per year.

7. Astrobiology Professor
Role: Teaches astrobiology at a university level and may conduct research.
Education: Ph.D. in astrobiology or related field, plus teaching credentials.
Salary: $60,000 - $150,000 per year, depending on institution and experience.

8. Environmental Scientist (Astrobiology Research)
Role: Examines Earth environments that may resemble other planetary conditions.
Education: Bachelor's or Master's in environmental science or biology; Ph.D. preferred for research positions.
Salary: $45,000 - $85,000 per year.

9. Space Agency Science Communicator
Role: Explains astrobiology research to the public and engages in science outreach.
Education: Bachelor's or Master's in astrobiology, biology, or science communication.
Salary: $40,000 - $70,000 per year.

NEW JERSEY
ASTRONOMICAL ASSOCIATION

The Paul Robinson Observatory
P.O. Box 214
High Bridge, New Jersey 08829-0214
www.njaa.org

10. Biochemist (Astrobiology)
Role: Studies the chemical basis of life in extreme environments.
Education: Ph.D. in biochemistry, chemistry, or related field.
Salary: $50,000 - $100,000 per year.

Notes:
Salaries can vary based on experience, location, and specific employer.
Some positions may have additional requirements, such as internships or specialized training.

The Evening Sky Map

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

WWW.SKYMAPS.COM

NORTHERN HEMISPHERE
NOVEMBER 2024

Sky Calendar – November 2024

1 **New Moon** at 12:47 UT. Start of lunation 1260.

3 **Moon near Mercury** at 7h UT (19° from Sun, evening sky). Mag. –0.3. Use the Moon to help find the elusive planet Mercury.

4 **Moon near Antares** at 2h UT (28° from Sun, evening sky). Occultation visible from Easter Island.

5 **Moon near Venus** at 0h UT (evening sky). Mag. –4.0.

5 **Southern Taurid meteor shower peaks**. Active from Sept 23 to Dec 8. Associated with Comet 2P/Encke.

9 **First Quarter Moon** at 5:55 UT.

11 **Moon near Saturn** at 2h UT (evening sky). Mag. 0.9. Occultation visible from Central America.

11 **Northern Taurid meteor shower peaks**. Active from Oct 13 to Dec 2. Occasional bright fireball.

14 **Venus at southernmost declination** (–25.6°) at 4h UT (evening sky). Mag. –4.1.

14 **Moon at perigee** (closest to Earth) at 11:19 UT (distance 360,109km; angular size 33.2').

15 **Full Moon** at 21:28 UT.

16 **Mercury at greatest elongation east** at 8h UT (23° from Sun, evening sky). Mag. –0.3.

16 **Moon near the Pleiades** at 8h UT (midnight sky).

17 **Leonid meteor shower peaks**. Arises from debris ejected by comet 55P/Tempel-Tuttle. Produces very fast meteors (70 km/sec). Expect 10–15 meteors/hour under dark skies. Moonlight interferes this year.

17 **Uranus at opposition** at 2h UT. Mag. 5.6.

17 **Moon near Jupiter** at 15h UT (morning sky). Mag. –2.8.

20 **Moon near Mars** at 23h UT (morning sky). Mag. –0.3.

23 **Moon near Regulus** at 0h UT (morning sky).

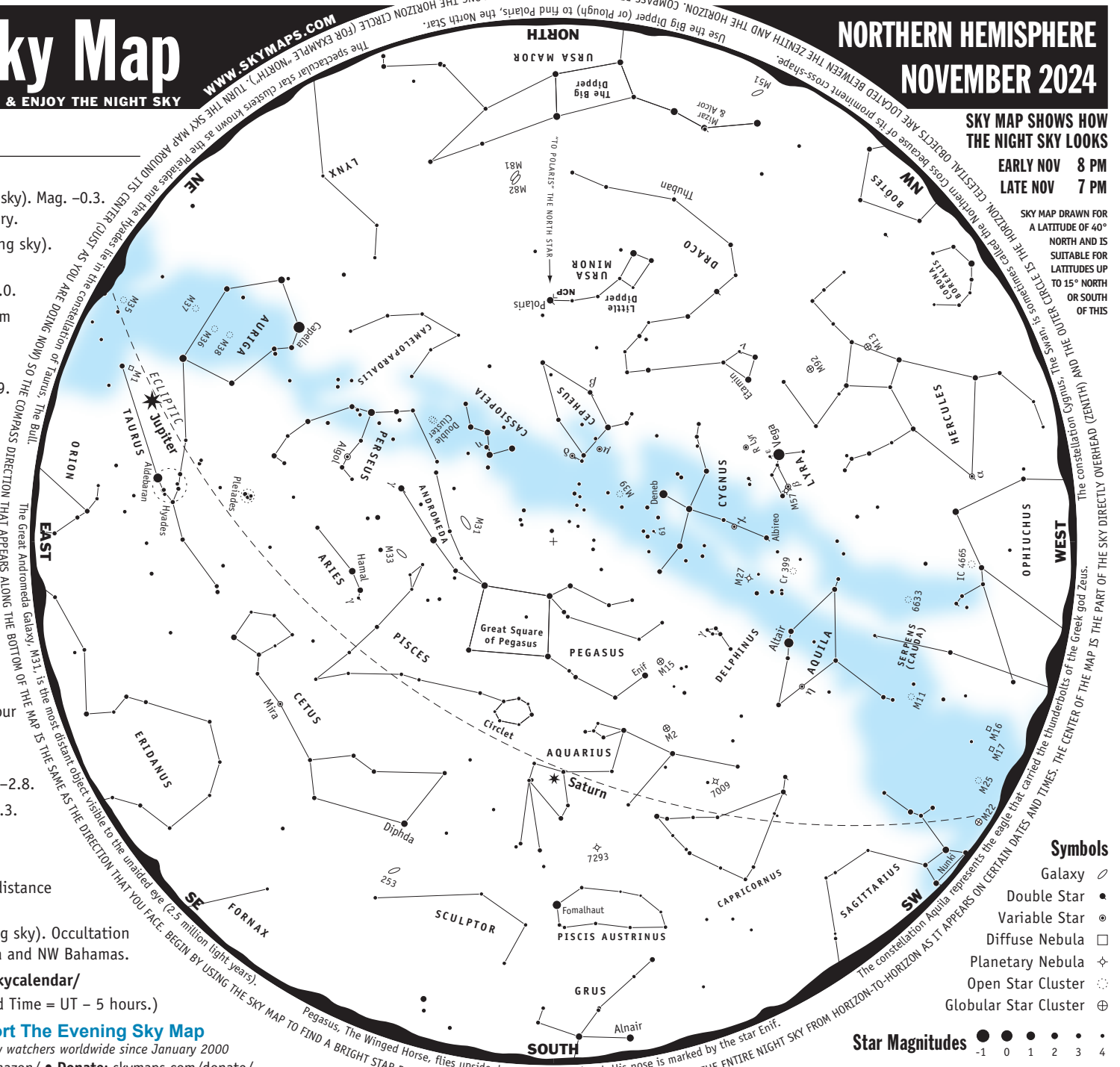
23 **Last Quarter Moon** at 1:29 UT.

26 **Moon at apogee** (farthest from Earth) at 12h UT (distance 405,314km; angular size 29.5').

27 **Moon near Spica** at 11h UT (42° from Sun, morning sky). Occultation visible from the Contiguous Unite States, E. Canada and NW Bahamas.

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

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



SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY NOV 8 PM
LATE NOV 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
- Globular Star Cluster

Star Magnitudes -1 0 1 2 3 4

Skymaps.com

Help Support The Evening Sky Map

Freely shared with sky watchers worldwide since January 2000

Shop: skymaps.com/amazon/ • **Donate:** skymaps.com/donate/

Recommended Telescopes & Products at: skymaps.com/astro/

KT

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.

CELESTIAL OBJECTS

NORTHERN HEMISPHERE
NOVEMBER 2024

Skymaps.com

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.
α Herculis	Her	◉	Semi-regular variable. Magnitude varies between 3.1 & 3.9 over 90 days. Mag 5.4 companion.
Vega	Lyr	●	The 5th brightest star in the sky. A blue-white star. Dist=25.0 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=66.7 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.
M13	Her	⊕	Best globular in northern skies. Discovered by Halley in 1714. Dist=23,000 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.
IC 4665	Oph	⁘	Large, scattered open cluster. Visible with binoculars.
6633	Oph	⁘	Scattered open cluster. Visible with binoculars.
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.
M25	Sgr	⁘	Bright cluster located about 6 deg N of "teapot's" lid. Dist=1,900 ly.
253	Scl	⬭	Fine, large, cigar-shaped galaxy. Requires dark sky. Member of Sculptor Group.
Mizar & Alcor	UMa	◙	Good eyesight or binoculars reveals 2 stars. Not a binary. Mizar has a mag 4 companion.
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.
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.
M17	Sgr	□	Omega Nebula. Contains the star cluster NGC 6618. Dist=4,900 ly.
M11	Sct	⁘	Wild Duck Cluster. Resembles a globular through binoculars. V-shaped. Dist=5,600 ly.
M16	Ser	□	Eagle Nebula. Requires a telescope of large aperture. Dist=8,150 ly.
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.