Keene Amateur Astronomers

The Newsletter for Keene Amateur Astronomers

Vol. 2025 No. 10 October 2025

Rosette Nebula Captured with DECam

Cradled within the fiery petals of the Rosette Nebula is NGC 2244, the young star cluster which it nurtured. The cluster's stars light up the nebula in vibrant hues of red, gold and purple, and opaque towers of dust rise from the billowing clouds around its excavated core. This image, captured by 570-megapixel Department of Energy-fabricated Dark Energy Camera (DECam), mounted on the U.S. National Science Foundation Víctor M. Blanco 4-meter Telescope at Cerro Tololo Inter-American Observatory, a Program of NSF NOIRLab, is being released in celebration of NOIRLab's fifth anniversary. Credit: CTIO/NOIRLab/DOE/NSF/AURA Image Processing: T.A. Rector (University of Alaska Anchorage/NSF NOIRLab), D. de Martin & M. Zamani (NSF NOIRLab)

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Editor's Message

This month starts out with a Supermoon on the 6th. Be sure to check out the last page of the newsletter and test your knowledge regarding why the Moon is so big when it rises. If you think this month's full Moon is bright, you are right. The Moon this month could be as much as 30% brighter and 14% larger than a typical full Moon. Don't forget, International Observe the Moon Night will be on the 4th.

This month there will also be two meteor showers, the Draconids and the Orionids. The Draconids radiate from the constellation Draco and will peak on the 8th. This meteor shower produces on average 10 meteors per hour but they might be hard to see with the Moon so bright a few days after it is full. The Orionids will provide a better opportunity later this month, producing on average 20 per hour and peaking on the 21st. These meteors are caused by debris left by Halley's Comet. Having a view of the South East sky will be prime viewing to catch sight of a meteor.

It is also a great time to get a great view of Mercury this month. It will be traveling with Mars in the late evening sky and on the 18th and 19th they will be separated by 2 degrees with Mercury shining the brightest. They will be close to the horizon just after sunset so you will need to plan ahead to make sure you have a good view of the sky to the South and West.

Pleiades is joined by Uranus and can be seen in the same 10 x 50 binoculars field of view until August of 2026. This makes it a great opportunity to find this distant planet with a small telescope or binoculars.

Great objects to view this month:

- **NGC 457** The Owl Cluster - the shape of this cluster resembles an owl with Phi Cassiopeiae, the double star representing the owl's eyes.
- **Mesarthim (Gamma Arietis) -** A double star in Aries is composed of two equally bright white stars. A magnification of 100x is best to split it into two stars.

- **NGC 7662 - The Blue Snowball Nebula** also known as Caldwell 22 is located in the Andromeda constellation, a magnification of 100x will show a small blue disk.

I hope you enjoy the skies this month.

- Susan Rolke

Monthly Business Meeting

Our next meeting will take place on October 17th at 7 pm at Keene State College. An observing session will be held on October 18th at the Sullivan Observatory weather permitting.

Club Happenings

International Observe the Moon in partnership with Keene Public Library will be held on Saturday October 4th from 5:30 - 8. Telescopes will be set up at the entrance to the Asheulot Park on West Street. Everyone is welcome. Last year there was a table of activities run by the library and there were several telescopes for attendees to look through to observe the Moon.

On October 19th Susan Rolke will be giving a short talk at the Frost Free Library about her adventure in Chile. The talk will be followed by an observing session. Members with telescopes are invited.

Another Look At Little Red Dots In the Early Universe

By Susan Rolke

In a previous article, I wrote about the discovery of Little Red Dots (LRDs) by the James Webb Space Telescope (JWST). These faint, distant objects were initially thought to be early galaxies that had formed less than a billion years after the Big Bang.

New evidence, however, suggests LRDs may not be galaxies at all. Instead, they could represent a completely new class of cosmic object: black hole stars. If this theory is correct, it may help explain how black holes in the early universe grew to massive sizes in the early universe.

Originally, LRDs were classified as galaxies. However, the mature star population in LRDs challenged current models of galaxy formation and cosmic evolution. One team thinks they have solved this issue. After performing additional analysis of the spectra of LRDs, researchers found that the light from LRDs was not the combined glow of countless stars. Instead, it seemed to come from a single, extremely energetic source.

The leading explanation is that LRDs are vast spheres of hot, dense gas surrounding a ravenous supermassive black hole. As the black hole devours matter, it blasts out energy, forming a fiery cocoon of gas.

Researchers will continue to analyze these mysterious objects from the early universe. It is possible we may see more explanations that better fit the data. However, this is an exciting possibility and solves the original issue of LRDs 'breaking' our understanding of cosmic evolution and at the same time gives us something new to consider. This new theory could help to shed light on why most galaxies have black holes at their center.

Reference: https://www.aanda.org/articles/aa/full_html/2025/09/aa54681-25/aa54681-25.html

Additional Resources for you:

Learn about a Monster Black Hole at the Beginning of Time in this video

Popular Science article "Oldest Black Hole Ever Seen is 300 Million Times Bigger Than Our Sun"

Night Sky Network Online Webinar

Join the NASA Night Sky Network on Wednesday, October 22, at 9:00 PM Eastern, along with Shane Larson as he presents a Storm of Stars. He will discuss the discovery of the Milky Way, how our perceptions of it constantly shape and change our understanding of other galaxies, and the Cosmos on much larger scales.

Observing

To find out skywatching tips for this month, click on the following link to learn more.

Video: What's Up October 2025 Sky Watching Tips from NASA

You can find past pdfs of the Astronomical League charts **here**. Turn to the end of the Newsletter to see what is up this month.

NASA Night Sky Notes, October 2025

This article is distributed by NASA's Night Sky Network (NSN).
The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

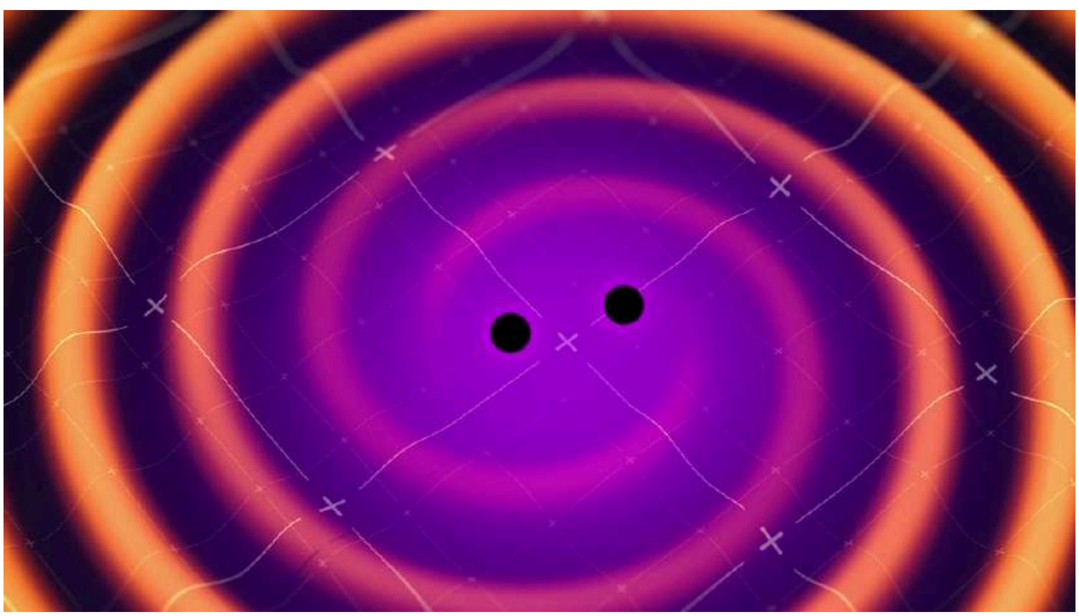
October's Night Sky Notes: Let's Go LIGO!

By Kat Troche

September 2025 marks ten years since the first direct detection of gravitational waves as predicted by Albert Einstein's 1916 theory of General Relativity. These invisible ripples in space were first directly detected by the Laser Interferometer Gravitational-Wave Observatory (LIGO). Traveling at the speed of light (~186,000 miles per second), these waves stretch and squeeze the fabric of space itself, changing the distance between objects as they pass.

Waves In Space

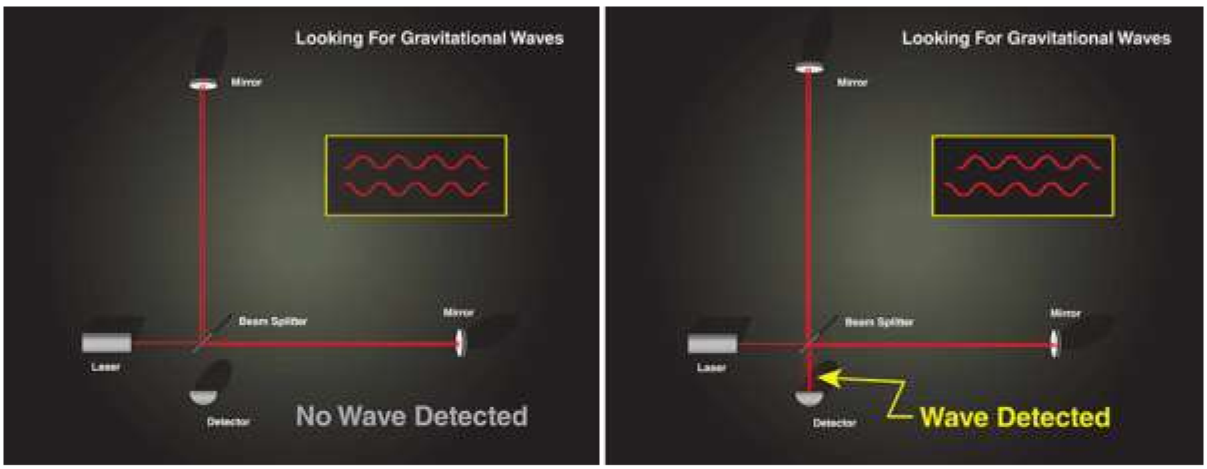
Gravitational waves are created when massive objects accelerate in space, especially in violent events. LIGO detected the first gravitational waves when two black holes, orbiting one another, finally merged, creating ripples in space-time. But these waves are not exclusive to black holes. If a star were to go supernova, it could produce the same effect. Neutron stars can also create these waves for various reasons. While these waves are invisible to the human eye, this animation from NASA's Science Visualization Studio shows the merger of two black holes and the waves they create in the process.



Two black holes orbit around each other and generate space-time ripples called gravitational waves in this image. Credit: NASA's Goddard Space Flight Center Conceptual Image Lab

How It Works

A gravitational wave observatory, like LIGO, is built with two tunnels, each approximately 2.5 miles long, arranged in an "L" shape. At the end of each tunnel, a highly polished 40 kg mirror (about 16 inches across) is mounted; this will reflect the laser beam that is sent from the observatory. A laser beam is sent from the observatory room and split into two, with equal parts traveling down each tunnel, bouncing off the mirrors at the end. When the beams return, they are recombined. If the arm lengths are perfectly equal, the light waves cancel out in just the right way, producing darkness at the detector. But if a gravitational wave passes, it slightly stretches one arm while squeezing the other, so the returning beams no longer cancel perfectly, creating a flicker of light that reveals the wave's presence.



Still images of how LIGO (Laser Interferometer Gravitational-Wave Observatory) detects gravitational waves using a laser, mirrors, and a detector. You can find the animated version [here](). Image Credit: NASA

The actual detection happens at the point of recombination, when even a minuscule stretching of one arm and squeezing of the other changes how long it takes the laser beams to return. This difference produces a measurable shift in the interference pattern. To be certain that the signal is real and not local noise, both LIGO observatories — one in Washington State (LIGO Hanford) and the other in Louisiana (LIGO Livingston) — must record the same pattern within milliseconds. When they do, it's confirmation of a gravitational wave rippling through Earth. We don't feel these waves as they pass through our planet, but we now have a method of detecting them!

Get Involved

With the help of two additional gravitational-wave observatories, VIRGO and KAGRA, there have been 300 black hole mergers detected in the past decade; some of which are confirmed, while others await further study.

While the average person may not have a laser interferometer lying around in the backyard, you can help with two projects geared toward detecting gravitational waves and the black holes that contribute to them:

- **Black Hole Hunters:** Using data from the TESS satellite, you would study graphs of how the brightness of stars changes over time, looking for an effect called gravitational microlensing. This lensing effect can indicate that a massive object has passed in front of a star, such as a black hole.

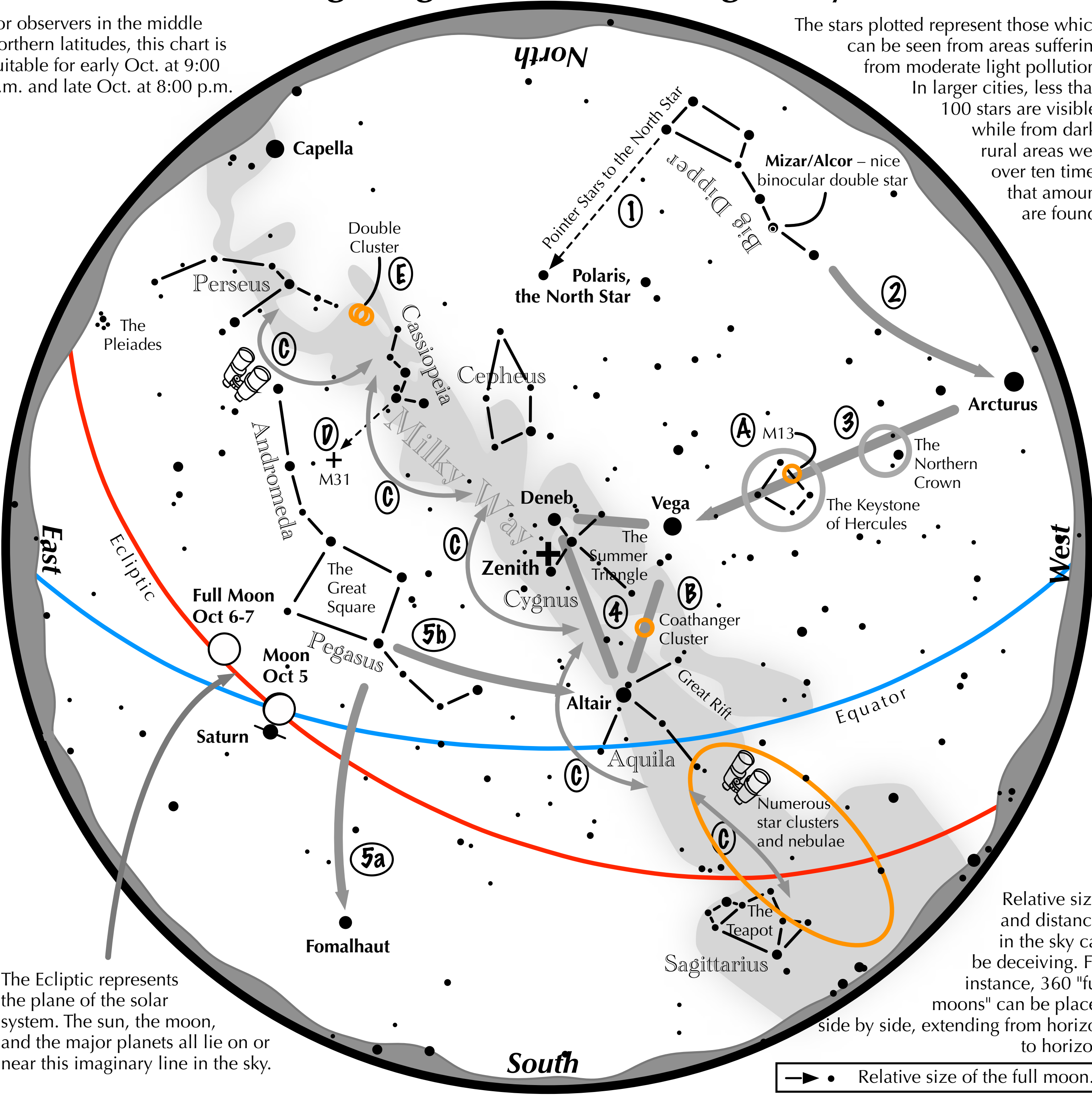
- **Gravity Spy:** You can help LIGO scientists with their gravitational wave research by looking for glitches that may mimic gravitational waves. By sorting out the mimics, we can train algorithms on how to detect the real thing.

You can also use gelatin, magnetic marbles, and a small mirror for a more hands-on demonstration on how gravitational waves move through space-time with JPL's Dropping In With Gravitational Waves activity!

Navigating the October Night Sky

For observers in the middle northern latitudes, this chart is suitable for early Oct. at 9:00 p.m. and late Oct. at 8:00 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

Relative size of the full moon.

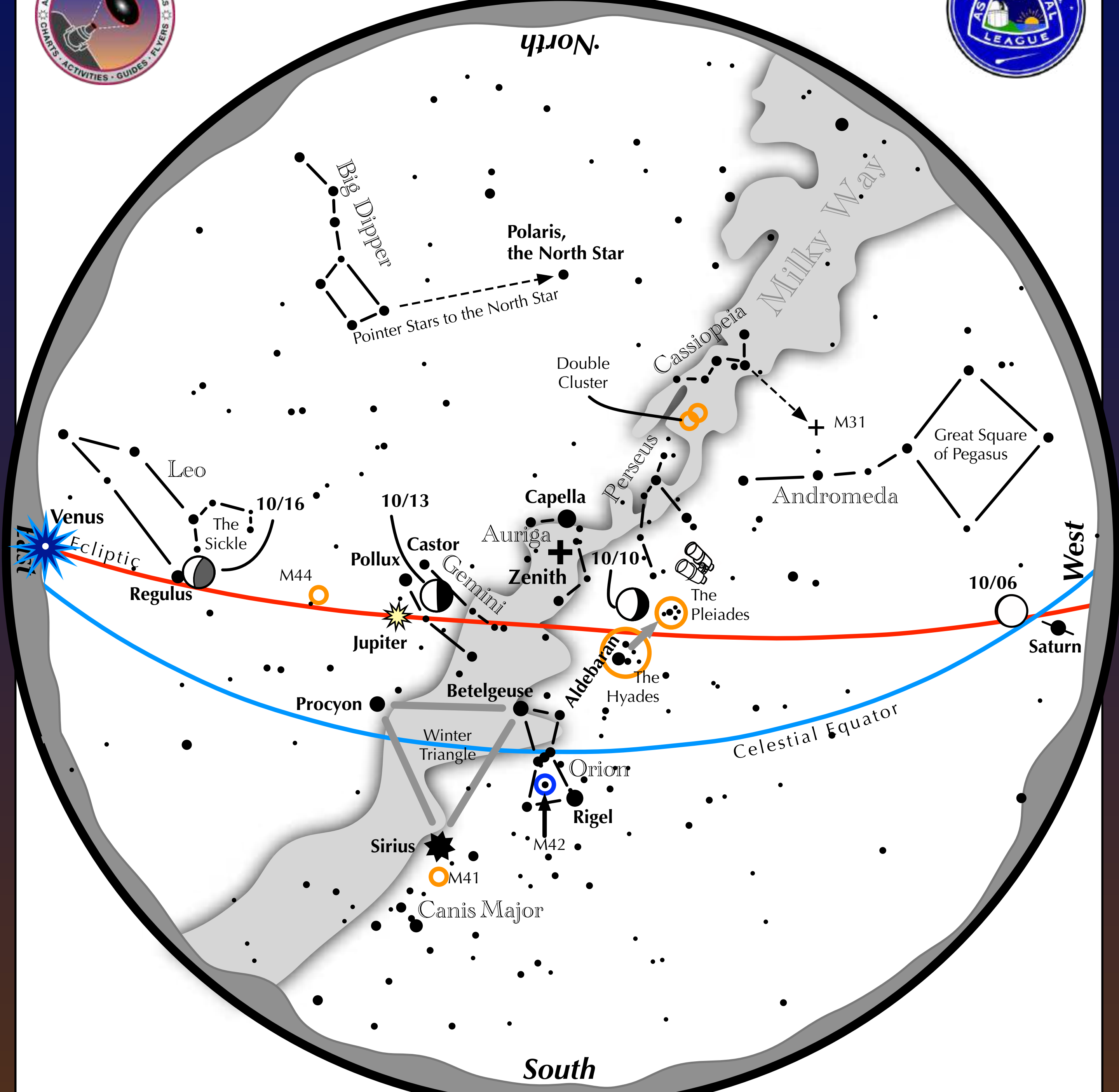
Navigating the October night sky: Simply start with what you know or with what you can easily find.

1. Extend a line north from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the early October evening sky.
3. To the northeast of Arcturus shines another star of the same brightness, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
4. Nearly overhead lie the summer triangle stars of Vega, Altair, and Deneb.
5. High in the east are the four moderately bright stars of the Great Square. Its two southern stars point west to Altair. Its two western stars point south to Fomalhaut.

Binocular Highlights

A: On the western side of the Keystone glows the Great Hercules Cluster, a ball of 500,000 stars. **B:** 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger. **C:** Sweep along the Milky Way for an astounding number of fuzzy star clusters and nebulae amid many faint glows and dark bays, including the Great Rift. **D:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **E:** Between the "W" of Cassiopeia and Perseus lies the Double Cluster.

Navigating the mid October Morning Sky



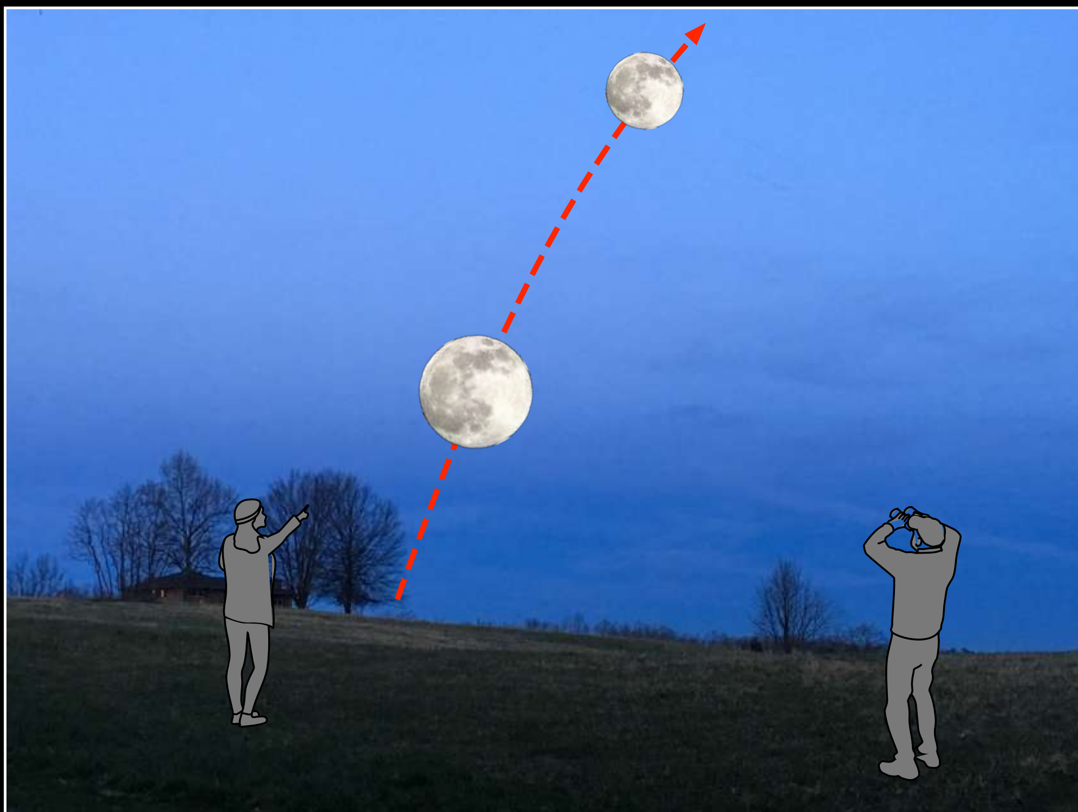
What a great way to start your day!

For observers in the middle northern latitudes, this chart is suitable for mid October at 5:00 a.m.

Late sunrises in October provide opportunities for early morning skywatching.

- Bright Jupiter shines nearly overhead.
- Venus climbs above the eastern horizon 60 minutes before sunrise.
- The third quarter moon glows next to bright Jupiter on October 13.
- The waning crescent moon glows next to Regulus on October 16.
- During the first half of October, gaze high in the south and overhead to see these many celestial features: the Pleiades, the Hyades with Aldebaran, Jupiter, Orion, Capella and Auriga, the Winter Triangle with Sirius and Procyon, and Gemini.

Big Moon Rising:
Is it real?



When the full moon rises, it seems to be unusually large. Later, when it has climbed higher in the sky, it returns to its expected apparent size. Why is this the case?

A. When the moon is close to the horizon, its apparent size can be compared to those of distant landscape objects. So, it seems larger than it is.
B. When it is near the horizon, it is closer to us than when it is overhead. So, it appears bigger.
C. It is an unconscious psychological effect. The same effect occurs over a featureless sea.

Look at the moon through a drinking straw when it is rising, and later, when it has climbed a good distance above the horizon. Does the apparent size of the moon through the straw appear to change?

C. would be the most correct. The psychological effect is not well understood.