

# MINNESOTA SKIES

July–August 2020

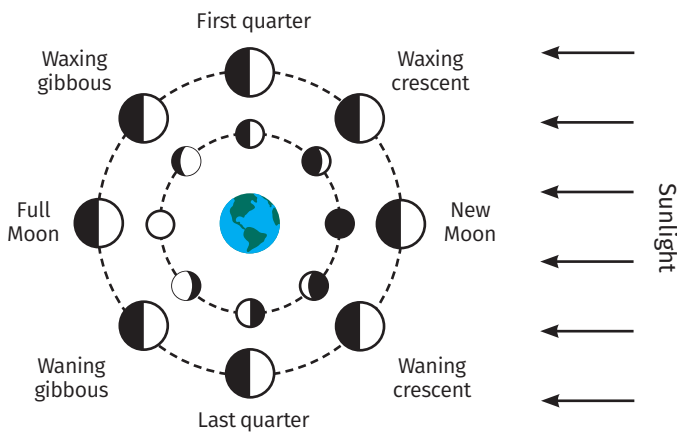


# Land Acknowledgment

The Bell Museum sits on the traditional and treaty land of the Dakota people who, along with the Ojibwe people, are the Indigenous peoples of this land, Mnisóta Makhóche, or Minnesota. In recognition of this fact, and to honor the Dakota people for their care of and knowledge of this land, we waive general museum admission for Dakota and all Indigenous peoples.

# Moon Phases

Half of the Moon is always in sunlight, just like Earth. The amount of the sunlit side we can see changes in the cycle we call phases, depending on the relative position of Sun-Earth-Moon.



The outer circle shows where in the Moon's orbit each Moon phase occurs. The inner circle shows what each phase looks like from your backyard.

The Earth's Moon takes on average 29.5 day to make one orbit around the Earth as seen from our backyard. The word "month" is derived from "monath," which comes from "moon."

## July: Giizis/Wi

July 5	Full Moon
July 12	Third Quarter
July 20	New Moon
July 27	First Quarter

## August: Giizis/Wi

August 3	Full Moon
August 11	Third Quarter
August 19	New Moon
August 25	First Quarter

# Indigenous Moons

Annette S. Lee is an astrophysicist, artist, and the director of the Native Skywatchers research and programming initiative. Along with the contributors listed on the next page, she shared the following information.

Traditionally, Indigenous people keenly observed celestial objects, especially the Moon, and kept track of the passing of time. Each full Moon marked the passing of one month and reflected the "moon time" of women (menstruation). Seasonal activities that were culturally significant each month became the name of each month. Some years had 13 moons. Like a drum beat or a heartbeat, the rhythm of the sky was unfolding in the seasons and in the phases of the Moon.

To acknowledge the cycles of the Moon was to become part of something bigger, the cosmic cycle. In this way, knowing the Moon was more than timekeeping; it was and still is about building a relationship with sky.

## Dibiki Giizisoog: Ojibwe Moons

### July Moon

*Aabita-niibino-giizis* (Mid-summer Moon)

### August Moon

*Manoominike-giizis* (Ricing Moon)

## Haŋ Wi: Dakota Moons

### July Moon

- *Çaŋpaša Wi/Čhaŋphá Šá Wí* (Red Chokecherry Moon)
- *Çaŋpašapa Wi/Čhaŋphá Šápa Wí* (Moon when the Chokecherries are Ripe/Black)
- *Wašuŋpa Wi* (Moon when the Geese Shed their Feathers)

### August Moon

- *Wasúthuŋ Wí/Wasuŋ Wí* (Harvest Moon)



July Blue Moon, Travis Novitsky, 2015

## Indigenous Contributors



*Annette Lee presenting precession at annual Native Skywatchers Workshop, Fond du Lac Tribal & Community College, 2016, photo by J. Tibbetts*

**Annette S. Lee** is an astrophysicist, artist, and director of the Native Skywatchers research and programming initiative. She has over three decades of experience in

education as a teacher, university instructor, teacher educator, program administrator, professional visual artist, and researcher. Annette is mixed-race Lakota, family name Wanbli Luta (Red Eagle).

**Carl Gawboy** is a professor emeritus, elder, and artist from the Bois Fort Reservation. Carl's work on Ojibwe astronomy spans four decades.

**Dakhóta iápi Okhódakičhiye** (Dakota Language Society) for Dakota language help.

**Iyekiyapiwiñ Darlene St. Clair** is an associate professor, Mni Sota Makóce project lead, and an enrolled member of the Lower Sioux Indian Community.

**Jeffrey Tibbetts** is the Title III director at Fond du Lac Tribal & Community College, an artist, and is Ojibwe from the Fond du Lac Reservation.

**Ramona Kitto Stately** is an enrolled member of Santee Sioux nation and project director of WASH-MN (We are still here, Minnesota!)

**Travis Novitsky** is a professional nature photographer from the Grand Portage Anishinaabe Nation in Northeast Minnesota.

**William Wilson** is an artist, elder, and first language Ojibwe speaker from Gull Bay First Nation.



*Gikinoon (One Year), acrylic on canvas, 30x40", William Wilson, 2014*

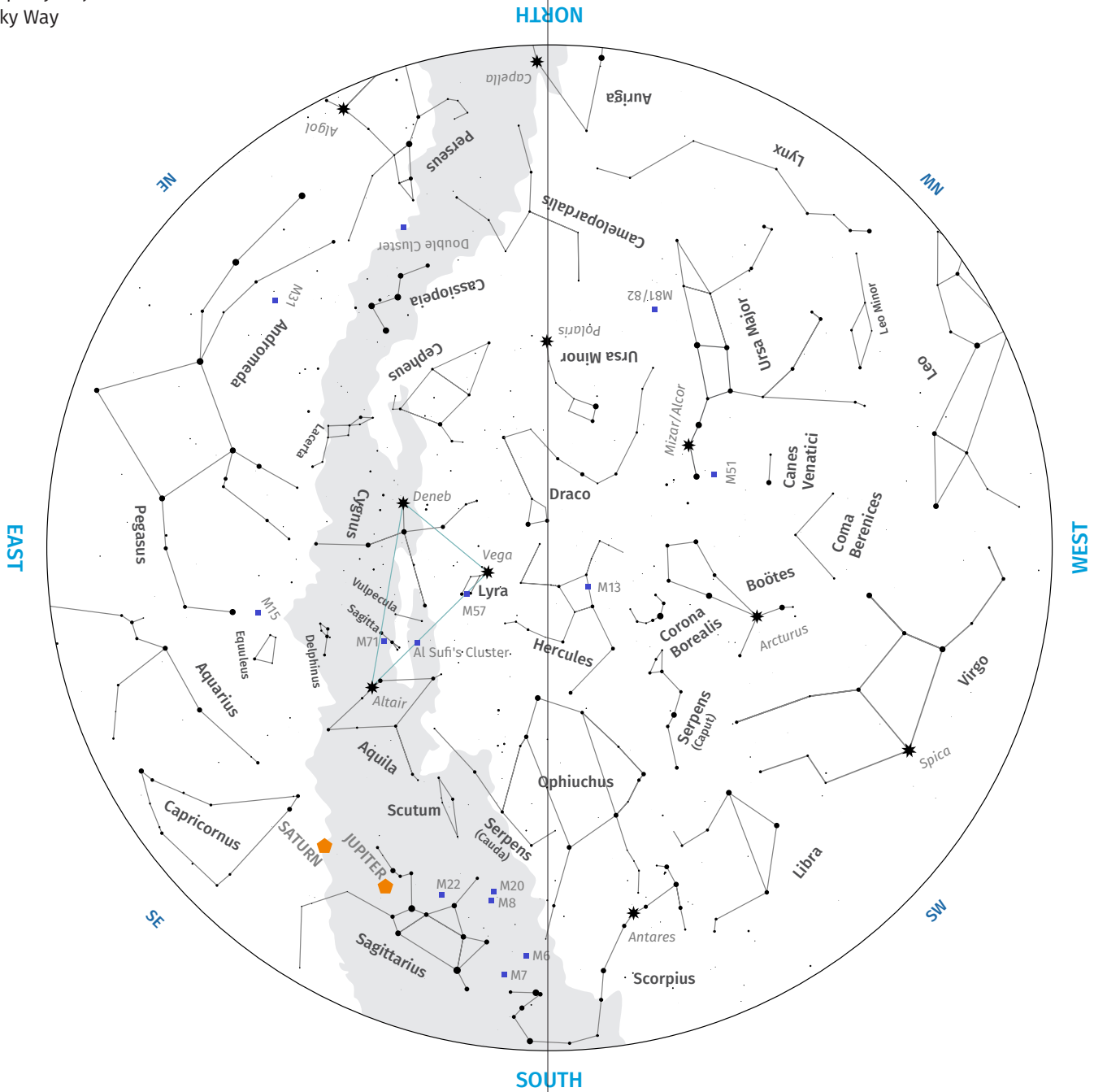
# Star Map

## Northern Hemisphere

### Best Viewing Times for this Map

July 1	10 pm (sunset 9:03 pm)
August 1	9:30 pm (sunset 8:38 pm)
August 31	9:15 pm (sunset 7:50 pm)

- \* Bright Stars
- 🟠 Planet
- Deep Sky Object
- ☁ Milky Way



### How to Read a Star Map

This map shows the entire night sky. 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.

Cardinal directions (N, S, E, W) are noted along the horizon. Turn the map around its center so the cardinal direction at the bottom is the same as the direction you are facing. Look up! Objects near the zenith/map center should be overhead.

### Tips for Observing the Night Sky

It's best to observe from the darkest location possible, avoiding direct light from street lights and other sources. You will see more stars as your eyes adjust, about 10–20 minutes after you go outside.

A dim red flashlight or headlamp will also help your eyes adjust. The light of the Moon can make fainter objects more difficult to see. Observing on moonless nights around the New Moon or Last Quarter can be ideal.

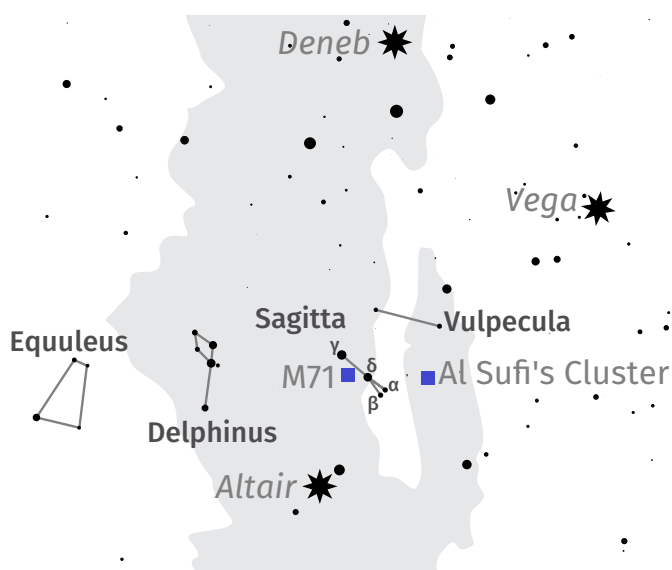
## Deep Sky Objects

Finding deep sky objects can be hard. Even with binoculars or a telescope, they can be difficult to see. To make things easier, start with distinctive groups of bright stars. This time of year, the grouping to find is the Summer Triangle, which passes directly overhead at midnight in the summer months. To find it, look south and then high up in the sky for the three brightest stars you can see. Connect them together and you're done—you've found the Summer Triangle! You can also imagine this as a slice of pizza pointing down to the horizon.

The star at the top right of the triangle is named Vega, the bottom star is named Altair, and the star at the top left is named Deneb. These three stars can guide you to hundreds of objects.

About one hand length from Altair in the direction of Deneb, you can see a star named Gamma ( $\gamma$ ) Sagittae. Just two finger widths to the west is the star Delta ( $\delta$ ) Sagittae. Right in between these two stars is the globular cluster Messier 71 (M71). Besides some redness to the stars from gas and dust in space, this small fuzzy piece of lint might not look like much to your eyes. Don't be fooled: You're seeing over 10,000 stars, almost 20,000 light years away, and a mere 9–10 billion years old (one of the youngest globulars found!).

If you're looking for something a bit brighter and more recognizable, hop back to Gamma. Admire for a moment the color you can see—a cool red giant star near the end of its life. Just a finger width away to the southwest you'll see two more stars—Alpha ( $\alpha$ ) and Beta ( $\beta$ ) Sagittae. They make up the feathered end of the constellation Sagitta, the Arrow, with Gamma at the tip (and you thought there wasn't a point in finding those stars!). Draw a line from Beta, passing just below Alpha, and extending onwards four finger widths. There you can spot a bright cluster of eight stars. This is Al Sufi's Cluster, first cataloged by the Persian astronomer Al Sufi in his Book of Fixed Stars in 964. As you gaze at this cluster, ask yourself "have I hung up all of my clothes?" When you have the answer, you'll also have the other common name of this star cluster.\*



\*The Coathanger

## Constellation Hunter

Having fun learning to identify constellations in the sky using the star map? Consider sketching what you see! Get tips on sketching and learn how to earn a Constellation Hunter pin and certificate on the Bell Museum website.

### Hidden Constellations

Hiding in and near the Summer Triangle are four smaller constellations: Delphinus, the dolphin; Equuleus, the little horse; Sagitta, the arrow; and Vulpecula, the fox. These constellations are small—fewer than five stars are used to connect the lines for their shapes—and the stars are dim. Use the bright stars of the Summer Triangle to help navigate to these lesser known constellations.

Join the Constellation Hunter project at [bellmuseum.umn.edu/constellation-hunter](http://bellmuseum.umn.edu/constellation-hunter)

## Astronomy Highlights

July 14

### Jupiter at Opposition

July 20

### Saturn at Opposition

Appearing in the southeast after sunset you can easily find Jupiter and Saturn in the sky. When in opposition, the planets' positions are directly opposite the Sun from our vantage point on Earth, making them appear at their brightest in our sky. With a good pair of binoculars, or a medium telescope, you can see the four Galilean moons off to the sides of Jupiter and the rings of Saturn, which Galileo called its "ears."

July 22–August 11

### Launch Window of Mars 2020 Perseverance Rover

The alignment between Earth and Mars is just right during the next three weeks to allow for a direct flight between the two planets. Perseverance's mission will be to seek signs of ancient life and collect rock and soil samples. The samples collected now may be returned to Earth during future missions. Perseverance is anticipated to arrive on Mars on February 18, 2021.

August 11–12

### Perseid Meteor Shower

For a delightful summer evening activity, the Perseids Meteor shower should not disappoint. With up to 60 meteors per hour, it is one of the best annual meteor showers to observe. The meteor debris originates from the periodic comet Swift-Tuttle which was first discovered in 1862, and whose last return appearance was in 1992. Meteors will radiate from the constellation Perseus, but can appear anywhere in the sky. For best viewing, observe from a dark location after midnight.



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***Minnesota's Astronomy Classroom Initiative  
is made possible by Ruth and John Huss.***

**Cover image: Building Community Around the Native Star  
Knowledge, Mixed media on paper, 18 x 24", Annette S. Lee, 2012**

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