

NATIVE  
**SKY**  
WATCHERS



Close-up - "MaKace Wicaripi Wowapi" by A. Lee, Rock ©2012



photo credit: NASA.gov

***TWO-EYED SEEING:  
D(L)AKOTA  
ASTRONOMY &  
NASA MOON TO  
MARS***

***LIVE***  
(virtual)

***SHOW***

Friday, November 13, 2020

## Land Acknowledgment

The *Native Skywatchers* program would like to acknowledge that the land under our feet is the original homelands of the Dakota people, *Mni Sota Makoce*, "Land where the waters reflect the ...skies"... "or clouds". Later Anishinaabe began settling in Northern Minnesota, (the Great Migration). We acknowledge both the Dakota and Anishinaabe's painful history of genocide and forced removal from this territory, and we honor and respect the many diverse Indigenous peoples still connected to this land on which we gather.

## Moon Phases

As viewed from space, half of the Moon is always lit up by the Sun, just like Earth. As viewed from your backyard, the amount of the half-lit Moon that we can see changes, depending on the relative position of Sun-Earth-Moon. We call this 'the phases of the Moon'.

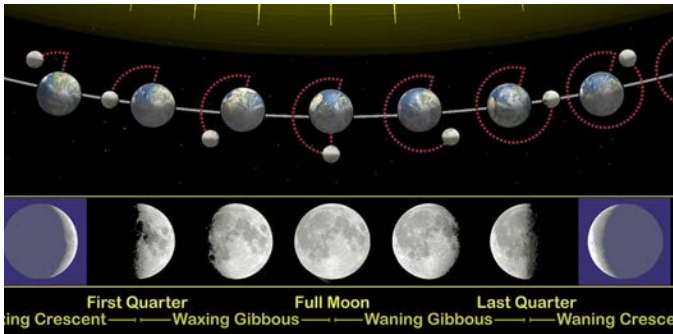


Diagram created by Orion 8, 2018 (not to scale)

### Oct - *Haŋ Wi*

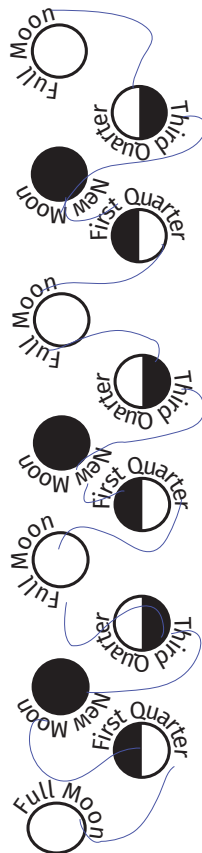
- Oct. 1 Full Moon
- Oct. 9 Third Quarter
- Oct. 16 New Moon
- Oct. 23 First Quarter
- Oct. 31 Full Moon

### Nov - *Haŋ Wi*

- Nov. 8 Third Quarter
- Nov. 14 New Moon
- Nov. 21 First Quarter
- Nov. 30 Full Moon

### Dec - *Haŋ Wi*

- Dec. 7 Third Quarter
- Dec. 14 New Moon
- Dec. 21 First Quarter
- Dec. 29 Full Moon



## Haŋ Wi - Indigenous Moons

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. Women kept track of their sacred "Moon Time". Seasonal activities that were culturally significant each month became the name of each month. Some years had thirteen 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.



Photo by A. Lee, Fall 2020

## D(L)akota *Haŋ Wi* (Moons)

October - *Čhaŋwápakasna Wí* - Trees shaking off the leaves Moon

November - *Thahéčapšuŋ Wí* - Deer Antler Shedding Moon

December - *Čhaŋkápophá Wí* - Moon of Popping Trees

### What does Turtle have to do with Moon?

Both the turtle and the Moon are related to time-keeping. There are 12 months in a year, but there are 13 moons (some years). For example, this year (2020) there are 13 full moons. Indigenous calendars often refer to a year as '13 Moons'. If you count the number of sections on the turtle's back, there are 13 sections. There are about 28 smaller sections around the outer rim of turtle's back (approx. the number of days in a month). Many tribes share cultural teachings referring to North America as 'Turtle Island'. More recently archaeologists have found that ancient (elephant-sized) sea turtles once lived here in North America ('Archelon'). How did the elders know?



Painted Turtle by A. Lee, Spring 2009



Lunar Eclipse by G. Donatiello, 2019

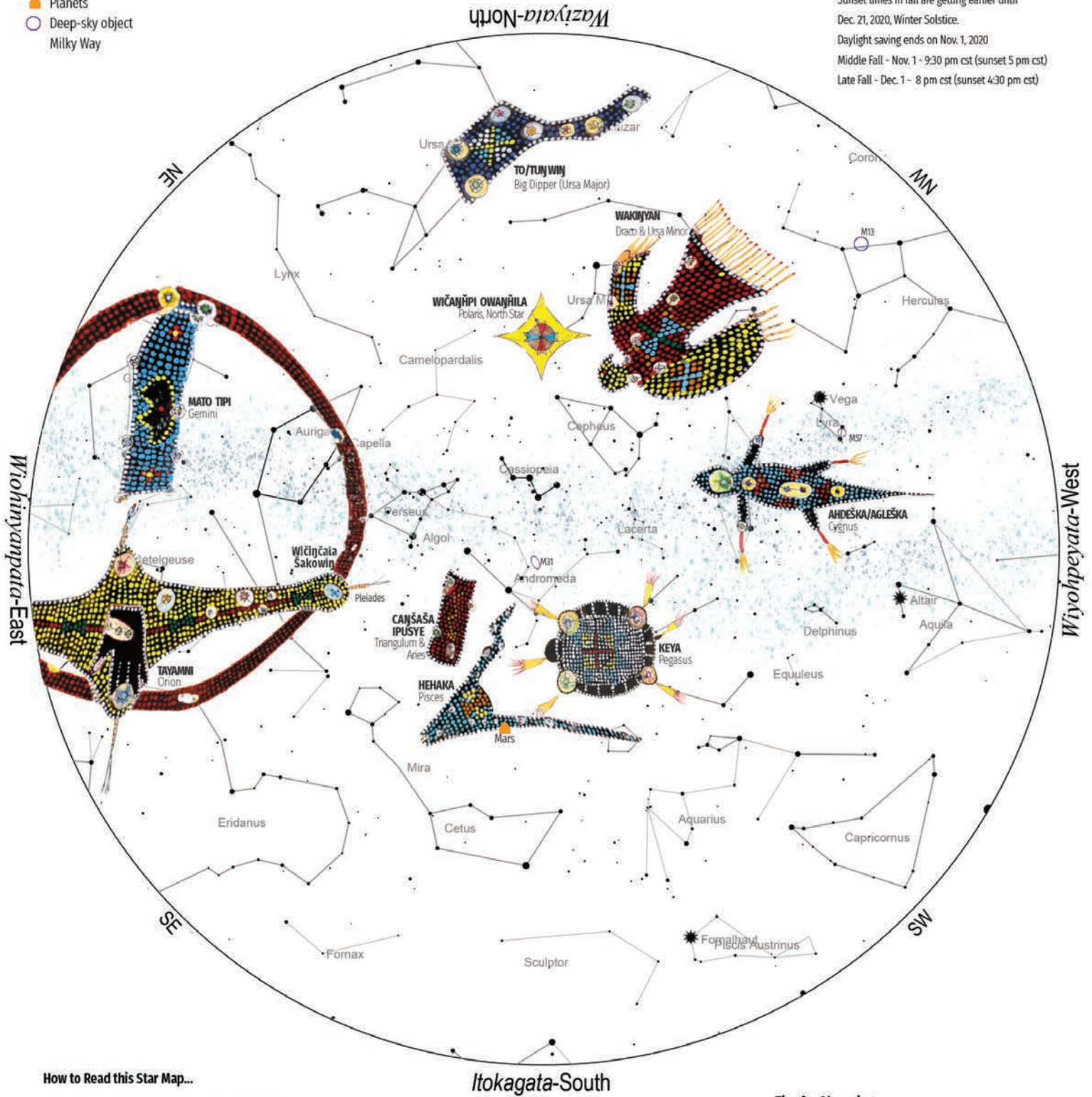
# PTANYETU - FALL NIGHT SKY

## Legend

- ★ Bright stars
- Planets
- Deep-sky object
- Milky Way

## Best Time to Use this map

- Sunset times in fall are getting earlier until Dec. 21, 2020, Winter Solstice.
- Daylight saving ends on Nov. 1, 2020
- Middle Fall - Nov. 1 - 9:30 pm cst (sunset 5 pm cst)
- Late Fall - Dec. 1 - 8 pm cst (sunset 4:30 pm cst)



## How to Read this Star Map...

This map is a snapshot of the entire night sky as seen in the Fall from mid-latitudes in North America. Imagine the page is a flat version of the sky above you, a dome shape. Standing outside, face north, then turn the map so that 'north' is on the bottom of the page. Look up and you will see all the objects on the map are in the night sky. Enjoy!

## Tips for Observing...

Enjoy! Dress warm. Get to the darkest sky possible. Allow ~10 minutes for eyes to adjust to the darkness. Amazingly more stars will 'appear' as your eyes become 'dark adapted'. Use a red light if possible.

Mid latitudes (+30 to 50°), Northern Hemisphere

## Ptanyetu - Fall Dakota Constellations

### Keya-Turtle (Pegaus) and Čhekpá

"Once the baby is born, we take the umbilical cord from the baby and place it inside the turtle and then sew it closed. This represents the connection to the star world and serves as a lifelong lesson to that child that we are the Star People. So, while baby is in the mothers belly, they are fed and given nutrients through the umbilical cord. Once children are born, that connection is put into *Keya* and we re-connect that child to the stars. For Dakota people, we sometimes make these amulets gender specific. For a girl we use a turtle and for a boy, a salamander. A turtle is a very powerful symbol for us. Among many other things, if a turtle becomes frozen it will stay that way until it warms up. Once it thaws out, the heart will beat again and the turtle will walk away! Imagine having such a strong heart! The salamander is similar for boys. Have you ever seen a salamander or a lizard lose its tail? It just grows right back. We see this as resiliency, or the ability to heal easily. These are prayers we have for all *wakanheza*, sacred little one." -Ramona Kitto Stately



Artwork by Ramona (left) *Keya*, turtle umbilical pouch, (right) *Ahdeška* (salamander) umbilical cord pouch, 2020

### To/Tuŋ Wiŋ, Blue/Birth Woman - Big Dipper - We Come From the Stars

Midwives and others pray to the Blue/Birth Woman Spirit so newborn babies will enter this world safely. She is a doorkeeper between worlds. Also known as *Wičakiyuhapi*-Stretcher and the *Wašihdapi/Wašigłapi*-Mourners. The stretcher carries a person that has passed away back into the spirit world. "In our *Očeti Šakowiŋ* traditions, the *Wičaŋħpi Oyate*, the Star Nation, is understood to be the place of origin of the *Nagi* (the soul). We descend down a path and enter this world through the center of the Dipper...at one time there lived a woman spirit there named *Wičaŋħpi To Wiŋ*, 'Lady Blue Star' or 'Blue Spirit Woman'" - Janice Bad Moccasin



Painting by Annette S. Lee, *To/Tun Win (Birth/ Blue Spirit Woman) - We Come From the Stars*, 2014

### Wanaġi Tačanġu-Milky Way & the River

*Wanaġi Tacanġu* (Road of the Spirits/Ghost Trail) the Milky Way. The *kapemni* pair of the Milky Way is the Mississippi River. *Kapemni* can mean swinging around, twisting, or mirroring in D(L)akota and is illustrated by two tipis/triangles connected at their apexes. The inverted top tipi symbolizes the sky/star world. The lower tipi symbolizes the Earth/physical world that we see around us. At the apex where the two worlds/tipis meet is a doorway.



Photo credit "Autumn Milky Way" by Travis Novitsky, Fall 2020

### Anpewi-Sun, Haŋwi-Moon & Šuŋkčijča-Wolf

A Lakota story shared by James Spotted Thunder passed down by his grandmother, Thelma Blindman.... about how during a time of great darkness, a woman prayed, asking for help for the people. Wolf heard her and carried her prayers to *Anpewi*-Sun. Sun saved Earth, and the people could always sing this song and the *Šuŋkčijča*-Wolf would come to help.



Photo by MN DNR



Photo wikipedia

### Planets to See this Fall

About an hour after sunset - **Mars** (east), **Jupiter & Saturn** (south/southwest), look for Jupiter & Saturn close together or 'in conjunction' on **Dec. 21, 2020** closest in nearly 400 years!

About an hour before sunrise - **Venus** (east), **Mars** (west) This time is called 'the end of night' or 'helical rising' and is recognized by Indigenous people world-wide as a sacred time.

## NASA Moon to Mars

### NASA Publishes Artemis Plan to Land First Woman, Next Man on Moon in 2024

Following a series of critical contract awards and hardware milestones, NASA has shared an update on its Artemis program, including the latest Phase 1 plans to land the first woman and the next man on the surface of the Moon in 2024. In the 18 months since NASA accepted a bold challenge to accelerate its exploration plans by more than four years and establish sustainable exploration by the end of the decade, the agency has continued to gain momentum toward sending humans to the Moon again for the first time since the last Apollo lunar mission in 1972.



Artemis Plan, Photo credit NASA.gov

### Our Educators recommend:

**Educator Ms. Jillian Stately**, Equity Specialist-Indian Education in the Osseo Area Schools recommends the NASA activity-*Make a Moon Phases Calendar and Calculator*. Most people are familiar with Moon trackers and calendars online but did you know NASA has a resource that allows you to make your own Moon Phase Calendar Calculator at home? This is a fun DIY project for you and your family to complete during distance learning! There is a 6 page template (3 pages double-sided) and using scissors, tape, and a pencil or pen you can complete your calendar. This is also a great learning opportunity for students because you will have to color in the Moon Phases Wheel based on what type of Moon is listed - you will be Moon phase experts in no time.

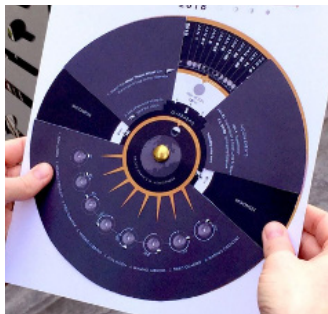


Photo credit NASA.gov

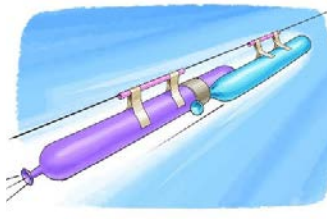


Photo credit NASA.gov

**Educator Mr. Michael Connelly**, Science Specialist, American Indian Magnet, St. Paul Public Schools, Minnesota recommends the NASA Moon to Mars Activity "Propulsion with the Space Launch System" located in the Educator Guide-Activity Three *Build a Multistage Balloon Rocket*. Students will design and build (as a team or on their own) a multistage balloon-powered rocket to demonstrate how rockets can achieve greater distances using the technology of staging. As students successfully launch it across the classroom/ outside they will then try to improve their rockets' performance based upon the results of the experiment.

## NASA STEM on Station

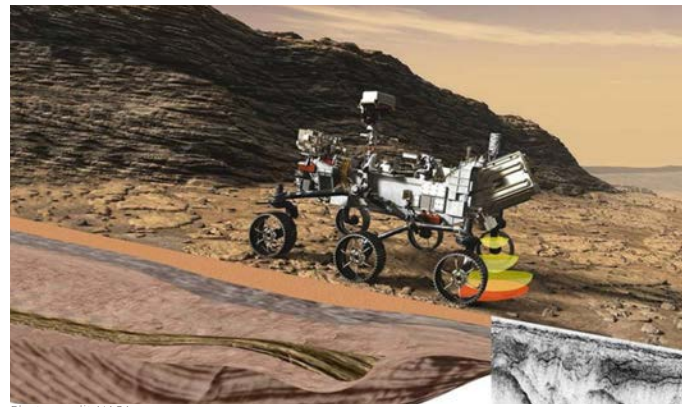


Photo credit NASA.gov

### NASA's Perseverance Rover Will Peer Beneath Mars' Surface

After touching down on the Red Planet Feb. 18, 2021, NASA's Mars 2020 Perseverance rover will scour Jezero Crater to help us understand its geologic history and search for signs of past microbial life. But the six-wheeled robot won't be looking just at the surface of Mars: The rover will peer deep below it with a ground-penetrating radar called RIMFAX. Unlike similar instruments aboard Mars orbiters, which study the planet from space, RIMFAX will be the first ground-penetrating radar set on the surface of Mars. This will give scientists much higher-resolution data than space-borne radars can provide while focusing on the specific areas that Perseverance will explore. Taking a more focused look at this terrain will help the rover's team understand how features in Jezero Crater formed over time. Learn more at: <https://www.nasa.gov/feature/jpl/nasas-perseverance-rover-will-peer-beneath-mars-surface>

### The Timber Wolf – A Vital Minnesota Natural Resource

It is no wonder that Minnesota chose the Timberwolves as a mascot! It is an amazing animal, a pure wolf that is noted for keeping the wilderness habitat healthy for the forest ecosystem.



Photo credit MN DNR

The idea of the Dakota peoples philosophy of "we are all related" can be observed if we look closely at this timber wolf. Because of hunting and trapping of the wolf, the populations were decimated and there were few left alive. The deer and elk are naturally afraid of the wolf and so they would not spend a lot of time getting water in the river. Once the wolf began to disappear, the deer and elk spent more time in the rivers foraging the vegetation along the rivers edge. The roots of the vegetation actually keep the soil in place. So scientists noticed an increase in erosion along riverbanks. Our environment from earth to mars works together, each action causing a reaction kind of like dominoes. There are many cool facts to find about our Minnesota Timberwolf and how we can make better decisions about our animal brothers if we see them as relatives and not resources. Want to know more? See: <https://www.howlingforwolves.org/about-gray-wolf/#mankind>

## Indigenous Contributions to Science

History at the K-12 level has generally followed 'great man' narratives as a pedagogical tool to draw students into complex historical events through individuals who have directly impacted them. Histories of science have relied even more heavily on these tropes, as readily called to mind by Galileo Galilei, Isaac Newton and Albert Einstein. In virtually all cases for U.S. K-12 curricula, these approaches center the agency of European or European-diaspora men. In 2014, however, for the first time, the majority of America's public schools were non-white. In 2040 the U.S. will be a 'majority minority.' This project creates Indigenous astronomy content by Indigenous people for our communities and everyone. (Gerardo Aldana)

## Indigenous Engineering

- Building a tipi out of a hide and poles
- Women owned and in charge of tipis, packed and moved the tipis in a short time
- Dugout canoe made of tree trunk
- Sleds made out of bison ribs, saplings, and rawhide (Ref. MNHS)



Photo credits: (left) MN Historical Society Dakota dugout canoe 1934; (right) Deer hide robe 1905

## Indigenous Housing

- Sustainability of a tipi, non-toxic, renewal materials, opening on top for light



Photo credits: (left) Janice Bad Moccasin, Dakota tipi, (right) Tipi poles, MN Historical Society, 1962



## Food Sovereignty

-D(L)akota were/are future oriented, preserving for future needs, not just surviving pre-colonization times but thriving (Carl Gawboy)

- Every part of the animal was used.
- Gathering traditional foods, like all the berries, strawberries, blueberries, cranberries .. drying them in the summer
- Preserving of traditional foods: Example: in summer smoke all meat; in winter leave it hanging someplace where there's no wind
- Example: preserve the moose and buffalo (cut into tiny shreds, dry it, mix with tallow and berries)
- Example: preserve fish so it would not rot (cut in half, hang & smoke)



Photo Credits: Bone sled (left) MN Historical Society 1905; (right) Inipi-Sweat lodge by Annette S. Lee

## Plant Medicine & Healing

- Sage, *Artemisia ludoviciana*, *blakaska*. Leaves and stems  
Leaves and stems burned as incense and used for "smudging." That is, the sage is burned and the smoke breathed in, and wafted all over the body to purify one's self. An infusion of the plant is used to treat stomach disorders, to treat intestinal worms, to calm nerves, and to treat colds, sore throats and diarrhea. This sage is used to form wreaths and bracelets for Sundancers (Wiwayang Wacipi)

- Tobacco, (varies) for example: Čaᅇ uᅇkčemna, Skunkbrush sumac, *Rhus trilobata*, Leaves are mixed with various tobaccos for pipesmoking. Along with Hairy umbrellawort and small leaf pussytoes, or čaᅇhlogaᅇ hū.

- Čaᅇšaša, red willow or red osier dogwood, During very cold months, the Lakota collect the stems of this shrub and then peel off the bright red, outer bark. Some boil the stems to make this task easier. What is desired is the cambium layer just below the red, outer bark. This material will be a light green to white color when freshly peeled, later turning a reddish brown. Can sasa is used in ceremonial pipe smoking, and is considered a very sacred plant.

(Additional Reference - L. Black Elk, W. Flying By, 1998)

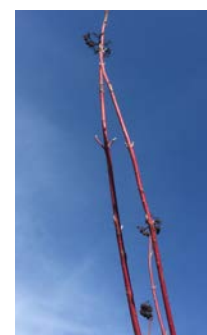
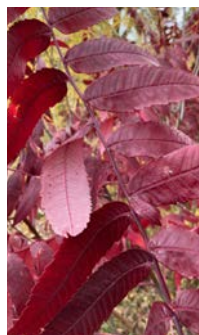


Photo credits: (left) Sumac in the fall; (middle) Sage or Artemisia ludoviciana, Čaᅇšaša-Red Willow, A. Lee, 2020



# Wopida!

Thank you.

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**Credit for this work:**

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