

Lesson	The 13 Moons
Grade	6
Unit	Space

Background Information

In our contemporary Western society, we use a solar calendar system for recording days, months, and years. Many cultures across the world use Lunar calendars from China to the Middle East, to even right here in North America. Many Indigenous Nations across North and South America use a lunar calendar system for recording their days, months, and years. Whether using a solar or lunar calendar, both systems are functioning on the interactions of celestial bodies (e.g. The Earth, the Moon, and the Sun).

Ontario is home to many Indigenous nations, including the Haudenosaunee, the Anishinabek, the Cree, the Métis; not to mention the hundreds of other Indigenous Nations from across the World. This lesson plan will be discussing the 13 Moons of the Anishinabek, but like many of our cultures, the Anishinabek 13 Moons are dynamic and may vary from community to community. A recommendation for teachers across Ontario is to adapt the content of this lesson plan that is reflective of the territory you are in, meaning if you are in Cree territory use Cree moons or if you are in a Mohawk territory use Mohawk moons.

This content below is adapted from *Achieving Aboriginal Student Success: A Guide for K to 8 Classrooms* by Pamela Rose Toulouse.

Moon (28-day Cycle)	Month (Approx.)	Happenings in the World
Sugar Moon	March	New life appears, Maple Tree sugaring
Sucker Moon	April	Sucker fish returns, cleansing of water
Flower Moon	May	Plant world awakes, flowers blooming
Strawberry Moon	June	Ripening of strawberries
Raspberry/Blueberry Moon	July	Ripening of other berries
Grain Moon	July/August	A time of harvesting, prepare for winter
Corn/ Autumn Moon	August	Corn harvest, passage of life
Falling Leaves Moon	September	Colourful leaves falling from trees,

Freezing Moon	October	Warm days over, sun sinks lower
Little Spirit Moon	November	Beginning of winter
Big Spirit Moon	December	Purification, world rests and reflects
Spirit Moon	January	World is silent, Northern lights
Bear Moon	February	Mother Bear making her lodge

Other nations will have different names of the moon in both English and their respective Indigenous languages and the happenings in the world will also change depending on where in the world the Indigenous nation is located. This is the reason for the importance of grounding your practice and incorporation of Indigenous content in the science classroom through a sense of place. The Indigenous knowledge of the moons can be incorporated into the science curriculum in multiple points, however it works exceptionally well for the grade 6 space unit.

The moon goes through 8 cyclic phases depending on its movement around the earth relative to the sun. As the Moon moves away from its position directly between the Sun and Earth (i.e. New Moon), the moon becomes more illuminated until the Earth lies directly between the Moon and Sun (i.e. Full Moon). Below is a chart of the phases of the moon adapted from an article on timeanddate.com.

Phases of the Moon	
New Moon	Sun, moon, and earth aligned, moon is dark
Waxing Crescent	Thin sliver of moon appears on right side
First Quarter	Moon is 50% illuminated
Waxing Gibbous	Moon is being illuminated more each night
Full Moon	Moon is 100% illuminated
Waning Gibbous	Moon is becoming less illuminated each night
Third Quarter	Moon is 50% illuminated
Waning Crescent	Thin sliver of moon appears on the left side

Activities

Minds On

1. Ask students about what prior knowledge they bring into the class about the Moon. Students can think-pair-share with the person(s) next to them for 1-2 minutes about “The Moon”. Guiding questions below can help with prompting conversation.

Guiding Questions:

- “What have you learned, in class or at home, about the moon?”
 - “Does anyone know another name for the moon - possibly in another language?”
 - “Are there any stories of the moon that you grew up hearing from your parents? Home Country?”
2. As a class, take up the discussions from the groups through a Mind Map on the board. The discussion of the moon can be consolidated through sharing an interesting fact about the moon or watching a moon. See the video below for an interesting short clip about the moon
 - Moon 101 | National Geographic:
<https://www.youtube.com/watch?v=6AviDjR9mmo>

Activity

1. Introduce students to the concept of lunar calendars. Make connections to Indigenous 28-day lunar calendars, writing the 13 moons somewhere in the classroom from the background information section above. Below are some YouTube videos about lunar calendars from around the world explained, please use these or any resources in your preparations for the lesson.
 - The Chinese Lunar Calendar Explained:
<https://www.youtube.com/watch?v=O5dumOQTTaU>
 - Understanding the lunar calendar (Islamic):
<https://www.youtube.com/watch?v=odz5FCOuRKU>
 - Article on Mayan Moon Goddess Ix Chel for teacher reference:
<https://yucatanliving.com/culture/ixchel>
 - 13 Moons on Turtle’s Back A Native American Calendar
<https://www.youtube.com/watch?v=4UCwpIYHzL0>
2. Introduce students to the phases of the moon, writing the terminology somewhere in the classroom.
3. Conduct the Moon Phase demonstration from the YouTube video below.
Moon Phases Demonstration:
 - Moon Phases Demonstration | National Science Teaching Assn. (US)
<https://www.youtube.com/watch?v=wz01pTvuMa0>

4. Begin the demonstration by turning the lights off in the classroom and then turning on an unshaded lamp that will represent the Sun.
5. Place a styrofoam ball (roughly 5 cm in diameter, but any size will do - can be found at dollar store) on a pencil, the styrofoam ball will be the moon.
6. As you move your body in a circle, standing in place and keeping your eyes on the moon as you move around, you'll notice the 8 phases of the moon as you spin. Your body will be the Earth.
7. In an open space in the classroom, allow the students to take a styrofoam ball and a pencil and try the demonstration for themselves. Allow the students to engage with the activity for 3-4 minutes before introducing the worksheet.
8. Students are going to be conducting a month-long inquiry into the phases of the moon. Using the attached worksheet in Appendix A, students will make daily observations of the moon and the changing phases.
9. Review the worksheet with students and allow the space for questions from the students.

Consolidations

1. Take 5 minutes at the end of one of the weekly science classes to ensure students are making observations by having students show their data as a ticket-out-the-door when changing periods or being dismissed. Repeat this once a week for the entirety of the inquiry.

Guiding Questions:

- "What patterns are you noticing with the moon cycle and the dates?"
- "Were there any nights you were not able to make observations and why? - Weather, forgot, etc."

2. At the end of the 28 day observation period, revisit the data collected by students, show the website: <https://www.timeanddate.com/moon/phases/> to allow students to compare the data they collected through their observations with the data collected by computer models, programmers, scientists, and satellites.

Guiding Questions:

- "Was your data 100% accurate and matched the data from timeanddate.com and why was your data either accurate or inaccurate?"
- "What do you find interesting and what did you find difficult about making scientific observations over the last 28 days?"

- “From our observations, how do you think scientists can predict the phases of the moon in the future?”
3. Give the students about 10-15 minutes or so to complete the reflection questions from the worksheet below in Appendix B. Be sure the phases of the moon and Anishinabek 13 Moons are posted somewhere in the classroom.
 4. The first two reflection questions in Appendix B can be discussed as a class as a form of consolidating the activity. The final two reflection questions can connect this content with Indigenous knowledge.

Curriculum Expectations and Assessment

Overall Expectations

2 - Investigate the characteristics of the systems of which the earth is part and the relationship between the earth, the sun, and the moon.

Specific Expectations

3.1 - Identify components of the solar system, including the sun, the earth, and other planets, natural satellites, comets, asteroids, and meteoroids, and describe their physical characteristics in qualitative terms

3.5 - describe the effects of the relative positions and motions of the earth, moon, and sun

Cross-curricular Expectations

Social Studies:

A1.1 - Explain how various features, including build, physical, and social features of communities, can contribute to identities in and images of a territory and/or country, and assess the contribution of some of these features of images of and identities in Canada.

Math, Data Sense and Probability:

- Collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject, and record observations or measurements

Safety Considerations

The demonstration of the Moon phases using an unshaded lamp may be too bright for students with light sensitivity or make participating fully difficult for students with low visibility in low light.

- A model can be used that only requires a flashlight.
- The video can be shown instead of the activity being performed by students.

Students will be making observations at home outside of school hours, it is important to discuss with students how to safely make observations at night.

- Try to make observations indoors if possible.
- Observations outside should be made from a backyard, porch, or other places in the vicinity of a student's homes.

Ethical considerations to be aware of is not all students' living situations are the same. Some may live in basements, apartments, houses. A student's living situation shouldn't impede their learning and make any necessary modifications needed.

Accommodations

Instructional Accommodations:

- Use repetition
- Frequently check with the students for understanding
- Use Differentiated Instruction and pair verbal and visual teaching methods

Environmental:

- Use preferential seating to reduce distractions.
- Post reference material to act as an external memory aid

Assessment

FOR

- Minds On Mind Mapping activating prior knowledge about the moon

AS

- Weekly check-ins of observations and guided discussions

OF (possibilities)

- Appendix B
- Culminating activity that applies gained knowledge (build a model)
- Oral test

Materials

Materials	Quantity
Phases of the Moon Observation Sheet	Class Set (1 for each student)
Reflection Questions Sheet	Class Set (1 for each student)
Pencils	Class Set (1 for each student)
Styrofoam Ball (~5 cm diameter)	Class Set (1 for each student)
Anchor Chart of Moon Phases	1
Anchor Chart of 13 Moons (Anish.)	1

References

Achieving Aboriginal Student Success: A Guide for K to 8 Classrooms. Pamela Rose Toulouse. Portage & Main Press, 2011

<https://www.timeanddate.com/moon/phases/>
<https://www.timeanddate.com/moon/phases/>
<https://www.youtube.com/watch?v=wz01pTvuMa0>
<https://www.youtube.com/watch?v=O5dumOQTtaU>
<https://www.youtube.com/watch?v=odz5FCOuRKU>
<https://yucatanliving.com/culture/ixchel>
<https://www.youtube.com/watch?v=4UCwpIYHzL0>
<https://www.youtube.com/watch?v=6AviDjR9mmo>
<https://www.teachspced.ca>

Appendix B - Reflection Questions

Name: _____

Date: _____

1. What did you find interesting about learning about the phases of the moon and making your observations?

2. What did you find difficult about making observations of the phases over the moon for a month?

3. From the observations you made, what Anishinabek Moon(s) were we in the last 28 days? What is important about the Anishinabek Moon(s)?

4. What are the two Anishinabek Moons that come before and after the Moon(s) found in your observations?
