



Indigenous Astronomy
The Sky and Stars Shape Who We Are
Unit Scope and Sequence
Grades 3-5

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Unit Standards

- [NGSS](#) Phenomena: Why Do We See Patterns in the Sky and What Else is Out There That We Can't See?
 - 1-ESS1-1 Earth's Place in the Universe: Use observations of the sun, moon, and stars to describe patterns that can be predicted
 - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence (1-ESS1-1), (1-ESS1-2)
- [SEL Standards](#)
 - Identify and manage one's emotions and behavior
 - Recognize personal qualities and external supports
 - Recognize the feelings and perspectives of others
 - Recognize individual and group similarities and differences
 - Use communication and social skills to interact effectively with others

Scope and Sequence

Lesson 1: Introduction to the Stars

([lesson plan](#), [slide deck](#))

Students will listen to a live sky show introducing them to the sky and stars with the help of a mini planetarium

Learning Objectives

- Students will reflect and share on their own experiences with stars
- Students will engage in and practice Indigenous Knowledge Systems and ways of knowing

Themes

- *Native Truths* uplifts the voices of Native people and allows them to speak for themselves
- Indigenous Astronomy is a legitimate and robust science with a rich history and vibrant knowledge base.

Questions

- What experiences have you had with the sky and the stars

Lesson 2: Karen Ann Hoffman and the Great Bear Hunt

([lesson plan](#), [slide deck](#))

Students will listen to the narration of the Great Bear constellation, also known as the Big Dipper

Learning Objectives

- Students will listen and learn from Indigenous star stories
- Students will engage in and practice Indigenous Knowledge Systems and ways of knowing
- Students will interpret texts and media to deepen their understanding of astronomy, Indigenous ways of knowing, and storytelling

Themes

- *Native Truths* uplifts the voices of Native people and allows them to speak for themselves
- Many Native tribes, communities, and peoples have been telling stories about the stars for thousands of years

Questions

- How do the sky and stars and the stories they tell relate to you, your family, and your community?

Lesson 3: Patterns and Symbols

([lesson plan](#), [slide deck](#))

Students will create their own constellation and constellation story

Learning Objectives

- Students will learn that many peoples use the stars to teach and learn lessons
- Students will engage in and practice

Themes

- *Native Truths* uplifts the voices of Native people and allows them to speak for themselves
- Make meaning from symbols and

<p>Indigenous Knowledge Systems and ways of knowing</p> <ul style="list-style-type: none"> Students will discuss and examine the science, culture, and history of Indigenous Astronomy 	<p>understand how to recognize patterns</p> <p>Questions</p> <ul style="list-style-type: none"> What makes some patterns and symbols important? What and how can we learn from the stars?
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Lesson 4: Storytime

([lesson plan](#), [slide deck](#))

Students will identify star and sky stories from different Tribes and communities. They will analyze the importance of patterns and identify personal connections

Learning Objectives

- Students will learn that many peoples use the stars to teach and learn lessons
- Students will engage in and practice Indigenous Knowledge Systems and ways of knowing
- Students will hear from multiple Native individuals with varying perspectives to deepen their understanding of Indigenous Astronomy

Themes

- Native Truths* uplifts the voices of Native people and allows them to speak for themselves
- Different Tribes, communities, and peoples have different star stories

Questions

- Why are star stories told?
- Why and how are patterns significant?

Lesson 5: Mindfulness

([lesson plan](#), [slide deck](#))

Students will listen to songs and poems while reflecting on their personal wellness. Resources include media from *Native Truths* and a mini planetarium

Learning Objectives

- Students will interpret and describe their personal feelings and stories involving wellness and mindfulness
- Students will engage in and practice Indigenous Knowledge Systems and ways of knowing

Themes

- Native Truths* uplifts the voices of Native people and allows them to speak for themselves
- The Indigenous relationship and knowledge of the sky is exceptional in that it encompasses mind, body, heart, and spirit

Questions

- Did you know that we all come from the stars?
- What is our connection to the Earth, sky, and stars

Critical Concepts and Vocabulary

Terms, critical concepts or words that should be defined before or during the lesson.

Concept / Term	Definition and rationale for choosing this word, phrase, or concept	Ideas for pre-teaching / front-loading the concept
Native Truths	<p><i>Native Truths: Our Voices, Our Stories</i> was created with the guidance of an advisory council of 11 Native American scholars and museum professionals, and in partnership with 130 collaborators representing over 105 Tribes. The 5 Native Truths, the foundations for the exhibit, come directly from Native people. The Five Truths are as follows:</p> <ol style="list-style-type: none"> 1. Our Ancestors connect us to the past, present, and future 2. Native people are everywhere 3. The land shapes who we are 4. We have the right to govern ourselves 5. Museum collecting and exhibition practices have deeply harmed Native communities 	The five Native Truths represented in the exhibit were discussed and decided by these collaborators. Students should understand that these Truths were created by Native people.
Ancestors	Your relatives or relations who came before you, maybe a parent, grandparents, great grandparents. It could also be someone alive or passed, who left a legacy, cultural or historical impression on you or your community. An Ancestor is someone we have learned from, students and teachers can be ancestors too.	Leave space for students to define what “ancestors” means to them
Astronomy	Astronomy in the most basic terms is the study of the stars. In the context of this Unit, astronomy plays an important role in Native American cultures and Native peoples have been studying the stars for thousands of years.	All of the earliest peoples looked to the stars and sky for knowledge, answers, connection, and stories.
Constellation	A group of stars forming a recognizable pattern. Over time, these patterns were given meaning in the form of cultural stories or symbols.	The constellations and stories associated that are often the default are Greek in origin. This Unit centers Indigenous constellations
Stardust	Small fragments of dust-like material found in space. In the context of this Unit, we all come from and are made of stardust. Most of the elements of our bodies were formed in stars over the course of billions of years and multiple star lifetimes.	This is a crucial understanding of most if not all Native peoples. Stories of stardust have been told and passed down for generations

Facilitation Tips

Lesson Prep

As you prepare to teach this lesson with your students, it's important to understand the history and relevance of Indigenous Astronomy.

Lesson Structure

- This unit contains 5 activities that can be facilitated in any order, but we recommend following them numerically 1-5
- The activities can stand alone, but we would *not* recommend just doing one activity - these activities build off of each other and are stronger together
- These activities can be repeated in different ways, or the same way to reinforce ideas

Context and Content Disclaimer

Collected from the [Lessons from the Earth and Beyond](#) website. The resources on this website were co-created by Native peoples.

"Our job in education today is to critically engage in a process of decolonization while also engaging in critical reflection into our own unconscious bias. As educators we must recognize that we have all, Indigenous and non-Indigenous, been impacted negatively through colonialism. In order to create positive changes in education, we need to look for opportunities to highlight and elevate Indigenous Knowledge systems. We need to recognize how Indigenous Peoples come from sophisticated societies with knowledge systems that are equal to subjects such as mathematics, physics, and science."

Quote from Isaac Murdoch, Serpent River First Nation:

"Indigenous Knowledge is derived from the understanding of the natural cycles of the earth and how all life is interconnected in a delicate balance. Learning this knowledge comes from being a part of the environment. Nature creates a set of beliefs and values that governs our way of life. Indigenous Knowledge is not separate from the people who learn it, they are the knowledge, they are the land, and the land is ceremony. Everything is connected. By delivering this resource to students they will be able to have a glimpse at the old stories of the Indigenous peoples from this land in order to further understand the connection to the great spirit of this land, Mother Earth. The more we explore these traditional beliefs in our education system, the deeper our understanding and connection to the natural world will be."

Indigenous peoples have had a close relationship and deep understanding of the sky and stars for thousands of years. These knowledge systems should be protected and uplifted. Native peoples believe that we come from stardust. Indigenous peoples have been teaching this truth for generations. [Here](#) is a Field Museum article and video from 2012 describing research on stardust. It is important to understand that Indigenous knowledges are, and have been historically devalued, labeled unscientific, and in many cases intentionally erased.

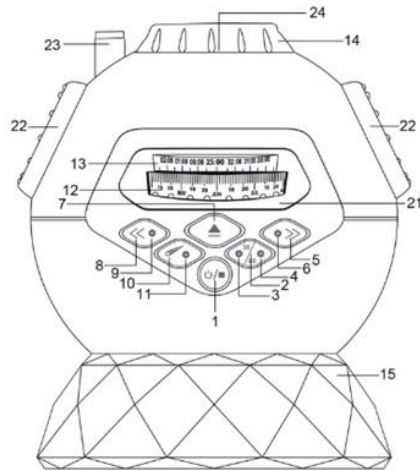
As you go through this unit with your students, center Native voices and knowledges. Speak and teach oral stories, star stories, and Indigenous astronomy as legitimate science, history, and knowledge.

When teaching about cultures and peoples different from your own, always remember that it's okay to not know the answer. For additional support for you and your students, please explore the additional resources listed in the next section.

Additional Resources

Resource Title	Description	Link
Lessons from the Earth and Beyond	Curriculum created as a result of two-day gathering of Elders, Knowledge Keepers, educators and scientists	<u>Before Starting... - LESSONS FROM THE EARTH & BEYOND</u>
We R Native	"We are a comprehensive health resource for Native youth, by Native youth, providing content and stories about the topics that matter most to them. We strive to promote holistic health and positive growth in our local communities and nation at large."	<u>Indigenous Star Stories - We R Native</u>
NMAI	This animation tells an Arikara story of the creation of a sacred landmark on the plains, the Bear Lodge (Devils Tower), as well as the formation of the Pleiades star cluster. It is one of nine traditional Native American stories that are part of the National Museum of the American Indian inaugural exhibition "Our Universes: Traditional Knowledge Shapes Our World"	<u>Star Stories: The Girl and Her Seven Brothers</u>
Science Friday	Relearning the Star Stories of Indigenous Peoples: How the lost constellations of Indigenous North Americans can connect culture, science, and inspire the next generation of scientists.	<u>Relearning The Star Stories Of Indigenous Peoples</u>
Karen Ann Hoffman interviews	These interviews were conducted at the opening of <i>Native Truths: Our Voices, Our Stories</i> at the Field Museum in May 2021	<u>Clip_05</u> <u>Clip_07</u>
Skywatch Wednesday	A series with new episodes on Wednesdays where you can learn what you can see in the night sky throughout the year with Theaters Manager Nick from the Adler Planetarium in Chicago	<u>Skywatch Wednesday Adler Planetarium</u>

Planetarium Operational Instructions



1. Press the Slide Tray Eject Button (7) to open the tray and install the star disc



2. (Optional) While the slide tray is still open, set the time and date of the night sky you want to view by aligning the desired date on the Date Dial (12) with the desired hour on the Time Scale (13)
 - a. *Note: We recommend setting this to the current date and choosing a time at night*
3. Close the tray. Do not turn the Date Dial when the tray is closed.
4. Press the ON/STOP/OFF switch (1) once to turn on the Projector Light. Dim or turn off the light in the room for the best visual experience.
5. You can freely adjust the projection angle of the Planetarium to suit viewing on the ceiling or sidewall.
6. Adjust the focus dial (14) until the projected star field is sharp. The image will be blurry if the distance is too close or too far.
7. Press the Rotate Left Button (8) to rotate the night sky counterclockwise, which is the motion of the stars in the Northern Hemisphere. Press the button again to increase the rotation speed.
8. Please remember to turn off the Planetarium when you are finished by pressing and holding the ON/STOP/OFF button.