



Natural Inquirer

Introduction to Moon Trees

LESSON PLAN

Learning Objectives:

Students can identify the five species of Moon Trees from the Apollo 14 Moon Mission.

Students can describe the history of Moon Trees and identify the tree closest to them.

Students will connect previous Moon Trees history to the Artemis Moon Trees.

Time Considerations:

- Getting Ready: 60 minutes
- Part 1: 45-to-50-minutes
- Part 2: 30-minutes
- Part 3: Two 45-to-50-minute sessions

Intended Grade Level:

3-5

Materials:

- Access to internet and web articles
- Copies of Student Pages

Materials for Part 1:

Information about and pictures of the five Moon Tree Species: Loblolly Pine, Douglas Fir, Redwood, Sycamore, and Sweet Gum trees (see supplementary information), or ability to visit one or more of these trees in-person

Background:

In 1971, Astronaut Stuart Roosa, a former Forest Service **smokejumper** (a firefighter trained to parachute from aircraft into roadless and rugged terrain to respond to wildfires and provide other fire support functions), took tree seeds from Loblolly Pine, Douglas Fir, Redwood, Sycamore, and Sweet Gum aboard the Apollo 14 Lunar Command Module. Upon return to Earth, the seeds were germinated by the Forest Service, with about 450 seedlings planted across the country.

To honor the work of Roosa, NASA and the Forest Service sent new seeds around the Moon as a payload on the Artemis I lunar orbital mission.

These seeds will be grown into seedlings at Forest Service and other tree nurseries. Public and educational institutions across the U.S. can apply to receive an Artemis I Moon Tree. Visit the *Natural Inquirer* Moon Trees website for more information.

Getting Ready

If trees are present on school grounds, make sure you identify them before starting this activity with students (apps such as iNaturalist's Seek can help with tree identification). If any of the species are species from the Apollo 14 mission, consider visiting the tree during Part 1 of this lesson. Please note that any tree species could be visited as part of the Tree Hike Enrichment Activity.

For Part 1: Make copies of tree photos and information. Set up five stations, one for each Moon Tree species, with photos and information

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for the students to study. If taking students outside to observe trees, check the site beforehand for potential hazards and risks.

For Part 2: Prepare copies or web access for Moon Tree History Article: [Moon Trees Stand as Living Testaments to First Voyages to Moon](#). Print copies of student pages for note-taking.

For Part 3: Determine the Moon Tree closest to your school site. Print copies of student pages.

Part 1: Observing Trees with Our Senses

Ask students if they have ever observed a tree before. Have students identify what they have observed about trees using their five senses.

Tell the students that they are going to use pictures to make observations about five different species of trees, moving through the five stations. They will have approximately 5 minutes at each station to record their observations.

Divide students into five teams and provide each student with a copy of the Tree Observation Graphic Organizer Student Page. Tell students whether you would like them to work individually or as a team to answer the questions.

Assign each team a starting station and provide 5 minutes to study the tree photos.

After everyone has viewed the tree pictures/ information and answered all five questions, discuss the trees and observations together. Sample discussion questions might be:

- What did students think about each tree species? Did anything surprise them when learning about the species?
- What were the tree species similarities and differences?
- Have you ever seen these species before?
- Where would each tree be grown based on the characteristics of each?

Note: If your school site has any of these five species, take your class outside to visit it in person and make observations. Discuss how the observations of the tree in-person compared to their observations of the tree from the picture and information. Were their observations correct? Is there anything they would change?

Part 2: Moon Tree History

Tell the students that they are going to read an article about something these five tree species have in common – they are all species that have had their seeds orbit the moon.

Have students read “[Moon Trees Stand as Living Testaments to First Voyages to Moon](#)” by NASA. Reading can be done through partners or individually. Students should complete the Close Reading Organizer Student Page as they read the article.

Once students have completed their close reading of the article, discuss the main points together as a class. Sample discussion questions might be:

- What was the purpose of the text?
- What is the main idea?
- How do you think this experiment affected future space travel?
- What do you think the astronaut’s motivation was to complete the Moon Trees mission?
- While reading the article, what did you visualize?
- What do you think the Moon Trees symbolize?
- How did your thinking change as you were reading?
- How does this article connect to you? Did it remind you of something?

Part 3: Moon Trees Near You

Explain to the students that they will now research the Moon Tree located nearest to their school.

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Have students conduct this research independently using the website:

https://nssdc.gsfc.nasa.gov/planetary/lunar/moon_tree.html. Review their findings as a class and discuss the Moon Tree closest to the school.

Tell the students that they will divide into teams to research this tree species and that they will present their findings to the rest of the class. Divide students into four teams and assign each team a research topic. Provide copies of the appropriate student page to each team and provide time to complete their research, either during class or as homework.

Once the teams have completed their research, have the students prepare a presentation for the rest of the class on their research topic (see student pages for research topic ideas). This could be a slideshow, an electronic or virtual presentation, or a verbal presentation.

Explain to the students that the next generation of Moon Tree seeds were sent as payload on the Artemis I mission and that schools can apply to receive a Moon Tree seedling. Discuss class interest in having their school apply for a tree.

Assessment Options:

Ask students to:

- Write an opinion essay about the Moon Tree mission.

Student presentations and completed student pages can also be used to assess student learning.

Enrichment Activity: Tree Hike:

Go on a tree walk around your school's property. Look at various trees and have students observe their similarities and differences. Students can complete the accompanying Tree Hike Student Page. Have students compare their observations to those made in Part 1 or use this to prepare students for the lesson.

Standards Alignment:

Part 1:

- CCSS.ELA-LITERACY.W.3.7
- CCSS.ELA-LITERACY.W.3.8
- CCSS.ELA-LITERACY.W.4.7
- CCSS.ELA-LITERACY.W.4.8
- CCSS.ELA-LITERACY.W.5.7
- CCSS.ELA-LITERACY.W.5.8

Part 2:

- CCSS.ELA-Literacy.RI.3.2
- CCSS.ELA-Literacy.RI.3.2
- CCSS.ELA-Literacy.RI.4.2
- CCSS.ELA-Literacy.RI.4.2
- CCSS.ELA-Literacy.RI.5.2
- CCSS.ELA-Literacy.RL.5.1

Part 3:

- CCSS.ELA-LITERACY.W.3.7
- CCSS.ELA-LITERACY.W.3.8
- CCSS.ELA-LITERACY.W.4.7
- CCSS.ELA-LITERACY.W.4.8
- CCSS.ELA-LITERACY.W.5.7
- CCSS.ELA-LITERACY.W.5.8

Extension

- CCSS.ELA-LITERACY.W.3.4
- CCSS.ELA-LITERACY.W.4.4
- CCSS.ELA-LITERACY.W.5.4

Additional Resources:

<https://www.fs.usda.gov/features/smokejumper-space-brings-back-moon-trees>

<https://www.fs.usda.gov/features/where-moon-trees-grow>

<https://www.nasa.gov/centers/marshall/history/moon-trees-stand-as-living-testaments-to-first-voyages-to-moon.html>

<https://earthobservatory.nasa.gov/blogs/earth-matters/2021/02/02/what-in-the-world-are-moon-trees/>

Name: _____ Date: _____

Tree Observations Graphic Organizer

Use the chart below to record your observations about each tree species.

| TREE SPECIES: | SIGHT: When looking at this tree, what do you notice that makes it unique and stand out from other species? | SOUND: Are there any parts of this tree that might make a sound in the woods, why or why not? | TOUCH: If you were to touch the bark, leaves, branches, or other parts of this tree how would it feel? Soft, smooth, rough, etc.? | SMELL: In your mind, what does this tree smell like? Fresh, pine, sweet, earthy? |
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Name: _____ Date: _____

“Moon Trees Stand as Living Testaments to First Voyages to Moon” by NASA Reading Organizer

First Reading

What does the article say?

- Read the title and predict what the article is about.
- Read the article. What is it about?
- Share your thoughts and ideas with a partner.

Second Reading

How does the text work?

- Highlight the title and/or headings.
- Underline the topic sentences.
- Circle powerful words and phrases.
- Draw a ★ next to important ideas.

Third Reading

What does the text mean?

Read a third time and answer the following questions:

What is the purpose of the text?

What is the main idea?

What evidence supports the main idea?

What are your own thoughts and opinions?

What is one question you had while reading the article?

Name: _____ Date: _____

Our Closest Moon Tree Information

Research Notes

Focus Area: Moon Tree History

| RESEARCH IDEAS: Interesting questions to think about. | DETAILS: What interesting facts or details support this idea? Paraphrase in your own words. | SOURCE: Where did you find this information? Write the title and author of the book or the name and url of the website. |
|---|---|---|
| Where is the Moon Tree planted? | | |
| What has been the history and growth of the Moon Tree? | | |
| Has there been any research done on this Moon Tree? | | |
| Other Research Questions: | | |

Name: _____ Date: _____

Our Closest Moon Tree Information

Research Notes

Focus Area: Moon Tree Species Identification and Characteristic

| RESEARCH IDEAS: Interesting questions to think about. | DETAILS: What interesting facts or details support this idea? Paraphrase in your own words. | SOURCE: Where did you find this information? Write the title of the book or the name and url of the website. |
|---|---|--|
| Are there any unique characteristics specific to this tree species? | | |
| What does this tree look like? What is its shape? How tall does it get? | | |
| How could we identify this tree in the forest? | | |
| Other Research Questions: | | |

Name: _____ Date: _____

Our Closest Moon Tree Information

Research Notes

Focus Area: Moon Tree Species Required Habitat and Climate

| RESEARCH IDEAS: Interesting questions to think about. | DETAILS: What interesting facts or details support this idea? Paraphrase in your own words. | SOURCE: Where did you find this information? Write the title of the book or the name and url of the website. |
|---|---|--|
| Where in the world does this tree species normally grow? | | |
| What type of climate does this tree species need? | | |
| What type of habitat or ecosystem does this tree species need? Are there any specific soil, sun, or water requirements this tree needs? | | |
| Other Research Questions: | | |

Name: _____ Date: _____

Our Closest Moon Tree Information

Research Notes

Focus Area: Moon Tree Species Uses

| RESEARCH IDEAS: Interesting questions to think about. | DETAILS: What interesting facts or details support this idea? Paraphrase in your own words. | SOURCE: Where did you find this information? Write the title of the book or the name and url of the website. |
|--|---|--|
| What wildlife relies on this tree species? | | |
| How do people rely upon this tree species? | | |
| Are there any invasive plants or insects threatening this species? | | |
| Other Research Questions: | | |

Name: _____ Date: _____

Tree Hike

Use your senses to observe the environment.

Write and draw your observations below.

Write an account of your tree hike experience.

| | |
|---|--|
| <p style="text-align: center;">Trees</p> <p>Describe the trees that you see. What are their sizes and shapes? What do the leaves look like?</p> | <p style="text-align: center;">Wildlife</p> <p>Describe any animals you see. What do they look like? What are they doing?</p> |
| <p style="text-align: center;">Other Plants</p> <p>What plants do you see besides trees? Where are they located? What are their shapes, sizes, and colors?</p> | <p style="text-align: center;">Sounds</p> <p>Describe the sounds you hear. Where are they coming from? Draw a map with you in the center and make dots where you hear sounds coming from.</p> |

