Learning about Forests (LEAF)
Monthly Planning Guide
for LINKS Chapters

November 2023

Overview

Monthly Theme	Environmental Awareness Days	Cultural and Identity Awareness Days
Indigenous Knowledge and Stewardship of the Forest	America Recycles Day (15)	Indigenous Peoples Heritage Month | LINKS, INC Founder's Day (9) | Campus Race to Zero Waste (Colleges/Universities competition)

Elementary	1. Activity 1: Exploring Indigenous Knowledge Resources 2. Activity 2: Seed Hunt
Middle and High School	1. Activity 1: Exploring Indigenous Knowledge Resources 2. Activity 2: The Trees Will Last Forever 3. Activity 3: Seed Hunt

Mentoring Moment Suggestion

Seek out passionate volunteers, activists, elders, and Indigenous members of the community, consider accessing the expertise of members of local tribes, Indigenous organizations, storytellers, and activists.

Indigenous Knowledge and Stewardship of the Forest

ELEMENTARY ACTIVITIES

SUMMARY

To honor Indigenous Peoples Heritage Month, students can explore resources and stories that illustrate Indigenous systems of knowledge and stewardship practices. To understand the life cycle of plants during the changing seasons, youth can go on a "seed hunt" to observe or collect seeds.

- *Reading and Activity Packet:* Traditional Ecological Knowledge (attached)
- *Reading:* (For Facilitators) Dos and Don'ts for Teaching TEK (attached)
- *Video*: Two -Eyed Seeing: Science and Traditional Ecological Knowledge [California Academy of Sciences]
- *Video:* Since Time Immemorial: How Indigenous People Are Reviving Traditional Stewardship [Nature Lab by Nature Conservancy]
- How to Collect Native Seeds guide (attached)
- Pumpkin Bird Feeder (attached)

BACKGROUND

Traditional Ecological Knowledge (TEK)[1]

Note: We use the term "Indigenous" or "Native American" here, preferring it over "Indian," which can be considered offensive.

Important Terminology

Before describing what TEK is, please note that the term, TEK or "Traditional Ecological Knowledge" is not an Indigenous term. This was created by non-Indigenous scientists who became interested in the deep body of Indigenous knowledge about animals, plants, ecosystems, climate, sustainability, and more. The term "Western science" refers to the dominant science that takes place in the United States (and elsewhere) today. Western science is originally associated with science as practiced in Western Europe or a colonized America but is practiced by people all over the world and from all backgrounds today.

What is TEK?

Traditional Ecological Knowledge refers to knowledge, beliefs, value systems, and practices in Indigenous communities that relate to the natural world. TEK involves knowledge about the physical environment (for example about animal habitats or local plants) and beliefs and values about the importance of life, ecosystems, and humans' role in taking care of the Earth. TEK is a practice*, it is a way of relating to the environment. TEK is a science and is sometimes called "Native Science" or "Indigenous Science."

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[1] https://static1.squarespace.com/static/5d092cd8f0025600012387be/t/6035efb3fd275d7401a08f57/1614147510295/New+to+TEK+Teacher%27s+Guide.pdf

The knowledge in TEK has been passed down over millennia and modern Indigenous communities continue to practice and add to TEK. Many Indigenous people who practice TEK see it simply as a "way of life." Importantly, each of the over 550 federally recognized Native American tribes in the United States has its own unique culture and knowledge of the natural world

As described above, TEK involves many elements related to caring for the environment and learning about the natural world. TEK includes science, spiritual elements, cultural practices, values, relationships with the environment, language, and more. A fundamental aspect of TEK is that all these elements are interconnected to such an extent that one element cannot be considered without the others.

Find more info, lessons, and resource here: https://www.stemtradingcards.org/teklessons

Activity 1: Exploring Indigenous Knowledge Resources

WHAT TO DO

Use the following resources to engage students in learning about some Indigenous systems of knowledge, as well as the cultural, spiritual, and stewardship practices that inform their care for the natural world.

1. ***Reading:*** Ask students to read the *Traditional Ecological Knowledge Reading* (attached). They can complete the Guided Notes section while they are reading.

   a. Turn and Talk: Have students pair up or form small groups to discuss what they've read.

   b. Once they've turned and talked to a partner, ask them to explore their own relationship to the environment and complete the last 2 pages of the packet.

2. ***Video*****: Two -Eyed Seeing: Science and Traditional Ecological Knowledge [**California Academy of Sciences]

In this video, Indigenous and tribal leaders and scientists advocate for **"two-eyed seeing,"** or marrying traditional ecological knowledge (TEK) with modern science: "There's a Western framework [and] there's also a traditional framework," says Dr. Frank Lake, a research ecologist for the USDA Forest Service and a member of the Yurok and Karuk communities, "and when you can align those and bring those together, then we help create the best available science together." [2]

3. ***Video***: **Since Time Immemorial: How Indigenous People Are Reviving Traditional Stewardship** [Nature Lab by Nature Conservancy]

STEWARDS OF THE LAND[3]

The story of the Emerald Edge is about how revitalizing Indigenous stewardship of ancestral lands not only supports local communities, but reaches far beyond—across the globe. Around the world, 18 percent of land is legally owned by or designated for indigenous peoples and local communities and at least double that is claimed *but not legally recognized*, leaving these lands vulnerable to development without local input. Twenty percent of the world's forest carbon stores exist on these lands. Indigenous peoples, like the First Nations of the Emerald Edge, have deep cultural connections to the land and rely on nature's abundance for their basic needs and livelihoods.

Discussion Question: *How is stewarding land and water different when you stop thinking of them as resources and instead think of them as relationships?*

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[2] https://www.calacademy.org/explore-science/two-eyed-seeing-science-traditional-ecological-knowledge

[3] https://www.washingtonnature.org/fieldnotes/emerald-edge-2017-nature-works-everywhere

Activity 2: Seed Hunt

Fall is a good time to look for seeds because many plants have finished making their flowers and are now making fruits and seeds.

WHAT TO DO

1. Visit a park, garden, or natural area to go on a seed hunt.

2. Good places to hunt for seeds would be under trees and where flowers were once seen on the plant...or in your pollinator garden. A walk through tall grasses may produce burrs or other seedy hitchhikers left over from last fall. Look up to find maple or sycamore wings. Search the ground for pinecones, acorns, and last year's apples. Berries on shrubs are great finds as well.

3. Find the seeds in any fruits you've found. Open up some of the bigger seeds to see what they look like inside. Ask students why acorns have hard casings and chestnut covers are thorny. (The coverings provide protection from weather and animals). You may need to open the capsule or pod, but be aware that the seeds may not be mature until the pod has opened.

4. Students can sketch the seeds in their journals, identify the plants they came from, or research how they germinate and the conditions for their growth.

4. Use the attached document, "How to Collect Native Seeds" to guide you in collecting native seeds that can be planted in a garden during fall or spring.



Have more seedy fun while feeding the birds in your community. Recycle your Halloween jack-o-lantern or pumpkin to make a bird feeder. See attached document for instructions.

Indigenous Knowledge and Stewardship of the Forest

MIDDLE AND HIGH SCHOOL ACTIVITIES

SUMMARY

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- ❖ Find more info, lessons, and resources about Traditional Ecological Knowledge here: https://www.stemtradingcards.org/teklessons

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Activity 1: Exploring Indigenous Knowledge

WHAT TO DO

Use the following resources to engage students in learning about some Indigenous systems of knowledge, as well as the cultural, spiritual, and stewardship practices that inform their care for the natural world.

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STEWARDS OF THE LAND[6]
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Discussion Question: *How is stewarding land and water different when you stop thinking of them as resources and instead think of them as relationships?*

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Activity 2: The Trees Will Last Forever

As unsustainable logging continues to ravage landscapes around the world, the [Menominee Tribe] of Northern Wisconsin is leading the way in regenerative forest management. After 165 years of logging on their reservation, the Menominee forest has a larger volume of standing timber now than it had 160 years ago. Guided by environmental stewardship and traditional beliefs, their management reflect the ethics of the Menominee people: a healthy ecosystem is critical for a healthy community.

WHAT TO DO

1. Click **HERE** to watch the video, *The Trees Will Last Forever* (11min).
2. As students watch the film, they can take notes and write down observations, insights, and questions.

Use the following prompts to guide a discussion about the film:

- After students have watched the film(s), ask them to share their general observations.
- Ask students to describe the individuals featured in the film(s). In what ways do they describe the land on which they live? In what ways do the individuals in each story express gratitude toward nature? In what ways do they express the importance of honoring a reciprocal relationship with the land, including plants and animals? What are the unintended and intended consequences of western science as shared in each story?
- Ask students to briefly describe the Native land management practice explored in the film(s). Why is it important to the individuals and their communities?
- Building off of students' observations, lead a discussion using the following prompt: Define ecological stewardship. How do the individuals and communities in each story model ecological stewardship? Ask students to use quotes or scenes from the film to support their point of view.
- Share the following quote from Robin Wall Kimmerer: "The land is the real teacher. All we need as students of the land is mindfulness. Paying attention is a form of reciprocity with the living world and receiving the teachings with open eyes, open mind, and an open heart." In what ways has the film(s) you watched shifted your

understanding and perspective towards the living world? How might the land be "the real teacher?"

ADDITIONAL RESOURCES

- The film is part of a lesson plan called Indigenous Perspective on Restoring Our World and includes 5 short films that feature individuals from five Native American Tribes across deserts, coastlines, forests, and prairies. The stories document the following traditions and their land management practices: Hopi dryland farming in Arizona, the restoration of buffalo on the Blackfeet reservation in Montana, sustainable forestry on the Menominee reservation in Wisconsin, the revival of Native food forests in Hawaii, and the return of prescribed fire to the landscape by the Karuk Tribe of California.
- *Book: Braiding Sweetgrass For Young People* by Robin Wall Kimmerer
- *Book*: *An Indigenous Peoples' History of the United States for Young People* by Roxanne Dunbar-Ortiz, adapted by Jean Mendoza and Debbie Reese

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WHAT TO DO

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Have more seedy fun while feeding the birds in your community. Recycle your Halloween jack-o-lantern or pumpkin to make a bird feeder. See attached document for instructions.

Dos and Don'ts for Teaching TEK

Below is a list of guidelines to be used when teaching the Traditional Ecological Knowledge lessons, or about other aspects of Indigenous history and culture.

- DO respect Indigenous science and customs as equal to Western science and customs.
- DO realize that while there is no one agreed-upon term, we recommend using "Indigenous," "Native," "Native American," or "Native peoples," or use the tribe or nation name (here, Yurok Tribe).
- Do NOT (generally) use "Indian." While some Indigenous people prefer this term, it is often considered offensive.
- DO talk about Indigenous people in present tense, in this and other lessons (unless you are referring to historic events).
- DO assume Indigenous students are in your class and teach accordingly.*
- DO NOT single out Indigenous students, put them on the spot, or ask them to educate you or their peers.
- DO leave space for Indigenous students to express their views and experiences if they volunteer them.
- DO realize that, as with all communities, people in Indigenous communities have a variety of views. Indigenous students in your class may or may not connect with TEK, or other cultural elements described here.
- DO ensure students are treated with respect regardless of their knowledge of views on concepts being discussed here.

**You may be in an area with high or low numbers of Indigenous students. However, even if you believe your classroom to not have Indigenous students, consider that you might not know the cultural and ethnic backgrounds of all your students. It can feel uncomfortable to have people discussing your culture or a culture with similarities to yours if not done respectfully.*

Dos and Don'ts for Teaching TEK

- DO feel comfortable being (respectfully) honest with students. If this material is new for you, tell students you are learning together! If students ask a question you don't know the answer to, tell them "I don't know!"

  DO look up pronunciations for Yurok words and phrases as resources allow (see Yurok Language Dictionary). If you are not sure of a pronunciation and cannot access the correct one DO be honest with students that you are unsure of the correct pronunciation.

- DO NOT accompany this lesson with any sort of "dress-up" activities or cultural reenactments.

- DO discuss whose ancestral territory your school is located on and discuss this with students. You can use https://native-land.ca/ to find this information.

If you have previously engaged in any of the "DO NOT" practices here please consider this a great chance to reform those practices and build a more culturally responsive classroom environment!

Please check STEMTradingCards.org for links to more resources on teaching about TEK.

Traditional Ecological Knowledge (TEK)

What is science? There are many ways to define science. One simple way is to say science is the "study of the world around you." Different cultures can have different ways of learning about the natural world.

Understanding and respecting nature is an important part of TEK.
Photo of Prairie Creek by Cherie Paul.

Many Indigenous communities have a deep scientific knowledge of the environments they live in. This can include which plants are safe to eat. It can include which plants can be used for medicine. It can also include knowledge about where animals live and how animals interact with each other.

Indigenous communities can have strong **relationships** with the environment. Many Indigenous people believe it is important to have respect for the environment and keep it healthy. Keeping the environment healthy requires an understanding of plants, animals, seasons, and more! Many Indigenous communities have sustainable ways of interacting with the Earth.

The term "Traditional Ecological* Knowledge," or TEK, has been used to describe the knowledge Indigenous people have about the environment and the relationships they have with the environment. TEK includes knowledge, culture, spirituality, and taking care of the Earth. It is called Indigenous science by some people.

One example of TEK is gathering and processing traditional foods in a way that does not deplete the environment. Traditional foods can be different for different tribes. They can include acorns, fish, deer, elk, berries, mushrooms, and more.

Another example of TEK is setting controlled fires. Historically, some Indigenous communities set controlled fires in places like prairies. Why did they do this? The fires helped make places for animals to live and helped plants grow better. Certain plants could be eaten or used to make baskets! The practice of setting controlled fires was stopped for many years. Some communities today are working to bring it back.

Traditional Ecological Knowledge (TEK)

TEK is very local! It's based on knowing about the environment one lives in and taking care of the environment one lives in.

One more important part of TEK is language. Why? The language a person speaks gives them a way of understanding the world around them. Language allows people to express their relationship with the environment. For example, the Ojibwe have dozens of words related to sugaring, or taking sap from trees. Having so many words about this activity shows its importance to the Ojibwe community. The rich vocabulary around sugaring also gives lots of information about trees and sap.

TEK has been passed down in Indigenous communities for thousands of years, and many Indigenous people continue to practice TEK. But they might not use the term TEK at all because the term TEK was not created by Indigenous people. Many Indigenous people simply think of practicing TEK as a way of life!

Men from the Yurok Tribe in brush dance regalia. Cultural events, such as ceremonies, allow Indigenous people to maintain relationship with the environment and are important in TEK. *Photo by Seafha Ramos.*

**ecology is the study of animals, habitats, and ecosystems*

Guided Notes for "Traditional Ecological Knowledge"

As you read about what Traditional Ecological Knowledge is, fill in this sheet so you have a set of notes. You may use bullet notes to answer each question.

Q: What are some types of knowledge in many Indigenous communities discussed in paragraph 2 of this reading?

Q: What does paragraph 3 tell us about many Indigenous communities' relationship with the environment?

Paragraph 4 introduces a big phrase, "Traditional Ecological Knowledge," or TEK! What are some components of TEK?

Write one example of TEK discussed in the reading.

Guided Notes for "Traditional Ecological Knowledge"

Is TEK based on knowing about the local environment?

Write one reason Indigenous langages are considered part of TEK

Q: What did you find most interesting about this reading?

Q: What part of this reading did you understand best? Are their parts that you don't understand as well yet? What questions do you have about the reading?

Your Relationship With the Environment

An important part of Traditional Ecological Knowledge, or TEK, is the relationship between Indigenous communities and the environment. Here you can explore your own relationship to your local environment!

Choose a place where you have been in touch with nature and that you have a relationship with (this could your local park, a national park, the beach, a tree on the sidewalk, the sky outside your window where birds fly). What place do you choose?

What is special about this place to you?

What animals, insects, or plants spend time in this place? Have you seen them there? What were they doing?

Your Relationship to the Environment

Draw a picture of the place you chose. You can include different insects, animals, and plants you have seen there. You can include yourself in the picture! Write anything else you would like to about the place you chose and your relationship to it. If you know the tribal ancestral lands, include the names of the tribes.

How to collect native seeds

Pollination of a single plant can yield thousands of seeds, all of which have the capacity to become mature plants. Collecting and sowing these seeds is environmental stewardship. You shorten supply chains, reclaim natural heritage, create green space, and offer next year's insects more food and shelter!

You will need:
A garden with flowering plants
Work gloves
Garden shears (optional)
Brown paper "coin" envelopes or paper bags
Permanent marker for labelling

1. **Find a garden** with a plant you'd like to harvest seeds from. In New England, seed harvesting takes place from September through November. Be kind when harvesting seeds and remember to thank the plant for sharing seeds with you.

2. **Look for seeds where the flowers used to be.** Flowers turn into fruits, inside of which are seeds. Fruits do not have to be colorful and juicy; many of the ones in your garden will be dry and brown (think: acorns) or fluffy.

3. **Know what you're looking for.** Some seeds like those of mountain mint (Pycnanthemum) are dark and tiny like poppy seeds. Others like milkweed (Asclepias) are broad and flat. Images of seeds for native plants can be found on prairiemoon.com.

4. **Check to make sure the seeds are ripe.** You know they are ready when they pass the "thumbnail test" and are hard enough so that they cannot be dented with your fingernail.

5. **Extract the seeds from the plant.** You can use a variety of methods: shaking or beating the dry seed heads into a paper bag works well. For bigger fruits (like those of milkweed Asclepias spp.) you might have to crack open the fruit and manually pull out the seeds. You can also cut off the seed heads into a bag to extract the seeds at home.

6. **Collect seeds from different plants into individual containers.** Avoid mixing seeds during collection; you can always combine them later if you'd like to make a seed mix.

7. **Label your bag or envelope with the date, location, and species.** Let the seeds dry out in the bag at room temperature for two weeks. Then, store your seeds in the refrigerator until ready to sow.

TPI Tip: starting a pollinator garden from seeds is more challenging than starting a pollinator garden from mature plants. If you are a first time pollinator gardener, we recommend that you start with already established plants that you can pick up at a nursery or our summer plant sale. Your garden can later be supplemented with plants grown from your harvestd seeds.

How to collect native seeds

When collecting seeds, keep the following in mind:

1. **Timing is key.** Some fruits from spring-blooming plants mature in late summer, others mature after frost. Harvesting seeds too early will result in poor germination rates; if the seed can be dented with a thumbnail, it is not mature. Harvesting seeds too late and you risk predation by birds and rodents.

2. **Know how seeds are dispersed. The easiest seeds to harvest are those that are dispersed mechanically by the plant.** You can typically shake or beat the ripe seed heads into a container to harvest seeds from these plants. Some examples are:
   - black-eyed susan (*Rudbeckia hirta*)
   - partridge pea (*Chamaechrista fasciculata*)
   - purple coneflower (*Echinacea purpurea*)
   - mountain mint (*Pycnanthemum* spp.)
   - wild bergamot (*Monarda fistulosa*)

3. **Other seeds are dispersed via the wind.** These seeds are also easy to collect, but come attached to a cottony fluff that can make harvesting difficult if not timed right. You can dislodge the fluff from the seed by shaking the seeds in a sealed plastic bag with a few quarters. Some example of plants with seeds dispersed via the wind:
   - common milkweed (*Asclepias* spp.)
   - wood asters (*Symphyotrichum* spp.)
   - new York ironweed (*Vernonia noveboracensis*)
   - goldenrod (*Solidago* spp.)
   - thistles (*Cirsium* spp.)

4. **Last, some seeds are dispersed via animals.** These seeds are more challenging to collect as they are typically encased within sweet, juicy flesh. Example of plants include black chokeberry (*Aronia melanocarpa*) and shrubby dogwoods (*Swida* spp.) Third-party instructions for harvesting these seeds can be found on our website.

5. **Harvest only from your garden or with explicit permission from neighbors.** Never harvest seeds from wild plants—intense pressure from seed collecting can deplete a local seed population quickly, especially of rare plants.

6. **Share your seeds with others!** Many native plants produce thousands of seeds in a growing season. If you only plan on sowing a small fraction of your harvest, sharing your seeds with others can be a great way of increasing the impact of your garden.

Tufts Pollinator Initiative

Project funded in part by the: Tufts University GREEN FUND

For more information, visit
sites.tufts.edu/pollinators
Find us on social media
@PollinateTufts

Pumpkin Feeder

WHAT YOU NEED

- birdseed
- strong twine or cord
- hollowed-out pumpkin
- two wooden dowel rods

Don’t toss your jack-o’-lantern after Halloween. Turn it into a feeder for neighborhood birds!

WHAT YOU DO

1. Cut off the top of the pumpkin, as shown. (Ask an adult for help.)

2. Poke a dowel into the pumpkin a few inches down from the top edge you just cut. Push it straight out through the opposite side of the pumpkin.

3. Poke the second dowel through the pumpkin so it crosses just under the first dowel.

4. Cut the twine into four equal lengths. Tie a strand to each dowel, as shown. Then tie the loose ends together in a large knot at the top.

5. Fill the pumpkin with birdseed, and then hang it in your yard.

TIP Make several small holes in the bottom of the pumpkin to let rainwater drain out.

TIP If you don’t want seeds to spill out of the pumpkin’s face, you can line the feeder with a sheet of newspaper before filling it.

SHOW US!

We want to see photos of your *gourd*geous feeders—and the birds that stop by for a snack, too! Send your letters and photos to *Ranger Rick; 11100 Wildlife Center Dr.; Reston, VA 20190-5362.*
E-mail: **rick@nwf.org**

We enjoy all your letters and photos, even though we can publish only a few in the magazine. All letters and photos become the property of National Wildlife Federation.

PHOTO BY MARK GODFREY