

The Ecology and History of Onondaga Lake: Exploring Haudenosaunee and Scientific Perspectives

MS Curriculum – Supporting Documents and further reading

Lesson 1: The Thanksgiving Address

- a) Questionnaire (Pre-activity 1; Post-activity)
- b) Ways of Knowing worksheet (Activity 1)
- c) Some examples of visual and verbal arts that express a combination of traditional and scientific ecological knowledge

Lesson 2: The Plants

- a) Plants of the Skā·noñh -- Great Law of Peace Center (also included in High School curriculum)
- b) Seed identification guide (not yet developed)

Other resources:

Anthony Wonderley, "The Eldest Medicine: Red osier dogwood in Iroquois folklore and mythology," in Christine Sternberg Patrick, *Preserving tradition and understanding the past: Papers from the Conference on Iroquois Research, 2001 – 2005* (New York State Museum Record 1, 2010, www.nysm.nysed.gov/file/2163/download?token=rxjO8p42)

Lesson 3: The Sun, Moon and Stars

- a) Selected SEK and TEK facts/stories
- b) Venn diagram template (Pre-activity part 2)
- c) Table: How the sun, moon, or stars supports at least five other beings in the thanksgiving address. (Post-activity 2)

Other resources:

Wallace L. Chafe, *Seneca Thanksgiving Rituals* (Washington: U.S. Government Printing Office, 1961) – excerpt of detailed translation.

Lynn Ceci, "Watchers of the Pleiades: Ethnoastronomy among native cultivators in Northeastern North America. *Ethnohistory* 25:4 (autumn, 1978), 301-317.

Lesson 4: The Thunderers and the Four Winds

- a) 6-sided die template (Pre-activity 1)
- b) Ways that the four winds and thunderers support other beings in the thanksgiving address (Activity 2)
- c) Answer sheet for Activity 2
- d) Web template for Activity 2

Questionnaire: The Haudenosaunee Thanksgiving Address as a pathway to stewardship education in the Onondaga Lake Watershed

Part A. For each question, please place a check mark where it best expresses your feelings about the statement.

	Very true	Kind of true	Not sure	Not very true	Not at all true
1. I have so much in life to be thankful for.	Very true	Kind of true	Not sure	Not very true	Not at all true
2. I can go a whole week without feeling grateful for anything or anyone	Very true	Kind of true	Not sure	Not very true	Not at all true
3. There are people I really appreciate.	Very true	Kind of true	Not sure	Not very true	Not at all true
4. When I look at the world, I don't see much to be thankful for.	Very true	Kind of true	Not sure	Not very true	Not at all true
5. When I talk with my friends, we mostly talk about things that make us angry or frustrated.	Very true	Kind of true	Not sure	Not very true	Not at all true
6. There are a lot of good things in the world.	Very true	Kind of true	Not sure	Not very true	Not at all true
7. If I feel grateful, I try to show it with words or actions.	Very true	Kind of true	Not sure	Not very true	Not at all true

Part B. What are some of the things you are thankful for? (List at least 3 and up to 9)

- * _____ *
- * _____ *
- * _____ *

Part C. Try to remember the last time you felt grateful.

1. What made you feel that way? _____
2. Did you express your gratitude? If so, how? _____

MS Curriculum Lesson 1: The Thanksgiving Address

Supporting document (c)

Some examples of visual and verbal arts that express a combination of traditional and scientific ecological knowledge:

1) The cover art of the book, **Words that come before all else**

2) **Shared Sky exhibit** in Australia and South Africa:

<https://www.skatelescope.org/shared-sky/>

<http://www.southafrica.info/news/starry-eyed-shared-sky.htm#.V5EJmDdUPzI>

“*Shared Sky* stems from a vision by the Square Kilometre Array (SKA) to bring together under one sky Aboriginal Australian and South African artists in a collaborative exhibition celebrating humanity’s ancient cultural wisdom. This vision embodies the spirit of the international science and engineering collaboration that is the SKA project itself, bringing together many nations around two sites in Australia and South Africa to study the same sky.” <https://www.skatelescope.org/shared-sky/>

And here are some musings by non-Native writers that reflect a combination of scientific observation and received wisdom:

3) **Turtle**

A poem by Mary Oliver

Now I see it--
it nudges with its bulldog head
the slippery stems of the lilies, making them tremble;
and now it noses along in the wake of the little brown teal

who is leading her soft children
from one side of the pond to the other; she keeps
close to the edge
and they follow closely, the good children--

the tender children,
the sweet children, dangling their pretty feet
into the darkness.
And now will come--I can count on it--the murky splash,

the certain victory
of that pink and gassy mouth, and the frantic
circling of the hen while the rest of the chicks
flare away over the water and into the reeds, and my heart

will be most mournful
on their account. But, listen,

what's important?
Nothing's important

except that the great and cruel mystery of the world,
of which this is a part,
not to be denied. Once,
I happened to see, on a city street, in summer,

a dusty, fouled turtle plodded along--
a snapper--
broken out I suppose from some backyard cage--
and I knew what I had to do--

I looked it right in the eyes, and I caught it--
I put it, like a small mountain range,
into a knapsack, and I took it out
of the city, and I let it

down into the dark pond, into
the cool water,
and the light of the lilies,
to live.

4) **The Geese Return**, by Aldo Leopold, From *A Sand County Almanac*, 1949.

One swallow does not make a summer, but one skein of geese, cleaving the murk of a March thaw, is the spring.

A cardinal, whistling spring in a thaw but later finding himself mistaken, can retrieve his error by resuming his winter silence. A chipmunk, emerging for a snbath but finding a blizzard, has only to go back to bed. But a migrating goose, staking two hundred miles of black night on the chance of finding a hole in the lake, has no easy chance for retreat. His arrival carries the conviction of a prophet who has burned his bridges.

A March morning is only as drab as he who walks in it without a glance skyward, ear cocked for geese...

...November geese are aware that every marsh and pond bristles from dawn to dark with hopeful guns.

March geese are a different story. Although they have been shot at most of the winter, as attested by their buckshot-battered pinions, they know that the spring truce is now in effect. They wind the oxbows of the river, cutting low over the now gunless points and islands, and gabbling to each sandbar as to a long-lost friend. They weave low over the marshes and meadows, greeting each newly melted puddle and pool. Finally, after a few *pro forma* circlings of our marsh, they set wing and glide silently to the pond, black landing-gear lowered and rumps white against the far hill. Once touching water, our newly arrived guests set up a honking and splashing that shakes the last thought of winter out of the brittle cattails. Our geese are home again!

---By this international commerce of geese, the waste corn of Illinois is carried through the clouds to the Arctic tundras, there to combine with the waste sunlight of a

nightless June to grow goslings for all the lands between. And in this annual barter of food for light, and winter warmth for summer solitude, the whole continent receives as net profit a wild poem dropped from the murky skies upon the muds of March.

5) **Prologue to "A Pageant of 12 Woods, held in Abinger"** by E. M. Forster, n.d. (Quoted in Richard Mabey, ed., *The Oxford Book of Nature Writing*, [Oxford and New York: Oxford University Press, 1995], p. 223.)

Welcome to our village and our woods. I welcome you first to our woods, because they are the oldest. Before there were men in Abinger, there were trees. Thousands of years before the Britons came, the ash grew at High Ashes and the holly at Holmwood and the oak at Blindoak Gate; there were yew and juniper and box on the downs before ever the Pilgrims came along the Pilgrims' way. They greet you, and our village greets you.

What shall we show you? History? Yes, but a history of a village lost in the woods. Do not expect great deeds and grand people here. Lords and Ladies, warriors and priests will pass, but this is not their home. they will pass like the leaves in autumn but the trees remain. The trees built our first houses and our first church, they roof our church today, they are with us from the cradle to the grave.

Further reading:

Robin Will Kimmerer, "Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action," *BioScience* 52:5, pp. 432-438.

<http://bioscience.oxfordjournals.org/content/52/5/432.full>

MS Curriculum Lesson 2: The Plants

Supporting document (a)

Existing plants on Skä•noñh Center grounds

Here are some key points on the biology or significance of these species in terms of “who” they are, and their relationship with people and other life forms. Compiled by Catherine Landis and Rachel May.

sycamore

- important floodplain/riparian species
- can reach 600 years in age. After 200 or 300 years the trunk hollows out but the tree continues to grow. People have sought shelter in very large hollow trunks; bears sometimes use them as dens; owls, swifts, and wood ducks roost in them.
- has the largest leaf of any native North American tree.
- the sap is drinkable and can be boiled down to syrup; hummingbirds like the sap, and Sapsuckers bore holes to release the sap so that they can catch insects that come to feed on it.
- the bark can serve as a coffee substitute
- the wood is hard to split and tends to twist when drying, but it is good for butcher blocks and for carving into boxes, utensils, and handles.
- the seeds are food for birds (purple finch, goldfinch, junco, chickadee) and mammals (squirrel, muskrat, beaver).
- its European cousin is also called the plane tree. “[A]ccording to Herodotus, the Greeks owed some of their success to the charm of the plane tree. In 480 BC, invading Persian King Xerxes camped his army in a grove of those trees. The king was so enamored by them that he put off his march for a few days. This delay helped lose Xerxes the war, and Greece went on to build the Athenian Empire.”

Source: Green Deane, “Sycamores get no respect,” Eat the Weeds blog [eattheweeds.com/sycamores-not-just-another-plane-tree-2/]. Some info also from www-pub.naz.edu/~treewalk/platanus/sycamore2.htm

ash (white or green).

- ash splint baskets were used by the salt industry to drain freshly exposed salt crystals (see photos at Liverpool Library);
- black ash, a wetland tree once common around the lakeshore, important for native basketry (see video: “Black Ash Baskets” <https://www.youtube.com/watch?v=rOWc9ZokBYY>)
- ash preferred wood for baseball bats
- emerald ash borer (EAB; a metallic wood-boring beetle) and the devastating effect it is having on ash species in this country. Why should students care about ash? EAB is an example of an invasive insect, so it could be folded into the discussion on plant invasives.

northern white-cedar

- northern white-cedar swamps were one of the most important habitats around Onondaga Lake before they were destroyed for salt production, commerce, and urban development (see <http://onondagalakehistoricalecology.weebly.com/northern-white-cedar-swamp.html> for information on the cedar swamps)
- this species should not be confused with eastern red cedar, famous for its reddish fragrant wood and oil
- long-lived; up to 1500 years!

- Rot resistant, and therefore used for longhouse posts and (later), fence posts; also canoe ribs, medicine

eastern white pine.

- “The primary national symbol of the Haudenosaunee is the Great White Pine (the Great Tree of Peace), which serves throughout the Great Law of Peace as a metaphor for the confederacy. Its branches are said to shelter the people of the confederated nations, and its roots spread to the four directions, inviting other peoples, regardless of race or nationality, to take shelter under the tree” (from Dictionary of Haudenosaunee, need correct name of this text)
- bundles (fascicles) of 5 needles represent the Five Nations when they first united for peace;
- pine needle tea high in vitamin C; prevented scurvy historically (no oranges from Florida back then)
- white pines up to 12’ in circumference once grew in the Syracuse area

staghorn sumac

- early successional species; clonal
- male and female flowers on separate plants; only female flowers produce fruits
- wood used for spiles to tap maple trees for sap;
- berries feed birds; can make beverage with antioxidant properties
- note differences with poison sumac—how would you tell them apart?

red oak

- wide ranging oak species; found further north than any other oak (except bur oak)
- tall, graceful form, spine tipped lobes on leaves
- produces relatively large acorns (look for them on the ground) & abundant crops; good for wildlife and people

red osier dogwood

- sprawling shrub of wetlands and moist ground
- new growth in spring & summer is green, but stems turn deep red by winter
- favored deer browse, and birds eat berries
- for cultural values/stories, see “The Eldest Medicine: Red Osier Dogwood in Iroquois Folklore and Mythology” by Anthony Wonderley (See Other Resources)

black raspberry

- important berry plant for native people
- first year canes do not produce flowers or fruit
- leaves in threes, green on tip and whitish on the underside of leaves
- canes can bend over and produce new shoots at the tip
- seeds spread by birds, people; establishment favored by disturbance, long-lived seed bank

red/Austrian pine

the Austrian pine is often confused with red pine because they look similar. Its furrowed bark shows patches of brown, white, and gray. It has flexible needles, 3-8” long, that grow in pairs. Austrian pine is native to Europe. It is ornamental and does well in urban conditions

Source: Ohio Public Library Information Network: “What Tree is it?”

http://www.oplin.org/tree/fact%20pages/pine_austrian/pine_austrian.html

boxelder “is native to portions of the southern tier and Susquehanna Valley, but has become more broadly established throughout many parts of the state. Boxelder grows commonly along the banks of streams and rivers, and may occur as a weedy species in urban areas where its seeds are able to germinate. Boxelder has a soft wood that has no commercial value, but is important for wildlife and the stabilization of stream banks where it grows. Boxelder is not recommended for horticultural plantings.”

Source: Cornell sugar maple research and extension program,
http://maple.dnr.cornell.edu/kids/tree_box.htm

sugar maple

- considered leader of the trees in Haudenosaunee culture
- NYS State Tree
- a “cultural keystone species”

European buckthorn

- Native to Eurasia; brought to North America as ornamental plant
- It spreads rapidly and suppresses other native plants in several ways:
 - leaves out early, drops leaves late, thereby shading many natives
 - it may produce chemicals that inhibit growth of other species
 - the high levels of nitrogen in its leaves feed invasive earthworms in the soil, which breaks down fungi in the soil that may be necessary for growth of native plants
 - it is a host for some plant pests, like soybean aphid, alfalfa mosaic virus, and crown fungus

Source: Michigan Department of Natural Resources Michigan Natural Features Inventory 2/2012
<https://mnfi.anr.msu.edu/invasive-species/CommonBuckthornBCP.pdf>

Phragmites (common reed)

“Non-native Phragmites, also known as common reed, is a perennial, aggressive wetland grass that outcompetes native plants and displaces native animals. Because of its height and its distinctive, fluffy seedheads, Phragmites is easy to spot.”

- It probably came to North America in the early 19th century.
- It invades salt marshes and other wetlands and chokes out all other plant species, reducing habitat for fish and wildlife, and sometimes blocking natural water channels.
- It spreads by seed (borne by wind or animals) and most commonly by rhizomes.
- It grows as high as 18’ and when it dries out it can be a fire hazard.
- “Is there anything good about Phragmites? Some birds, such as yellowthroat, marsh wren, salt marsh sparrow and least bittern roost in Phragmites. Red-winged blackbirds and some wading birds have been documented to nest in Phragmites. Other studies suggest that due to its high productivity, limited ability to export litter, and slow decay rates, Phragmites might offset problems that rapid sea level rise could pose to many coastal marshes.”
- There is a native species of Phragmites that occurs in the Northeast, but it is rare and non-invasive.

Source: US Fish and Wildlife Service, “Phragmites: Questions and Answers”
https://www.fws.gov/gomcp/pdfs/phragmitesqa_factsheet.pdf

MS Curriculum Lesson 3: The Sun, Moon, and Stars

Supporting document (a)

Selected SEK and TEK facts and stories; how communities in other times and places have relied on the sun, moon, or stars:

SEK facts about the Sun: <http://www.sciencekids.co.nz/sciencefacts/space/sun.html>

SEK facts about stars:

<http://www.universetoday.com/25145/interesting-facts-about-stars/>

SEK facts about the Moon:

<http://www.sciencekids.co.nz/sciencefacts/space/moon.html>

Mythology about the moon

<http://www.windows2universe.org/mythology/planets/Earth/moon.html>

Inuit story about the sun and Moon:

“A long time ago, after the World was created, a great shaman acquired such strong powers that he went to live in the sky. He brought with him his sister – who was very beautiful – and fire. He added so much fuel to the fire that it became the Sun.

The brother and sister lived in harmony for a long time until a great disagreement arose between them and the brother hit the sister, marking her face with a disfiguring burn. The young woman left her brother to take refuge elsewhere in the sky where she became the Moon. Since then, the brother and his fire have followed her, trying to reach her, but never succeeding.” Source: Virtual Museum Canada, “The sky of the first inhabitants” http://astro-canada.ca/_en/a4102.php

Using the sun, moon and stars in other times and places:

Hokule’a – Polynesian Voyaging Society round-the-world voyage (navigating by the stars) <http://www.hokulea.com/education-at-sea/polynesian-navigation/>

Inca astronomy for agriculture: <http://www.starteachastronomy.com/incan.html>

Shared Sky exhibit in Australia and South Africa:

<https://www.skatelescope.org/shared-sky/>

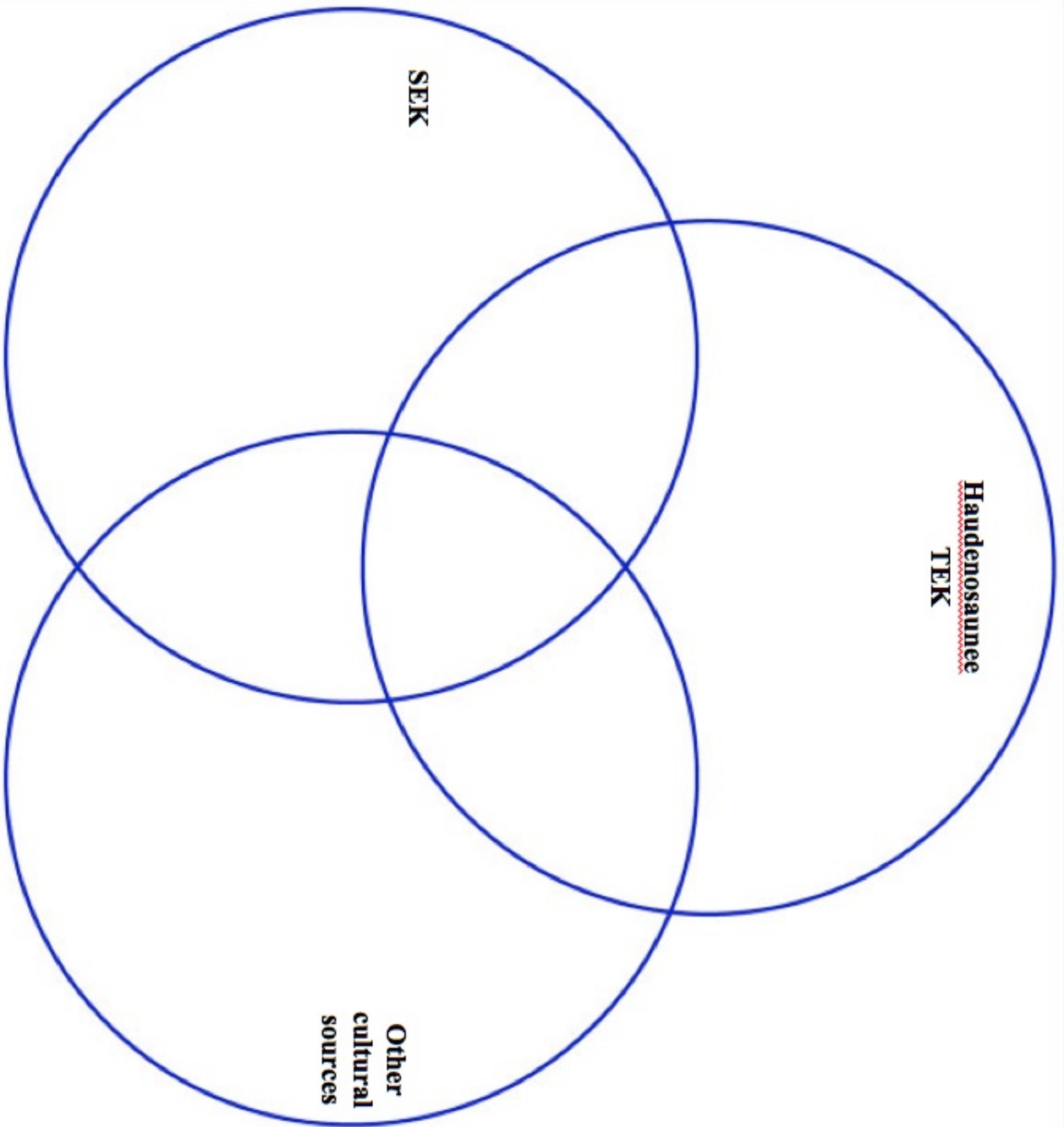
<http://www.southafrica.info/news/starry-eyed-shared-sky.htm#.V5EJmDdUPzI>

StarTeach Astronomy Education – info on many ancient cultures

<http://www.starteachastronomy.com/archaeoastronomy.html>

NAME:

Text Comparisons: TEK, SEK, Other knowledge sources



MS Curriculum Lesson 3: The Sun, Moon, and Stars

Supporting document (c)

How the Sun, Moon, and stars support other beings in the Thanksgiving Address

Fill in at least five boxes in the SUN column, with a very short example of the way the Sun affects that element of the Thanksgiving Address. (Example: SUN x People – “Provides light”) Repeat for the Moon and Stars columns.

	SUN	MOON	STARS
People			
Earth			
Waters			
Plants			
Animals			
Birds			
Thunderers and Four Winds			