ELA Common Core Content Standards:
Reading Standards for Literature 1, 2, 3
Reading Standards: Foundational Skills 1, 2, 3
Writing Standards 2
Speaking and Listening Standards 1, 2, 4, 5, 6
Language Standards 1, 2, 6

Estimated duration:
Two 1-hour sessions

Goal: Students will expand upon their knowledge and understanding of traditional Karuk land-related values with vocabulary and perspectives typically associated with the botany of western science. They will learn to recognize different types of acorns found in our region and their identifying features.

Teacher Background: The cultural heritage of most Native American and Alaska Native peoples, including that of the Karuk People, incorporates sophisticated traditional ecological knowledge into all components. This Native Science is derived from "a lived and storied participation with the natural landscape."[1] Despite these strong cultural traditions, Native People are the most under-represented minority in scientific disciplines overall, especially in the natural sciences. While many people would agree that Native scientists would be likely to bring new perspectives and potential insights to environmental science and resource management, it appears that most Native American students, as well as many students from other cultural traditions, are intimidated by science and math courses.

Native American students also come up against an additional barrier--the tendency of western scientific and academic traditions to either ignore or make light of the principles and knowledge of indigenous peoples. The cultural bias that is at the core of this behavior rests on an idea the science must be objective to qualify as science. The fact that there is nothing in the human experience that exists outside of culture (and is thus inextricably influenced by it) is often overlooked, however. More and more, social scientists are understanding that culture frames all that people do – including developing systems of knowledge, technology, and education. This lesson will help students understand that these two forms of science – Traditional Ecological Knowledge (TEK) and western science – can augment each other when properly understood.

[1] quote from Leroy Little Bear, J.D., former director of the Native American Program at Harvard University

Theme/Big Idea: We All Take Care of Each Other
Big Questions: Who are we? Where are we? How did we get here?
Vocabulary: cultivate, technique, nurture, forb, supple

Materials:

Oak, Fire, and Traditional Knowledge (included) - modified excerpt of scientific article[2]
Oak Tree Identification pages for Black Oak, Tan Oak, White Oak, and Live Oak trees, leaves and nuts (included)
Oak Tree Information (included)
Acorn Maidens worksheet (included)
Vocabulary Black Line Master (included)

Preparation:

Cut out tree photos individually
Optional: Copy **Acorn Maidens** worksheet (included in this lesson) for students
Read through the **Oak Tree Information** sheet
Place **Vocabulary Black Line Master** onto a viewer
Make a large poster of vocabulary to be ready to show

Discussion Circle: Tell students that today we will continue on our adventure learning who we are and where we came from. Ask them if they remember how we learned about ourselves in our last lesson (We learned that origin, or traditional stories, teach us about ourselves and where we come from). Tell them that the Native people from this land learn about their environment by studying the plants and animals. It is important to learn about all these things, because we have a responsibility to care for all that is given us. "If you agree say, "*chími!*[3]" (fine, alright)

Explain to students that the word "science" means "knowledge" and that different people have different ideas about what knowledge is. Karuk People, like other tribal people, have watched the plants, animals, fish, stars, winds and weather for thousands of years – and still do – to learn how and when to do things to improve their lives and the lives of their relations, which includes all these things. Some people use other ways of measuring changes to notice differences in the environment, and we will call that kind of knowledge western science here. It can be very helpful to friends of nature to understand both of these ways of thinking and looking at things.

Vocabulary: explicitly teach this special vocabulary, which is important to know when talking to western scientists about plants. Project the Vocabulary Worksheet with a document reader for the class to see. With a pointer, read from left to right and prompt the students to guess what the vocabulary word is that is written in bold. Ask them to guess what the word means, and correct them if needed.

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[2] Adapted excerpt from Ortiz, B. R. 2006. Contemporary California Indians, oaks, and sudden oak death (Phytophthora ramorum). In A. Merenleder, D. McCreary, and K. L. Purcell, eds. Proceedings of the Sixth Symposium on Oak Woodlands: Today's Challenges, Tomorrow's Opportunities, pp 39–56. PSW-GTR-217 USDA-Forest Service, Albany, CA. http://www.fs.fed.us/psw/publications/documents/psw_gtr217/psw_gtr217_39.pdf retrieved June 3, 2015.

[3] Pronounced something like "CHI-me."

Tape the prepared vocabulary poster up for all students to see.

cultivate – to grow and care for (plants)
technique – a way of doing something by using special knowledge or skill
nurture – to help (something or someone) to grow, develop, or succeed
supple – soft and able to bend or fold easily
forb – a flowering plant other than a grass

Read Aloud: Tell students that you will read a portion of an article written by a western scientist, Beverley Ortiz. In it, she talks about Native Science, or Traditional Ecological Knowledge that California Indians used to care for the landscape. Then read Oak***, Fire, and Traditional Knowledge***, stopping to clarify meaning if needed. After finishing, ask students to recall what they had learned and write it on the whiteboard as bullet points.

Oral Tradition review: Ask the students if they can remember the story of the "The Acorn Maidens." Encourage them to try to retell the story to the class. If this proves difficult, reread the first version in Lesson 5 to refresh the students' memories.

Vocabulary Review: This vocabulary was included in the Kindergarten lesson and may need to be reviewed.

lobe – a curved or rounded part of something (such as a leaf or a part of the body)
serrated – jagged, toothed
bristles – short, stiff hairs, fibers, etc.
elongated – to be stretched out to be longer
deciduous – having leaves that fall off every year (of a tree or bush)

Then, using the ***Acorn Maidens Worksheet Clues*****,** work together as a class to figure out which Acorn Maiden represents each oak tree. Have the students complete the Acorn Maidens worksheet.

Building Background: Show students ***Oak Tree Identification*** pages with pictures of the acorn trees and close ups of the branches, leaves, flowers and nuts. Pass the pictures around the circle so each child can get a close look at them.

Ask students if they can see the differences between these trees, and ask students to try to tape the pictures that relate to the same plant in one cluster on the board for all to see.

Have a discussion about how trees, leaves and acorns change over the year. Show the tree identification pages and ask students to point out differences and similarities. Can they see how the leaves might change from rough to smooth, or red to green during growth, and how the acorns get bigger until they fall from the tree? This happens in the autumn when leaves are falling, too.

Answer any questions that come up with the information provided in the ***Oak Tree Information*** sheet.

Optional, but highly recommended: Take a walk outside and identify some of the trees you see.

Acorn Maidens Worksheet Clues

a. *Black Oaks have leaves with pointy, serrated lobes, cut deep or shallow.*

b. *Tan Oak acorn caps are covered with bristles.*

c. *White Oak leaves have rounded lobes.*

d. *Live Oaks acorns are elongated and narrow with pointy ends.*

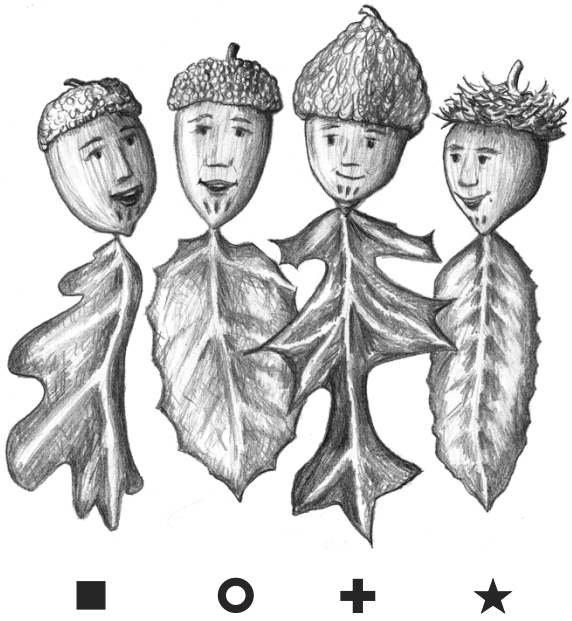
New Caps

Illustration by Bari Gayle Morehead Talley

Study the illustration and listen to the clues. Identify the acorn maidens on the worksheet.

Key

***Acorn Maiden Worksheet**: Trace the letters in the tree names and draw a line to the symbol to identify the acorn maidens.*



Tan Oak

White Oak

Live Oak

Black Oak

Name_____

***Acorn Maiden Worksheet**: Trace the letters in the tree names and draw a line to the symbol to identify each acorn maiden.*

■ ○ ✚ ★

Tan Oak ○

White Oak ✚

Live Oak ★

Black Oak ■

Oak, Fire and Traditional Knowledge

Excerpt from published article by Beverly Ortiz[4], adapted for lesson by Lisa Hillman

Some people think that California Indians were only hunters and gatherers who did not work on or cultivate the landscape where they lived. This isn't true: Indians re-shaped the landscape through the use of such techniques as burning, digging, and pruning. This resulted in a world rich with beauty and a great variety of plant communities. This managed landscape nurtured the health of diverse plant species, while providing for the needs of humans and other animal species, including the many species upon which humans depended.

California Indians used fire as a management technique to help the growth of seed-bearing forbs and grasses, keep meadows open, ensure the growth of open woodland trees, and to control some plant diseases and harmful insects. They used it to help the growth of fine, straight, supple shoots used for weaving baskets, and long, straight, sturdy hardwood branches useful for digging sticks and other tools. They also used it to make the tender, new growth eaten by animals, which, in turn, the men hunted.

In 1997, 92-year-old Karuk Elder Ramona Starritt described the fire-managed landscape of the Trinity River area that she grew up in: "The Indians burned all over... The earlier years it would just burn, burn, burn, until the sun looked like a big orange. It just burned itself out. That was that. They did it for the purpose of their basket weaving, and for the animals. The deer had to eat. They ate the young sprouts. And you could see for miles. You weren't hemmed in with brush... There were very nice trees. You go to where the Indians lived and burned, you'll see really tall fir trees; and pine trees, and madrone trees were large... When I was young,
you could see clear across the gorge. You could look over, see a bear climbing the mountain, or a deer, or anything."

The Karuk, Yurok and Hupa likewise managed several species of oaks and tanoak with fire and pruning. According to Kathy Wallace (Karuk/Yurok/Hoopa 2003), "I was told...they would burn under oaks, and it took care of a lot of the bugs... It was a low-temperature burn, but it would take care of ground-carried diseases. It would also clear off the area underneath the trees to make it easier to gather the acorns."

[4] Adapted excerpt from Ortiz, B. R. 2006. Contemporary California Indians, oaks, and sudden oak death (Phytophthora ramorum). In A. Merenleder, D. McCreary, and K. L. Purcell, eds. Proceedings of the Sixth Symposium on Oak Woodlands: Today's Challenges, Tomorrow's Opportunities, pp 39–56. PSW-GTR-217 USDA-Forest Service, Albany, CA. http://www.fs.fed.us/psw/publications/documents/psw_gtr217/psw_gtr217_39.pdf retrieved June 3, 2015.

Oak Tree Information

- Oaks have leaves that can have lobes (finger-like parts), serrated edges (notched/toothed) edges, or flat on the edges.
- White oaks have rounded leaf lobes (finger-like parts) instead of pointed ones.
- Live Oaks have elongated, narrow, light brown acorns with pointy ends.
- Black Oaks have leaves with pointy lobes, cut deep or shallow.
- Oak trees always drop their leaves in a certain season. That's why they are called a deciduous tree.
- Oaks produce both male and female flowers. Male flowers are arranged in clusters called catkins. Female flowers are very small and hard to see. When the female flowers are pollenated, those are what will become acorns.
- Oak trees start to produce acorns after they are at least 20 years old.
- Oak trees do not grow acorns every year, yet can have bumper years when just one tree may produce 500-1000 pounds. In places with a variety of oak species, there is rarely a year without an acorn crop.
- Most oak trees only produce acorns every 2-3 years, so people stored up acorns for years because it was a food that was eaten every day.
- Only one out of 10,000 acorns gets the appropriate conditions to germinate and grow into a tree.
- Acorns are good food for humans after they are processed to take the tannin out acorns.
- Tannin makes the acorns taste bitter, so needs to be leached out by soaking and rinsing in water to make them edible for humans.
- While all species of oak acorns are edible, different species vary in taste and amount

of work required to crack and process.

- Many other animals like bear, deer, woodpeckers, squirrels, blue jays and mice like to eat acorns.
- 25% of a deer's fall diet is acorns!
- Oak trees depend on animals to carry their acorns somewhere else, bury them, and then forget about them so a new tree can start growing.
- Oak wood is very strong and hard.
- White Oak is a large tree, growing up to 100 feet tall. Its trunk can get up to four feet across.
- Leaves of White Oak are four to nine inches long, with between five and nine lobes (finger-like parts). They are bright green on top, and whitish underneath.
- White Oak leaves turn red or brown in the fall, and will often stay on the branches of younger trees in the winter.
- Tan Oak acorn tops are covered with dense bristles.

Oak Tree Identification

White Oak Tree

White Oak Acorns

White Oak Leaf in Spring

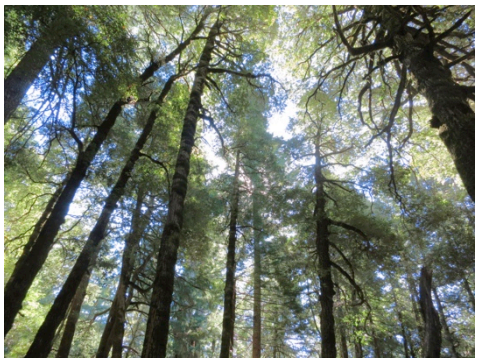
White Oak Leaves in Summer

White Oak Barksprout[5]

White Oak Branch with Catkins[6]

[5] Barksprout is when sprouts come up from the roots.

[6] catkin – male flowers found especially in willows, birches, and oaks. Origin "from its resemblance to a cat's tail" - http://www.merriam-webster.com/dictionary/catkin



Tan Oak Tree Stand

Young Tan Oak Acorns

Tan Oak Leaf (underside)

Tan Oak branch with catkins[4]

Tan Oak Tree

Tan Oak Acorns (more mature)

Live Oak Tree (Old Growth)

Live Oak Acorns

Live Oak Leaf (can be spiny or smooth)

Live Oak branch with Catkin[7]

Live Oak Bark

[7] catkin – male flowers found especially in willows, birches, and oaks – the free dictionary. Origin "from its resemblance to a cat's tail" - http://www.merriam-webster.com/dictionary/catkin

Black Oak Tree (mature)

Black Oak Acorns & Leaves

Black Oak Leaves

Black Oak Acorn

Black Oak Bark

Black Oak Trees (young)

Vocabulary Black Line Master

1. I like the **technique** used to make the basket design.
2. The catkins* are soft and **supple** in my hand.
3. If a new mother doesn't have milk, she can **nurture** her baby with acorn water.
4. Karuk people **cultivate** Indian Potatoes and other Native plants.
5. That's not grass, that's a **forb**!

* catkins are male flowers found especially in willows, birches, and oaks