LESSON 2

Changing Landscapes

ESSENTIAL UNDERSTANDINGS

- History
- Lifeways

LEARNING OUTCOMES

- Identify reasons the sea otter has been important to the Coquille Tribe's traditional way of living
- Discuss the impacts of non-Indian takeover of the ecosystems of the Oregon Coast
- Identify both the internal and external structures of the sea otter and describe their function
- Understand why sea otters are important for balancing the ecosystem of the Oregon Coast
- Develop an informational poster or pamphlet (e.g., poster, newspaper editorial, or pamphlet) that teaches about the sea otter and its importance in the traditional lifeways of the Coquille Tribe

ESSENTIAL QUESTIONS

- How do the structures and functions of living things allow them to meet their needs?
- What can our communities do to help return the sea otter to the Oregon Coast?

Overview

In this lesson, students will learn about the important role of the sea otter in the history and traditional life of the Coquille Indian Tribe. They will also learn about the long-term impact the European fur trade had on the population of this magnificent creature and how the sea otter's virtual extinction damaged the ecosystem of the Oregon Coast. Students will then learn how to identify and diagram the sea otter's internal and external structures (i.e., the organization of the inside and outside body parts that form a living thing) and describe how the purpose of these structures supports sea otter survival. Finally, students will create an educational poster or pamphlet that provides an overview of the sea otter and its impact on the traditional life of the Coquille Indian Tribe.

Background for teachers

ANCESTRAL LANDS

Teachers should visit the Coquille Indian Tribe website (https://www.coquilletribe.org/) and become familiar with Tribe's history. The Tribe's ancestral homelands extend from south of Bandon to all reaches of the Coquille River watershed in Coos, Curry, and Douglas counties.

LOGISTICS

- Where does the activity take place?
  Classroom
- How are the students organized?
  ☒ Whole class ☐ Teams: 2 – 4
  ☒ Pairs ☒ Individually

TIME REQUIRED

Approximately 3 hours

STANDARDS

Oregon science standards

From Molecules to Organisms: Structures and Processes: **4-LS1-1.** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Oregon ELA standards

RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

Ocean literacy[1]

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The Coquille Tribe's history, culture, and lifeways are inseparable from the forests, meadows, and coastal lands of Southwest Oregon. This region's fertile landscape provides plentiful resources for the Tribe, including abundant forests and a rich coastal ecosystem. Prior to contact with non-Indians, the Tribe constructed its permanent villages along the tidewaters and lower reaches of streams and rivers. At least seven of these villages are known to have stood between Bandon and Myrtle Point on the Coquille River.

Both historically and in the present day, the Tribe has relied on the forests, meadows, tidal pools, estuaries, and ocean for food, medicine, and shelter. From the ocean they harvested mussels, clams, and other shellfish. From the rivers they harvested salmon, sturgeon, lamprey, and other fish. From the forests and meadows they gathered roots, berries, and medicinal plants such as buckbrush, fireweed, yarrow, and cascara buckthorn, and stinging nettle. Seashells were used

[1] In the early 2000s, stakeholders from across the country developed a Framework for Ocean Literacy for Grades K-12.

as ornaments on clothing, especially the tusk-like shells called dentalium. Many of these traditions persist in the present day.

From time immemorial, sea otters also made their home along the Oregon Coast, and the Coquille Tribe used their pelts for clothing—both practical and ceremonial—and for some kinds of shelter. Sea otter pelts were highly valued and were worn as capes by some honored men and as ceremonial headdresses for women. Because of the Coquille Tribe's understanding of kinship with the animal world, every animal or fish that was hunted was treated reverently and with respect. Every part of the animal was used for either food, clothing, or tools.

The Coquille Tribe continues to be a steward of the land and sea. The Tribe makes careful use of natural resources; protects wildlife habitat; and promotes a lush, diverse, and productive landscape. For example, the Tribe uses fire proactively to encourage fresh growth of useful plants—a practice they have been using for thousands of years. Routine burning manages the growth of brush and helps clear the underlying layer of vegetation in old-growth forests. This also helps maintain grassy prairies on ridges and southwest slopes, where plentiful elk are a cherished blessing. Since the Coquille Tribe's restoration in 1989, the Tribe has regained several important tracts of its ancestral lands.

Additional resource

Berg, L. (Ed.). (2007). First Oregonians (2nd ed.). Corvallis, OR: Oregon State University Press.

MATERIALS

What materials are needed for students to engage in this activity?

- Coquille and Coastal Ecosystems PowerPoint presentation
- Student handouts
  - Science or vocabulary journal (three to five pages of lined paper per student)
  - Concentric circle graphic organizer (one per student)
  - "Northern Sea Otter Structure and Function" (one per student)
  - Informational Poster Rubric

VOCABULARY

Ecosystem – An ecosystem includes living things (such as plants and animals) and resources (such as rocks, soil, sunlight, and water).

Producers – Plants and algae that get their energy from the sun through a process called photosynthesis.

Consumers – Animals that eat producers, other consumers, or both.

Decomposers – Animals, bacteria, and fungi that break down, or decompose, waste matter, putting nutrients back into the system.

Structure – The organization of parts that form a living thing.

Function – What something is used for.

Conservation – Advocating for and protecting animals, plants, and natural resources.

Species – A group of animals or plants that are similar and can produce young animals or plants.

Keystone species – Organisms, usually animals, that play a crucial role in different habitats and have a huge effect on their environment.

THE PACIFIC FUR TRADE

Teachers should have some familiarity with the history of the European and Euroamerican fur trade and how it ultimately devastated coastal tribes and local ecosystems. The fur trade began as early as the 1600s in some parts of North America, and it reached the Oregon Coast in 1788 when the Lady Washington, under the command of Captain Robert Gray, landed just north of Yaquina Bay. The fur trade drove much of the exploration, commerce, and settlement in the Northwest region for much of the next 70 years. While this lesson cannot cover the fur trade in detail, having some understanding of this history—and its impact on the Coquille and other Coastal Tribes—will provide valuable context for the teacher.

Online articles

- https://oregonencyclopedia.org/articles/fur_trade_in_oregon_country/
- https://oregonencyclopedia.org/articles/sea_otter/
- http://articles.latimes.com/2001/apr/07/news/mn-48079
- https://cmast.ncsu.edu/cmast-sites/synergy/seaotter/shist.html
- https://seaotters.com/2012/03/the-legacy-of-the-fur-trade/

Sea otter resources

Websites

- Elakha Alliance
  (https://www.myowf.org/elakhaalliance)
- Oregon Wild: Otter Watch
  (https://oregonwild.org/wildlife/otter-watch)
- Oregon Coast Aquarium
  (https://aquarium.org/animals/northern-sea-otter/)
- The Otter Project
  (http://www.otterproject.org/)
- Friends of the Sea Otter
  (http://www.seaotters.org/)
- Monterey Bay Aquarium
  (https://www.montereybayaquarium.org/conservation-and-science/our-priorities/thriving-ocean-wildlife/southern-sea-otters)

Educational videos

- https://oceantoday.noaa.gov/seaotteranatomy/
- https://oceantoday.noaa.gov/seaotters101/welcome.html
- https://www.youtube.com/watch?v=qjrgDVh_gPE&feature=youtu.be
- "Some Animals are More Equal Than Others" https://www.youtube.com/watch?v=hRGg5it5FMI
- Video of Coquille tribal member

Articles

Ivy, D. B., & Byram, R. S. (Eds.). (2002). *Changing landscapes, sustaining traditions: Proceedings of the 5th and 6th Annual Coquille Cultural Preservation Conferences*. North Bend, OR: Coquille Indian Tribe.

Book

Payne, M. (2007). The fur trade on the Upper Athabasca River, 1810–1910. In I. S. MacLaren (Ed.), *Culturing wilderness in Jasper National Park: Studies in two centuries of human history in the Upper Athabasca River Watershed* (pp. 1–39). Edmonton, Alberta, Canada: University of Alberta Press.

OCEAN LITERACY

Teachers will need to become familiar with ocean and environmental literacy by visiting the websites below. For example, teachers should understand fundamental ocean concepts—specifically, the unique ecosystem of kelp forests off the Oregon Coast. In addition, teachers should have a strong working knowledge of the current efforts to preserve and maintain the Pacific Northwest's sea otter population.

Websites

- Ocean Literacy (http://oceanliteracy.wp2.coexploration.org/ocean-literacy-framework/?page_id=164)
- Ocean Conservancy (https://oceanconservancy.org/)

- Oregon Environmental Literacy Plan (http://www.eeao.org/images/pdf_docs/OELP/OELP_revised04202013.pdf) https://www.ode.state.or.us/gradelevel/hs/oregon-environmental-literacy-plan.pdf

Considerations for teachers

Assessment: How will you know if students are learning?

- Students will engage in a substantial amount of discussion with partners and groups. Teachers should actively monitor student discussion for correct understanding and intervene if there are misconceptions or bias.
- Students will produce a diagram of the key structures and functions of the sea otter's anatomy. Teachers will assess understanding of both content knowledge and how to diagram.
- Students will create informational poster or pamphlet writing that will allow teachers to see their current understanding and insight.

Practices (group roles, classroom routines). This depends on the activity. For instance, how do you rotate roles? Assign computers? Get supplies?

- *Small group/pair-share discussion* – Activity 2 requires students to participate in "Concentric Circle" discussions. If you have never used the pair-share discussion model, be sure to set the stage by explaining norms and expectations for speaking and listening. Anticipate any students who may have difficulty in pairs (or reading the handouts for this lesson) and match them with students who will help them be successful.
- Teachers must have a strong knowledge of how to diagram the functions and structures of animal biology and be able to model this skill for students (see websites listed under "Resources" above).

Learning targets

- I can identify reasons the sea otter has been important to the Coquille Tribe's traditional way of living.
- I can summarize, in my own words, the impact of the European fur trade on the sea otter population and the coastal ecosystem of Oregon.
- I can identify and diagram key structures and functions of the sea otter's anatomy.
- I can create, in writing, an informational piece (e.g., poster or pamphlet) to educate the general public about the sea otter and its impact on the traditional life of the Coquille Tribe.

Options/extensions

- Tell your students to imagine that a first-grader has asked them, what are sea otters? Why are they important? Challenge students to write themselves a "script" for how they would respond to that question in a way a younger child would understand. Have your student present their understanding to a classroom of first-graders.

Reflection/closure

- Create daily exit ticket with one of the following questions:
    a. Why are the sea otter important to the Coquille Tribe?
    b. Why are they important to healthy coastal ecosystems?
    c. What happened to the sea otters on the Oregon Coast?

Appendix Materials

Materials included in the electronic folder that support this lesson are:

- Coquille and Coastal Ecosystems PPT
- Concentric Circle Graphic Organizer
- Northern Sea Otter Structure and Function
- Informational Poster Rubric

Activity 1

Personal picture dictionary[2]

Time: 30 minutes

Preparation: Teachers can have students use five to six pieces of lined paper. Make sure students have access to colored pencils or markers. Use an overhead projector to model each step of this activity.

For more directions, as well as examples of the personal picture dictionary, visit www.tolerance.org.

Say:

For our first task, everyone is going to make a personal picture dictionary. A personal picture dictionary is your very own vocabulary and spelling resource that you create to help support understanding of a new topic.

Step 1:

Ask students to write each of the following words in a different color. Tell students they should leave enough space to write the definition and draw a picture.

- Ecosystem
- Producers
- Consumers
- Decomposers
- Structure
- Function
- Species
- Conservation

[2] This activity was adapted from Teaching Tolerance.

Activity 1 *(Continued)*

Step 2:
Have students say each word out loud as a whole class.

Step 3:
Have students clap the syllables of each word as the whole class says it out loud.

Say:
Now, I would like you to close your eyes and visualize the beginning, middle, and ending parts of the words as I read each one out loud.

Step 4:
Prompt students to close their eyes. Begin to slowly read each new vocabulary word out loud. Read each word out loud three times. Pause for a few seconds between each new word.

Step 5:
Using the overhead projector, provide students with the correct definition of each word (one at a time). Then have them write the definition in their own words in their personal picture dictionary.

Step 6:
Prompt students to draw a picture representing the word. Allow students 10 to 15 minutes to complete their personal dictionary.

Step 7:
Have students add to their personal picture dictionary over the course of the lesson.

Activity 2

Coquille and coastal ecosystems

Time: 50 minutes

Say:

In the next activity, you will need to participate as an active listener and speaker. During the teacher presentation, please record two pieces of new information, two pieces of information that surprised you, and one piece of information that you would like to learn more about. Record these notes in your ***concentric circle graphic organizer****. After you have listened and taken notes on the presentation, you will participate in a classroom discussion called "****Concentric Circles****."*

Step 1:

Share slides 1–2 of the **Coquille and coastal ecosystems PowerPoint presentation** and provide the following information:

Say:

The Coquille Tribe's history and culture are inseparable from the forests, meadows, and coastal lands of Southwest Oregon. The Tribe's ancestral land extended from the present-day town of Bandon throughout the entire watershed of the Coquille River. Today, the Coquille Tribe is restoring many of its traditional lifeways.

Step 2:

Share slide 3 and provide the following information:

Say:

The Coquille people depend on the abundant resources provided by the forest, meadow, and coastal ecosystems, as did their ancestors. Permanent villages were constructed along the tidewaters and lower reaches of streams and rivers. The Coquille fished and gathered resources from forests, meadows, tidal pools, estuaries, and shores.

Activity 2 *(Continued)*

Step 3:
Share slide 4 and provide an overview of some of the resources (e.g., food) gathered by the Coquille people.

Say:
The Coquille gathered mussels, clams, and other shellfish. Shells of all types were used as ornaments on clothing and were widely traded, including the beautiful, tusk-like dentalium shell. The Coquille also depended on salmon, white sturgeon, perch, smelt, and Pacific lamprey fished from the Coquille River and estuary. Many of these fish are now endangered.

Step 4:
Share slides 5–6 and provide the following overview of forest resources and canoe building:

Say:
The Coquille have always been stewards of the coastal forests. Red and white cedar were essential to their traditional way of life. The trunks of these trees could be split into timber for houses. A single trunk could be shaped into a canoe—the mode of transportation the tribe depended on for hunting, fishing, and trade. The Coquille constructed canoes for different purposes. Shovelnose canoes had rounded bottoms to help them glide through river currents. Canoes with high prows were built for the ocean, where the waters were much rougher. The Coquille were seafaring people. In fact, there are stories of the Tribe making great sea journeys—some say as far east as Japan!

Step 5:
Pause and check for student understanding. Ask for three to four volunteers to share one piece of information they have learned and recorded in their graphic organizer. Next, ask for three to four volunteers to share something they hope to learn more about. Walk the room to assess student progress with completing the graphic organizers. Answer any questions and clarify any misinformation.

Activity 2 *(Continued)*

Step 6:
Share slide 7 and provide the following overview of the sea otter:

Say:
Let's move on and learn about a very important coastal and cultural resource for the Coquille Tribe: the sea otter. Coastal Tribes of Oregon that spoke a specific language used for trading, called Chinuk Wawa, knew the sea otter as the Elakha. In the oral tradition of the Coquille Tribe, the Elakha was often represented as a trickster or prankster who was always getting into mischief.

The sea otter used to live along the rocky shores of the entire Oregon Coast. The thick fur pelt of the sea otter was a prized resource used for warm clothing, clothing used in ceremonies, and for some kinds of shelter and storage, such as we might use tarps and tents today.

Step 7:
Share slides 8–9 and provide students with a summary of the fur trade in Oregon and its impact on the Oregon Coast's sea otter population.

Say:
At one time, there were thousands of sea otter along the Pacific Coast. Beginning as far back as the 1700s, Europeans and Euroamericans began exploring the Pacific Coast. These early explorers frequently traded with the Native people they met, including the Coquille, and they soon learned about the usefulness of the thick fur pelts of the sea otter, beaver, and other small, fur-bearing animals in the region. As these explorers brought the pelts back to their home countries and cities, the popularity of beaver and otter pelts spread. People in China, Russia, England, all across Europe, and in the eastern cities of the United States wanted beaver hats and otter coats and shawls. Several companies, such as the Hudson Bay Company, the North West Company, and the Pacific Fur Company established trading posts along the Washington and Oregon Coast, and their main interest was in gathering fur pelts to sell.

Activity 2 *(Continued)*

Unlike the Coquille and other Native people, who only took as many sea otter as they needed for their own clothing and shelter needs, these companies trapped and traded for otter pelts by the thousands. Their interest was in making as much profit as possible by meeting the demand for pelts that was being driven by people who lived thousands of miles away from the Pacific Coast. As a result, the otter population was quickly wiped out. Today, there are no sea otter living along the Oregon Coast, although there are plans to try to bring them back.

In this lesson, we're going to examine the biology of the sea otter. First, let's discuss what we have learned so far about the Coquille Tribe and its ancestral territory.

Step 8:
Direct students to complete their **concentric circle graphic organizer**. Next, ask students to stand in two concentric circles, facing one another.

Step 9:
Post the following prompt for the whole class to review and respond in a paired discussion:

What two pieces of information did you learn?

Step 10:
After a one- to two-minute pair discussion, prompt one of the circles to move left or right so that each student now faces a new partner with whom they discuss the next question:

What information surprised you the most?

Activity 2 *(Continued)*

Step 11:
After a one- to two-minute pair discussion, repeat the process for one final question:

What would you like to learn more about?

Step 12:
Walk the room and check for understanding. When there is a clear lack of understanding, pause the activity to provide clarity for the whole class.

Activity 3

Sea otter's structure

Time: Two 50 minute class periods

Step 1:

Ask students to take out their **personal picture dictionary** and spend up to two minutes reviewing their definitions of the following:

- **Structure** – The organization of parts that form a living thing.
- **Function** – What something is used for.

Say:

*Animals have many unique structures found on the outer and inner parts of their bodies. These structures have many **functions (or purposes)** that help animals eat, reproduce, and live. Every animal has special structures that help it survive in its environment. These structures are divided into two groups: internal and external.*

Step 2:

Ask students to add the following terms and definitions to their **personal picture dictionary**:

- **Internal structure** – A part found inside an animal.
- **External structure** – A part found on the outside of an animal.

Step 3:

On the board or a sheet of chart paper, with the whole class, create a list of external and internal structures of the human body. Have each student provide at least one example and record their responses under "External structure" or "Internal structure." After each student has contributed an example, examine the list as a class.

Say:

Now, let's think about the function of each of these internal and external structures. How do they help us survive in our environment?

Activity 3 *(Continued)*

Step 4:
Facilitate a five-minute classroom discussion about the function of key structures in the human body (e.g., heart, lungs, legs, arms, skin, and eyes).

Say:
We are going to watch two videos to help us learn about some of the structures of the sea otter and how they help the sea otter survive in its environment. We will mostly focus on the external structures of the sea otter.

Step 5:
Distribute one copy per student of the handout **Northern Sea Otter Structure and Function** and review the directions.

Step 6:
Show the video "Sea Otter Anatomy" by **Ocean Today**. It runs a little over two minutes. You will want to show this video at least twice so that students can hear the narrator describe in detail the anatomy of the sea otter. Make sure to download the video ahead of time to prevent buffering issues. https://oceantoday.noaa.gov/seaotteranatomy/

Step 7:
After the first viewing, pause the video and use the **Northern Sea Otter Structure and Function** handout to model for students how to diagram one structure of the sea otter anatomy (e.g., long tail, retractable claws). Then "think aloud" for students as you write a brief description of the function.

Activity 3 *(Continued)*

Say:

The beginning of this video had some interesting facts that I want to repeat. First, I heard the narrator refer to the sea otter as the "smallest of the marine mammals." A mammal is a warm-blooded animal like us human beings. Mammals have a backbone and feed their young milk produced by the mother. Mammals are covered in hair, so I'm going to guess that one of the sea otter's external structures is hair. I also heard the narrator say that the sea otter is an endangered species. This means that the sea otter is in danger of no longer living anywhere on the earth.

I want to pause and make a connection to our previous activity. The reason the sea otter are an endangered species is due to the European fur trade and the invasion of non-Native people on the ancestral coastal territory of the Coquille and other Native Tribes.

Next, I heard the narrator say that the sea otter does not have blubber to keep it warm in the ocean waters. Instead, it has two layers of dense fur to keep it warm. I can see on my diagram of the sea otter that there is an arrow pointing to the outer area of its body. I'm going to write "two layers of dense fur" to identify this as an important structure. Next, I'm going to write a description of the function. For example, "The function of the sea otter's dense fur is to keep it warm in the cold ocean environment."

This dense fur was also a useful resource for the Coquille Tribe. It provided warmth for clothing and bedding.

Step 8:

Play "Sea Otter Anatomy" again and give students time to add to their **Northern Sea Otter Structure and Function** handout.

Step 9:

Show the "Sea Otters 101" video by Ocean Today. This video runs about three minutes. It only needs to be shown once. https://oceantoday.noaa.gov/seaotters101/welcome.html

Activity 3 *(Continued)*

Step 10:
Instruct students to use additional information learned from this video to add to their **Sea Otter Structure and Function** handout.

Say:
Remember that in the past there was a large population of sea otters off the Oregon coast. These animals were decimated by the European fur trade. By the early 1900s, they had been driven to the edge of extinction. There are no longer any sea otters on the Oregon Coast.

Step 11:
Ask students the "big idea" questions below. Instruct students to discuss in pairs or small groups.

Why are sea otters important to the health of the Oregon Coast? Why should we care?

Step 12:
Show students the "Some Animals Are More Equal Than Others" video (**start at 7:45 and play to the end**). https://www.youtube.com/watch?v=hRGg5it-5FMI

Say:
Now, we're going to watch one final video that will introduce a new term: keystone species. This new term will help us answer why sea otters are important to the health of the Oregon Coast.

Please add this new term to your Personal Dictionary. As you watch the video, write down a definition for this new term.

Step 13:
Once the video has ended, facilitate a whole-classroom discussion about the two "big idea" questions in Step 11.

Activity 4

Informational Poster[3]

Time: Two 50 minute class periods

Say:

As we have learned, the sea otter played an important role in the traditional life of the Coquille Tribe. In the next activity, you will have the opportunity to educate the public about the sea otter and its impact on the Tribe.

Step 1:

Distribute the Informational Poster Rubric.

Say:

For this project, you will create an informational poster to educate the public about the sea otter and its relationship with the history and culture of the Coquille Tribe.

Step 2:

Tell students they should be as creative as possible, but their final product must include the following information:

- The importance of the sea otter to the history and culture of the Coquille Tribe
- Basic information about sea otters (including the structure and function of their anatomy, their habitat, and interesting facts)
- The role of sea otters in keeping coastal ecosystems healthy

[3] This activity was adapted from "Diving into Oregon's Kelp Forests," developed by the Oregon Coast Aquarium. https://aquarium.org/wp-content/uploads/2018/07/Diving-Into-Kelp-Forests-Teachers-Guide.pdf

Activity 3 *(Continued)*

Step 3:
Give students two 50-minute classroom sessions to work on this project.

Alternative: Teachers can choose to have students develop (and/or finish) their poster at home. The final product can follow the school/district writing process (e.g., draft, revise, final).

Step 4:
Have students display their final products on their desks, then have the class stand up and walk around the classroom to view each other's work.