



SCIENCE

# Seasonal Rounds and Ecosystems

## ESSENTIAL UNDERSTANDINGS

- **Since Time Immemorial**
- **History**
- **Lifeways**

## LEARNING OUTCOMES

After the lesson, students will be able to:

- Describe the interconnectivity between the air, water, land, animals, fire, and spirit.
- Describe the importance to Native Americans Tribes in Oregon of “reading” the land, knowing the local language, learning from Elders, and maintaining a symbiotic relationship with nature.
- Explain that Indigenous knowledge is based on a systematic method of observing nature and passing knowledge to the next generation.
- Explain how Western science can complement Indigenous knowledge but does not replace it.
- Describe the historical relationship between the seasonal rounds of Native American Tribes in Oregon and local ecosystems.
- Explain how federal Indian policy (forced relocation to reservations) disrupted the balanced relationship that Native American Tribes in Oregon had to their ancestral homelands.

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## Overview

The annual cycle of seasonal rounds for Native Americans in Oregon reflects the relationship they share with the land—a relationship that includes intimate knowledge of local ecosystems. Since time immemorial, Tribes in Oregon have carefully considered seasonal ecosystems and ecoregions, and this knowledge of soil, water, plants, and animals helped them survive. Native Americans in Oregon today continue to draw on traditional Indigenous knowledge to guide how they manage the parts of their ancestral homelands that remain in their care.

In this lesson, students will use a systems-thinking approach to explore the components and processes of ecosystems as they consider how the seasonal rounds of Native American Tribes in Oregon reflect local ecosystems. Students will analyze a hypothetical and a local ecosystem by identifying abiotic and biotic components and their relationships and then consider how Native people in Oregon considered the local abiotic and biotic components of their seasonal ecosystems in seasonal rounds. Students will also consider the impact of forced relocation to reservations. Prior to white settlement, most Tribes in Oregon moved seasonally throughout a vast region in a pattern based on the availability of foods. Students will consider habitats, natural resources, stability and change, and living and nonliving components of habitats.



## ESSENTIAL QUESTIONS

- Describe how Native Americans in Oregon practice seasonal rounds today.
- What is an ecosystem, and how did Oregon's Indigenous people groups live within that ecosystem?
- What is Indigenous knowledge?
- What happened to Native American Tribes in Oregon and their relationship with their ancestral lands after they signed treaties with the United States?
- What are the components and processes of an ecosystem?
- What would seasonal rounds have looked like prior to white settlement?
- How do they look today?

## LOGISTICS

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

## TIME REQUIRED

Two hours of class time.

## STANDARDS

### Oregon social studies standards

**HS.60** - Analyze the history, culture, tribal sovereignty, and historical and current issues of the American Indian/Alaska Native/Native Hawaiian in Oregon and the United States. (History)

**HS.66** - Examine and analyze the multiple perspectives and contributions of ethnic and religious groups, as well as traditionally marginalized groups within a dominant society and how different values and views shape Oregon, the United States, and the world. (History)

**HS.41** - Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their political, cultural, and economic dynamics.

**HS.46** - Assess how changes in the environmental and cultural characteristics of a place or region influence spatial patterns of trade, land use, and issues of sustainability.

**HS.53** - Explain how power and privilege influence where people live and how they interact with their environment at the intergroup and institutional levels and how they have been affected.

### NGSS standards

**HS-LS2-6** - Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

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## Background for teachers

Seasonal migration patterns reflected a deep knowledge of local ecosystems. For example, riverine villages were occupied when the salmon were running and other locations were favored when berries were ripe or when roots were ready to be harvested or elk or other animals were available. Foods gathered



and preserved through seasonal rounds provided Indigenous families with sustenance through the winter and also became one of the mainstays of intertribal trade. Later, Native American Tribes in Oregon traded these preserved foods to white explorers, fur traders, and trappers, which contributed to the survival of these newcomers.

Through the centuries Indigenous people have hunted, picked berries, dug roots, and cut grasses, plants, and bark for medicinal remedies. They have collected wapato (potato) and aquatic plants and prepared their harvests for winter storage. They have woven baskets, beaded buckskin, and created moccasins for utility and for trade. The seasonal gathering rounds or journeys were important to the survival of the people and continue to be a vital part of Native American cultures in Oregon today.

#### Links to useful websites that add more detail or context

- [https://www.academia.edu/30297250/Seasonal\\_Gathering\\_Rounds\\_Sustained\\_Columbia\\_River\\_Peoples](https://www.academia.edu/30297250/Seasonal_Gathering_Rounds_Sustained_Columbia_River_Peoples)
- <https://trailtribes.org/umatilla/camp-life-and-seasonal-round.htm>

#### Key ideas to be aware of

- Indigenous knowledge and lifeways, historically and contemporarily
- Components of ecosystems: abiotic and biotic
- Ecoregions in Oregon

#### STANDARDS *(Continued)*

**HS-LS2-8** - Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

**RST.11-12.7** - Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

**WHST.9-12.2** - Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

#### MATERIALS

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

- Whiteboard or overhead projector
- Ecoregions handout
- Seasonal Rounds handout



### What teachers should do or review prior to delivering the lesson

- Review the Broken Treaties video: <https://www.opb.org/television/programs/oregon-experience/article/broken-treaties-oregon-native-americans/>
- When watching the video, consider the human impact on ecosystems, particularly in the following sections: Manifest Destiny (12:00), gold mining/land grab (12:40), and treaties with sovereign Oregon nations (18:00).
- Review the impacts of forced relocation and Indian removal on the seasonal rounds of Native American people in Oregon (8:30–12:00).

### References

Cajete, G. (2016). *Native science: Natural laws of interdependence*. Clear Light Publishers.

Campbell, K., Menzies, C., & Peacock, B. (2003). *BC First Nations studies*. British Columbia Ministry of Education.

### Considerations for teachers

#### Assessment

- Students will engage in discussions in pairs and in groups. The teacher should actively monitor the student discussion for correct understanding, and the teacher should intervene so that there are no misconceptions or bias.
- Students should be assessed both formatively and summatively. The formative assessment will

### VOCABULARY

**Ecosystem** – A system that includes all living organisms (biotic factors) in an area as well as its physical environment (abiotic factors) functioning together as a unit.

**Indigenous knowledge** – Traditional knowledge, Indigenous knowledge, and local knowledge generally refer to knowledge systems embedded in the cultural traditions of regional, Indigenous, or local communities.

**Native science** – In his book *Native Science*, Dr. Gregory Cajete (Santa Clara Pueblo) “tells the story” of Indigenous science as a way of understanding, experiencing, and feeling the natural world. He points to parallels and differences between the Indigenous science and Western science paradigms, with special emphasis on environmental/ecological studies and the interdependence of humans and their environments.

**Ecoregion** – Adjoining areas that share a similar climate and ecological features.

**Seasonal rounds** – The pattern of movement from one resource-gathering area to another in a cycle that was followed by Native American people in Oregon each year. Spring, summer, and fall saw Native American people moving to a variety of resource areas. During winter, they gathered in more permanent villages. The abundance of resources also determined how often people moved. In areas that had a greater abundance of variety, people could stay in one location for longer than in areas where resources were scarcer (Campbell, Menzies, & Peacock, 2003, p. 25).

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be teacher observation of student participation in class and group discussions. Summative assessment will be teacher review of each student's written analysis of the ecoregion activity to confirm understanding of important facts and themes.

### Practices

- The teacher should have basic biology concept knowledge and be able to teach about ecology, ecosystems, and human impact on the environment.
- The teacher must have the skill to read various maps of Oregon as well as historical documents.
- The teacher should create conditions that activate engagement strategies such as think-pair-share and group discussion.

### Learning targets

- I can identify key concepts of ecosystems and the ecoregions of Oregon.
- I understand the concept of a seasonal round and can connect that to the concept of ecosystems.
- I understand how seasonal rounds were disrupted by forced relocation to reservations.

### VOCABULARY *(Continued)*

**Abiotic** – Nonliving, as in abiotic factor, which is a nonliving physical and chemical attribute of a system (for example, light, temperature, wind patterns, rocks, soil, pH, and pressure in an environment). Source: <https://www.biologyonline.com/dictionary>

**Biotic** – Of, pertaining to, or produced by life or living organisms (of an ecosystem). Pertains to a living thing (such as plant, animal, fungus) as well as its products (for example, secretions, wastes, and remains).

**Traditional ecological knowledge** – The evolving knowledge acquired by Indigenous and local people over hundreds or thousands of years through direct contact with the environment. Also called Indigenous knowledge or Native science.

*Source for some of the key vocabulary terms:*  
<https://www.biologyonline.com/dictionary>



## Appendix

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

- PowerPoint
- Seasonal Rounds handout
- Oregon's Ecoregions handout

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## Activity 1

# Introduction to Ecosystems

*Time: 60 minutes*

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Begin the lesson by showing a very brief excerpt of the Broken Treaties video (8:30–13:30). This will contextualize the lesson within the framework of a disruption of lifeways for the Indigenous peoples of Oregon following white settlement. Explain to students that people are also part of ecosystems and ecoregions, and with forced relocation to reservations came a disruption in the traditional lifeways of Native Americans in Oregon, including seasonal rounds. While this is a science lesson, it is important for students to understand that Indigenous knowledge—also called traditional ecological knowledge—is Native science.

Write the word “ecosystem” on the board or on an overhead transparency. Ask students to describe the meaning of the word. Do not judge their answers or correct misconceptions. Allow think time and free association.

Next, write the following words on the board or transparency: beach, river, city, forest, aquarium.

Ask students which of these represent an ecosystem. Guide the discussion to bring out that all are examples of ecosystems and that they can be large or small. In addition, all may include humans. Describe ecosystems as a community of organisms plus the abiotic parts of their environment. Discuss that ecosystems are also often described by the major plants found within them (e.g., forest ecosystem). Present the concepts of biotic and abiotic (Power-Point slides).

Ask students to look at the word “ecosystem” on the board again. Have them focus on the second part of the word: “system.” Ask them what it might mean to look at ecosystems as a system. Help students reach the understanding that each ecosystem is an integrated system of components (biotic and abiotic) and processes.

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## Activity 1 (Continued)

**Say:**

*Systems ecology focuses on interactions and transactions within and between biological and ecological systems and is especially concerned with the way the functioning of ecosystems can be influenced by human interventions. Think about the many ways that Native Americans in Oregon traditionally lived and functioned within the ecosystem. These traditions are still an important part of Native American cultures in Oregon today.*

**Say:**

*These are the think-pair-share questions: How do humans fit into ecosystems? How is a community an ecosystem?*

Ask students to think-pair-share.

**Say:**

*How do you think Native Americans in Oregon subsisted within their unique ecoregions historically and how do you think they subsist and exist today living on reservations and in cities and towns off the reservation?*

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## Activity 2

# Ecoregions and Seasonal Rounds

Time: 60 minutes

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Split students into groups of two. Distribute the Oregon's Ecoregions and Seasonal Rounds handouts.

**Say:**

*In different think-pair-share groups, use the ecoregions map to imagine the kinds of plants, animals, and waterways that made up a Tribe's seasonal round in their ancestral ecoregion. Identify the abiotic and biotic components of that ecosystem. What kinds of hunting, gathering, or other subsistence activities might have occurred?*

In a large group, brainstorm some characteristics of each of Oregon's ecoregions and ask students to share out (popcorn style). Have students write these down. Remind them to think about the kinds of foods that might have been available to Native Americans in Oregon historically and how that might or might not be different today.

**Say:**

*For each of the eight ecoregions, write a short description of the general geography. Ask yourself, "What would I see if I were dropped in the middle of this ecoregion? What would I eat? Based on the landforms in my ecoregion, and my position in the state, what climate might I expect for this area?"*

*Using the Kalapuya Seasonal Round on the worksheet, form a hypothesis to answer your question. Your hypothesis should be based on known or researched information that can be tested. Take the information from the background (for example, the description of a rain shadow) and add your own observations and previous knowledge. Make a written statement (hypothesis) about what you think the climate will be like in the ecoregion (for example, its temperatures and type and amount of precipitation).*

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## Activity 2 (Continued)

### Reflection/closure

**Say:**

*All Native American Tribes in Oregon practiced seasonal rounds. This is a complex annual system of family groups or whole villages moving to where resources are ready for harvest, hunting, or fishing. Many of these resources would be processed on site and then brought back to winter villages for storage. Families owned specific gathering locations and traded with other Tribes at trading centers. This was a cultural pattern that existed for an estimated 8,000 to 10,000 years.*

*In Western Oregon, for example, the camas cycle, emphasized in the Kalapuya Seasonal Round handout, reveals the ways that Kalapuyans traveled about their lands in the annual cycle. Many Native people still follow these cycles today in Oregon. They grow up learning the seasonal cycles of the berry plants and agriculture in the Willamette Valley, for example. They grew up knowing that strawberries are ready at the end of May, and that after strawberries come cherries, blackberries, and then blueberries. Many people still follow this cycle and access U-pick opportunities, and many have grown up canning all manner of fruits and vegetables. Using Native science that has been passed down for thousands of years, many contemporary Native people have a deep understanding of plant cycles and other fundamental aspects of the ecosystem in their regions.*