Southern Oregon LAND CONSERVANCY

Kinship Clusters

Part of the Rogue River Preserve Interactive Map for Grades 3-5

Exploring data organization, visualization, and sensemaking

Lesson Synopsis

Western science tends to organize like with like: a field guide will list all of a region's tree species together, all of its birds in a separate section, and all of the insects in yet another chapter. By comparison, traditional Indigenous ways of knowing tend to organize ecological information around the relationships between plants, animals, and the landscape's physical characteristics. In this lesson, students first arrange data based on Western scientific classification systems, then they reorganize the same information to reflect the Indigenous approach of highlighting interdependence among species living in a particular habitat.

Learning Outcomes

During this lesson, students will:
- obtain and summarize information from text and photos
- represent the same data in two different ways
- communicate complex ideas about interrelationships in ecosystems using text and images

NGSS Alignment

Disciplinary Core Ideas: LS2.A: Interdependent Relationships in Ecosystems
Crosscutting Concepts: Patterns; Systems and System Models
Science and Engineering Practices: Analyzing and Interpreting Data; Communicating Information

Linked & Embedded Resources

When using resources from the Google Drive, please duplicate each resource and then move it to your own Drive to ensure that the original remains intact for other users.
- Google Earth Project: Rogue River Preserve Interactive Map for Grades 3-5 available here
- Web page: Rogue River Preserve Characteristic Species galleries available here
- Google Sheet: Classifying Characteristic Species example sheet available here

Approximate Time Needed

75-105 minutes; can be presented over multiple days/class periods

Digital Tools

Google Earth
Google Sheets
Google Slides

Student Activities

Classification (30-40 minutes)

The first data organization activity uses Western taxonomy to arrange information. Initiate a conversation with your students about classification: how do scientists group information about living things? What are some of the categories that they use?

Explain that next, students will practice sorting a selection of species based on this kind of classification system. Either provide students with a Google or Excel sheet with a pre-established selection of categories (examples below and on the public Google Drive), or invite them to make their own organizational sheets, digitally or on paper. In any case, the first row should identify a classification, and the second row should include a brief description of what makes an organism fit into that classification. You can provide students with the descriptions, or you can use a group discussion to come to a consensus about how to describe each one.

You can work at an introductory level like this:

Plants	Animals	Fungus	not sure
An organism that grows in one place and uses photosynthesis to turn sunlight into food	*An organism that consumes organic material, breathes oxygen, and can change location by moving*	*An organism that decomposes organic material, does not use photosynthesis, and cannot move from where it grows*	*If you're not sure which category an organism goes in, put it in this column.*

Or you can use this activity to explore classification more deeply:

Trees	Other Plants	Mammals	Birds	Other Animals	other / not sure
A woody plant that has a single large stem or trunk and whose branches are far away from the ground	*Any other organism that stays in one place and uses photosynthesis to turn sunlight into food*	*Animals that have fur or hair, give live birth, are warm-blooded*	*Animals that lay eggs, have feathers, wings, scaly legs, beaks, and hollow bones, and are warm-blooded*	*Any other organism that eats organic matter, breathes oxygen, and can change location by moving*	*If you're not sure which category an organism goes in, put it in this column.*

Once your students have established their organizational sheet, let them know that they will be using this chart to group organisms that live at the Rogue River Preserve. Based on information in pictures and text, they will write each organism's name in the column that they think is the best fit. As students sort organisms into these columns, they can check against the description at the top to ensure they are placing organisms appropriately. If they are unsure, or if they feel that there isn't a column that's a good fit, they can write those organisms in the "other" column. Remind them that it's okay not to know!

Direct students to the Rogue River Preserve Characteristic Species web page at https://www.landconserve.org/rrp-characteristic-species. Depending on your students and your available time, you can ask them to classify all of the organisms on the page, or you can direct them to only classify a portion. Likewise, you can ask students to work independently, or you can place them in small groups/breakout rooms to work collaboratively, with each small group using a shared Google Sheet.

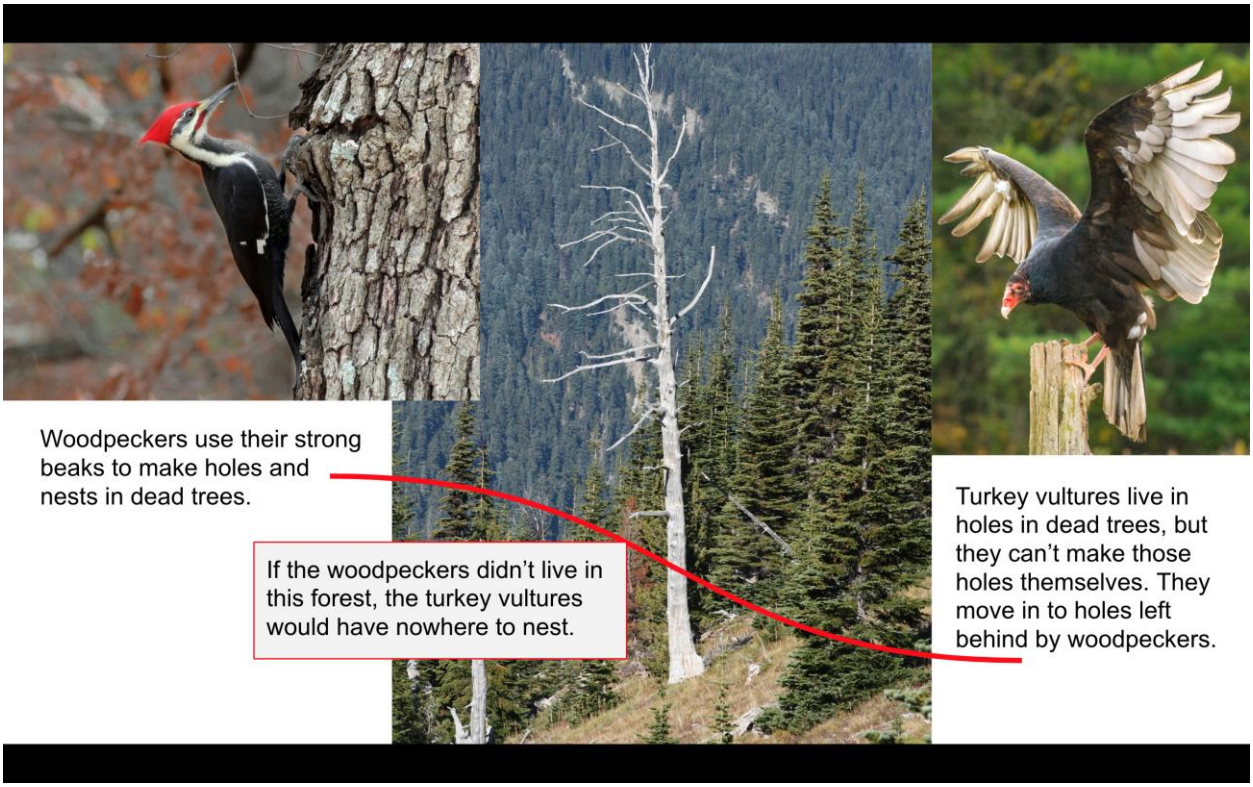
After students have sorted the Rogue River Preserve organisms, lead a discussion about the experience. What did they notice? What was easy, what was difficult, and why? What about this process felt familiar? What was new?

Kinship Clusters (35-45 minutes)

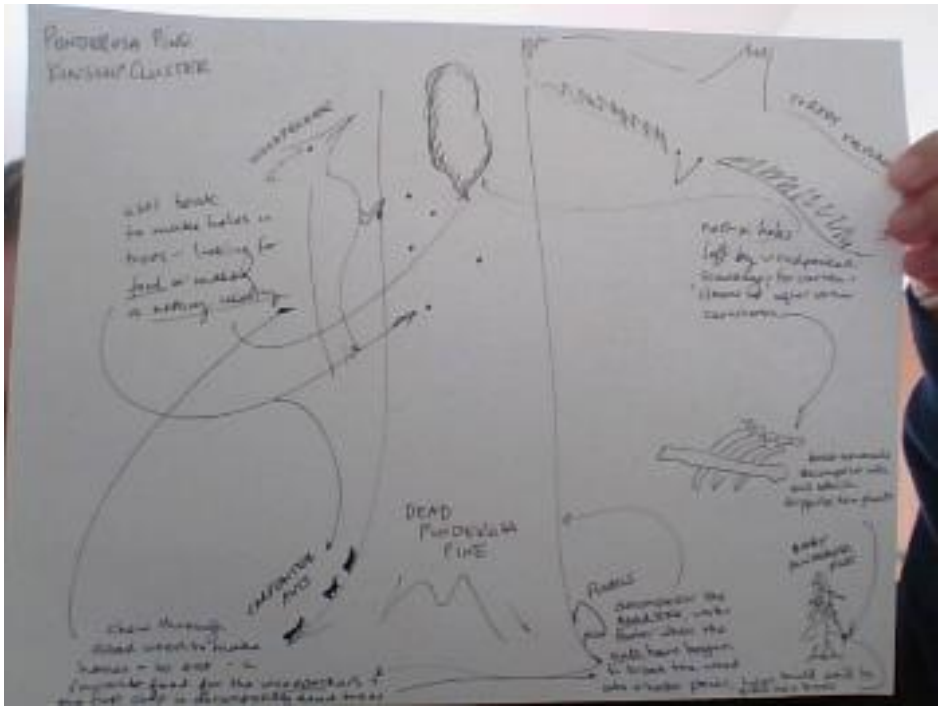
Let students know that now, they're going to look at the same information from a different point of view. Explain that many Indigenous peoples have incredible knowledge about the natural world, but it's not necessarily organized into categories or columns. Instead, it's organized by how living things relate to each other in their landscape. Give an example, like "Turkey vultures live in holes in large dead trees like ponderosa pine. But turkey vultures can't make those holes – they move into nests that woodpeckers created. If the woodpeckers weren't there, turkey vultures wouldn't be able to live there either." Extend the kinship cluster by including carpenter ants (woodpeckers' preferred food and a driver of decomposition); fungus (a decomposer that completes the ants' work and turns dead trees into soil); and carrion (turkey vultures' food, and another source of soil nutrients). Or, lead a discussion so that the class works together to produce an example.

Next, ask your students how they might record or present these relationships, which can be called "kinship clusters". Remind students that a graphic organizer with rows and columns, like they used in the previous activity, is one way of presenting complex information in an understandable way, but that there are many other options. Guide the discussion toward a model that uses images, text, and symbols, and share an example of such a model, like the ones below.

This simple example was made in Google Slides, using the "Insert > Image > Search the Web" function to find the photos:



The slightly more complex example below was drawn by hand and then added to Google Slides using the "Insert > Image > Camera" function. Note that the resolution of these images will vary greatly depending on each student's laptop camera, so you may need to request that students take a photo with their phone and upload it in order to read the details.



Tell the students that they will now be making their own kinship clusters to model the relationships between organisms in an ecosystem. Choose guidelines that are appropriate for your students: pick a minimum number of organisms to include, a required number of plants or animals, at least one producer/consumer/decomposer, etcetera. Consider providing students with a grading rubric that lists your requirements.

As in the previous activity, you can direct students to work individually or in small groups. Invite students/groups to choose one of the Rogue River Preserve habitats, or assign a habitat to each student/group. Once students know which habitat they will be exploring, send them back to the Rogue River Preserve Characteristic Species web page and ask them to carefully read all of the information about the organisms in their particular habitat. Invite them to take notes about connections that they notice as they read – these notes will help them determine which species to include in their kinship cluster model. Be available to assist students if they have questions about vocabulary words in the characteristic species galleries.

Create a Google Slide deck and ask each student/group to work on a single slide. They can use the embedded digital tools or they can work on paper and upload photos of their work.

After students have created their kinship clusters, lead a discussion about the experience using the same questions as you used to debrief the first classification exercise. What did they notice? What was easy, what was difficult, and why? What about this process felt familiar? What was new?

Conclusion (10-20 minutes)

To wrap up, guide the group in a discussion to compare these two ways of representing and communicating the same information. Invite your students to take a few minutes before this conversation to reflect on their own experiences with the two approaches: provide them with the chart below, or ask them to create their own visual organizer that will compare and contrast the classification chart and the kinship clusters.

	Classification chart	Kinship clusters
What did you notice about the Rogue River Preserve's organisms and/or habitats when you used each of these organizational approaches?		
What questions about the organisms came up for you when you were using each approach?		

What was easy for you to understand and communicate about the organisms/ habitats when you were using each approach?		
What was difficult for you to understand and communicate about the organisms / habitats when you were using each approach?		

After students have had an opportunity to reflect individually, invite them to share some of their thoughts and reactions. Ask them to consider both their preferences and the usefulness of each approach with questions such as: Do you like one approach more than the other? Why? What are the benefits and drawbacks of each approach? Wrap up the discussion by reminding students that both approaches are valuable tools for understanding and communicating complex information, and that by exploring multiple ways of thinking, students will learn more than by just using the one approach that is most familiar.