

Teacher's Guide

SUPERPOD

SAVING THE ENDANGERED ORCAS OF THE PACIFIC NORTHWEST

About the book



The endangered Southern Resident orcas whistle and click their way around the waters of the Pacific Northwest in three small family groups while facing boat noise, pollution, and scarce food.

Superpod introduces young readers to beloved orcas like Cookie, Shachi, and Tahlequah—spunky youngsters, wise grandmothers, devoted moms, and more. Throughout, readers will also meet people in a kind of “human superpod” fighting for the orcas’ recovery. Experts are training scat-sniffing dogs, studying orcas from the air, using hydrophones to learn about orca communication, and inventing ways to treat sick orcas. Author Nora Nickum also discusses her own work on laws to protect the orcas; tackles the dark history of orca capture for marine parks; visits a river with spawning salmon; and shares moments of wonder.

Readers are invited to dive in to help save these intelligent, playful orcas with diverse action ideas and inspiration for a wide range of future careers.

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Grade level: 3-7+

Available at:

- Bookshop.org
- [Seattle Aquarium](http://SeattleAquarium.org)
- [Barnes & Noble](http://BarnesandNoble.com)
- [Amazon](http://Amazon.com)
- [Chicago Review Press](http://ChicagoReviewPress.com)
- Your local independent bookstore

About the author



Nora Nickum is the Senior Ocean Policy Manager at the Seattle Aquarium, where she leads orca recovery and other ocean conservation policy efforts. She writes nonfiction and fiction books for children, many of which celebrate biodiversity and STEM topics and explore today’s wildlife conservation challenges and innovative solutions. Nora loves exploring tidepools, watching for whales, spotting seals, and collecting sea glass. She lives on an island in Washington state with her husband and daughter. Learn more about Nora at www.noranickum.com.

This guide is intended to support classroom instruction.

Common Core State Anchor Standards Alignment for *Superpod*:



English Language Arts Anchor Standards:

- Reading informational texts: CCR.ELA-Literacy.RI.4.1, 4.2, 4.3, 4.5, 4.8, 4.10 (and other grades: RI.3, RI.5, RI.6, RI.7, RI.8)
- Writing: CCR.ELA-Literacy.CCRA.W.1, W.2, W.4, W.7, W.8, W.9 (grades 3-8)
- Speaking & Listening: CCSS.ELA-LITERACY.CCRA.SL.4.1, 4.2, 4.3, 4.4 (and other grades: SL.3, SL.5, SL.6, SL.7, SL.8)

Next Generation Science Standards:

- Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)
- Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2, 4-PS3-3, 4-PS3-4, 4-ESS3-1, 5-PS1-2, 5-PS1-3, 5-PS1-4)
- 3-LS4-4 Biological Evolution: Unity and Diversity (Grades 3-5). LS2.C: Ecosystem Dynamics, Functioning, and Resilience; LS4.D: Biodiversity and Humans.
- 5-ESS3-1. Earth and Human Activity (Grade 5). ESS3.C: Human Impacts on Earth Systems.
- MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics (Grades 6-8). LS2.A: Interdependent Relationships in Ecosystems.
- MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics (Grades 6-8). LS2.C: Ecosystem Dynamics, Functioning, and Resilience.

Project 2061

By the end of 5th grade, students should know that:

- Scientists' explanations about what happens in the world come partly from what they observe, partly from what they think. 1B/E3a
- Doing science involves many different kinds of work and engages men and women of all ages and backgrounds. 1C/E3
- Because of their ability to invent tools and processes, people have an enormous effect on the lives of other living things. 3C/E6
- Technologies often have drawbacks as well as benefits. A technology that helps some people or organisms may hurt others—either deliberately (as weapons can) or inadvertently (as pesticides can). 3C/E5*

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Questions for reading and discussion

Ask students to read one chapter of *Superpod*, choosing between chapters 2, 4, 7, 8, 9, 12, 14, and 15 (or you can read one aloud or assign different chapters to different groups). Ask the students to take notes as they read or listen. Then, have them discuss the chapter as a class or in small groups. Invite the students to answer these questions:

1. In this chapter, what facts stand out? What questions do you still have?
2. What do you think it would be like to have the job of the person who is interviewed in this chapter? What would be hard? What would be fun?

Read chapter 2 of *Superpod*, “What’s in a Name?”

1. What do you think about naming wild animals?
2. Would you prefer to call the Southern Resident orcas by their names (like Blackberry), or alphanumeric (J-27)? Why?
3. If you like using names, what name would you give a new baby orca, and why?

Questions for writing and discussion

Engaging in Argument from Evidence; Constructing Explanations

Provide these as pre-reading questions before students read *Superpod*. Later, have them work on pulling evidence from the text to answer these questions in writing or in oral presentations.

1. Given that there are other orca populations in other parts of the ocean—that eat different things and have different cultures—do you think it’s important to save this particular population of orcas? Why or why not?
2. What do you think is making it difficult for humans to quickly improve the outlook for these endangered orcas? Why are they still in trouble, when we know so much about the problems they face?
3. There are a lot of different people profiled in *Superpod*, from scientists and educators to vets, activists, and enforcement officers.
 - a. Why is it important to have people bringing different skills to a problem like this?
 - b. Did any of those roles surprise you as ones that might be important for helping wild whales?
 - c. Are there any jobs described in the book that you think you might like to try (not necessarily focused on the orcas)?
4. What are some differences or challenges with studying and helping endangered animals that live in the ocean, compared to endangered animals that live on land?

Persuasion: Reducing threats to orca recovery

Engaging in Argument from Evidence; Designing Solutions; Cause & Effect

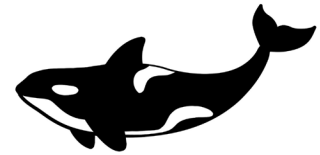
Have students write or create something that will persuade their audience to take an action that will help the endangered orcas (or another endangered species) by reducing one of the threats to their recovery. For the orcas, that might be doing something that will help reduce underwater noise, reduce toxic pollution, or increase the number of salmon available for the orcas to eat by removing a dam or restoring salmon habitat. Reading *Superpod* will give them additional ideas.

They could choose to write or create something from this list, or come up with their own idea:

- Letter to the editor, which they could even submit to the local newspaper
- 2 minute speech (the length of time often allowed for public comment at a hearing)
- A letter to a member of Congress
- A poster, brochure, flyer, song, or poem encouraging other students or community members to take a specific action

Encourage your students to keep these things in mind:

- Who is your audience?
- What do they care about?
- What specific action are you asking your audience to take?
- Are there any facts you can use to back up your argument?



Research orcas around the world & present findings

Carrying Out Investigations; Obtaining and Evaluating Information; Constructing Explanations

Individually or in groups of two to three, students will research another kind of orca (killer whale) from another part of the world, like Antarctica, Iceland, or Scotland. (This website can be a starting point: <https://us.whales.org/whales-dolphins/meet-the-different-types-of-orcas/>) Students will use what they learn in their research to create presentations to share with the class. Emphasize the need to use reliable and credible sources. Encourage students to think creatively.

Students may want to include some or all of this information in their presentations:

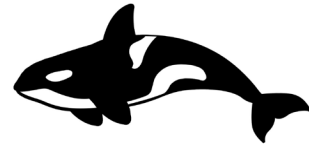
- What do these orcas eat? What kinds of skills do they need to be able to capture that prey?
- Are these orcas thriving or in trouble? Are people doing anything to help them?
- Are scientists studying these orcas? What are they interested in learning?

After also reading *Superpod* chapter 3 & 11:

- Compare & contrast: Can you identify five ways the orcas you're researching are different from the Southern Resident orcas in *Superpod*? What about the transient orcas?
- What needs to be done to help these particular orcas you've researched? Is it the same as one of the things that needs to be done to help the endangered Southern Residents in the Pacific Northwest?

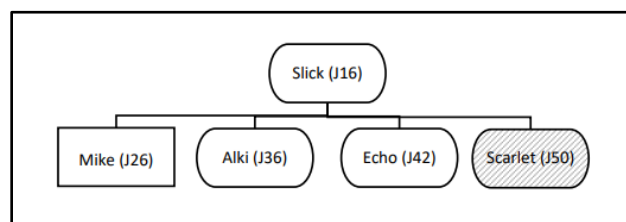
Build a family tree

Obtaining and Evaluating Information; Patterns & Systems



Have the class make a big family tree in the classroom for K pod or L pod, similar to the one shown in the *Superpod* book for J pod.

1. Use an index card for each Southern Resident orca, with its name, alphanumeric (e.g., L122), sex, and birth year.
2. Ask students to research their relationships and arrange them on the wall, the floor, or a cardboard tree to show the family relationships.
 - a. To research the relationships, they can click on the photos at [Meet the whales | The Whale Museum](#) or use the orca trading cards available at the Seattle Aquarium gift shop.
3. Ask questions:
 - a. Who is the oldest female, and the likely leader of the pod? Who is the next oldest, and likely to take over the leadership role next?
 - b. Which orcas have more close family members that are likely to share food with them?
 - c. How many youngsters are there (under age 10) who will hopefully grow up to have babies and grow the population? Does that seem like a lot, or not very many? How many are females?
 - d. Which male orcas have lost their mothers and grandmothers? (And are therefore at higher risk?)
4. Family trees for each pod are available on my website if you need to give a hint or want to give the students a chance to check what they've created when they're all done: www.noranickum.com/orca



Web of life

(courtesy of the Seattle Aquarium)

Grades 2 & up

20-30 minutes depending on group size

Materials: yarn & notecards

This is a fun activity for participants to visually see how different animals are connected through food webs. Download instructions here:

<https://www.seattleaquarium.org/sites/default/files/files/Web%20of%20Life%2010-2017.pdf>

Whale food pyramid

(courtesy of the Seattle Aquarium)

Analyzing & Interpreting Data

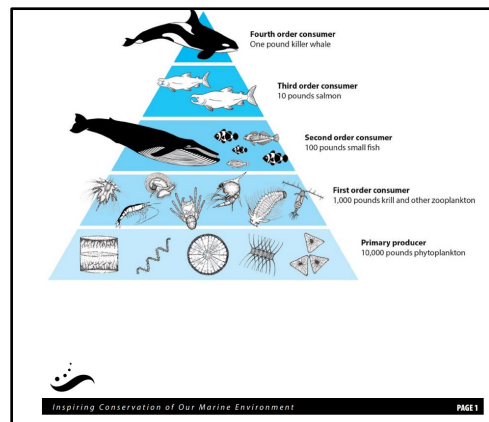
Grades 9-12

30-60 minutes

WA state standards: Systems: SYSB & SYSC; Life Sciences: LS1A

Students will:

- Learn how much salmon it takes to sustain an adult orca and how much phytoplankton, zooplankton and small fish are required to support the salmon.
- Be able to calculate how much phytoplankton, zooplankton, small fish and salmon it takes to support an adult orca.
- Understand how to interpret a food pyramid.
- Uncover the reasons why the largest animal on the planet, the blue whale, is able to support itself on plankton.



Download instructions here:

<https://www.seattleaquarium.org/sites/default/files/files/Whale%20Food%20Pyramid%202017-R1.pdf>

Tackling underwater noise

Analyzing and Interpreting Data; Engaging in Argument from Evidence; Designing Solutions

Have students research sources of human-made underwater noise. Then, have them research the different ways to reduce one or more of those noises.

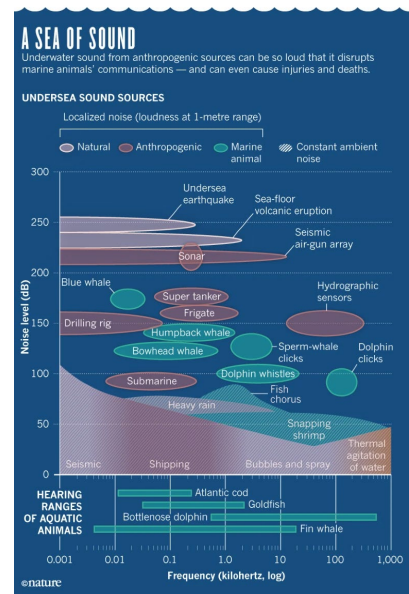
Some sources for this research phase:

- *Superpod* chapter 14, “An Ocean Full of Noise” and chapter 15, “Quieting the waters.”
- Divide the class into groups in a computer lab (or do this in the classroom as one large group looking at a large screen). Have students:
 - [Explore common sounds of the Salish Sea](#) by clicking the animals and other objects in this panoramic soundscape from Langley Whale Center and Orca Network.
 - Listen to the “Anthropogenic sounds” audio clips at <https://dosits.org/galleries/audio-gallery/#manmade>
- Look at this graphic in *Nature* magazine to see how different noises overlap with marine animals’ hearing ranges: <https://www.nature.com/articles/d41586-019-01098-6>
- Online sources like NOAA.gov, newspaper and journal articles, and environmental NGOs.

Next, have students write a persuasive piece to urge an elected official, decision-maker, boater, construction company, or shipping company to take an action that will help reduce underwater noise.

- It can be in the form of a letter to the editor; a two-minute speech (i.e., for a phone call, meeting, public comment at a hearing, or testimony on a bill); a letter to a legislator; a poster or a flyer; or something else they come up with.
- Encourage students to focus on the audience they have in mind and what that audience cares about; the specific action they want the audience to take and how it will help the orcas; and 1-3 facts they can use to back up their argument.

You can also try some of the activities and lessons in the NOAA materials for grades 3-5: [How Increased Ocean Noise Affects Whales](#) (NGSS 4-LS1-1, 4-LS1-2, 3-5 ETS1-2).



Orca recovery board game

Cause & Effect; Systems

Have groups of students invent a board game based on the threats facing the endangered orcas and actions that can help them recover.

Materials:

- Butcher paper
 - Index cards
 - Markers
 - Scissors
 - “Fish” for players to collect (i.e., slips of paper with salmon clip art, or macaroni or beans). *Examples of salmon icons you could use (some requiring attribution):* [salmon 1](#), [salmon 2](#), [salmon 3](#)
1. Students decide what the goal of their game will be. What will “winning” look like for the orcas in this game? Given the orca family structure and culture, a cooperative game might be appropriate. Sample ideas:
 - a. Collect enough salmon to get everyone in the group (pod) to the average daily amount an orca needs (25). For extra realism, they could have different players be young orcas, adult males, and adult females, and research how many salmon each of those need to eat.
 - b. Reach a destination like the Fraser River (an important source of salmon that this orca population visits every year).
 2. Hand out index cards. Students can refer to *Superpod* for ideas about good and bad things that can happen to an orca or its pod. They’ll write one idea on each card.
 3. Next, have students think about how helpful or problematic each circumstance would be for an orca, assigning positive or negative points/spaces accordingly, and writing those numbers on the index cards.
 - a. If players are trying to collect enough salmon, card examples might include:
 - A dam is removed from a river: you catch 4 more salmon.
 - Noise from big ships makes it hard for you to echolocate: you lose 3 salmon.
 - Boats are required to go slow around you, quieting the waters: you catch 2 more salmon.
 - You catch six big salmon: choose how many you’ll share with each member of your pod.

- b. If their game's goal is about reaching the Fraser River, card examples might include:
- You catch a big Chinook salmon: go ahead 1 space.
 - A dam is removed and more salmon spawn: go ahead 4 spaces.
 - Noise from big ships makes it hard for you to find your way: go back 2 spaces.
 - Your sibling shares a salmon with you, giving you extra energy: go ahead 1 space.
4. To play, students can draw cards and move spaces on the board they've drawn, or draw cards and collect something to represent salmon (e.g., beans, pasta, paper fish icons). After completing game play, they could rotate to experience playing another group's game.
5. After playing, have the class discuss:
- a. Which threats did you assign the most points to? Why are those more devastating than the others?
 - b. Which helpful actions did you assign the most points to? Why?
 - c. Was it easier to come up with good cards or threat cards?
 - d. Did you come up with a balance of good cards and threat cards that felt realistic, or not?
 - e. How easy or hard was it to win? Do you think that reflects what the endangered orcas face?



Science & multimedia

Making hypotheses and designing studies

- Read *Superpod* Chapter 9 about breaching and other mysterious orca behaviors, and watch a video clip (such as [Baby Southern Resident orca breach - YouTube](#) or <https://www.youtube.com/watch?v=N3WM8tuqLyk>).
- Ask the students:
 - What additional theories do you have about why orcas do those things?
 - What do you think about Dr. Otis's theories?
 - What additional information might be useful for drawing clearer conclusions? Can you design a study to test that?

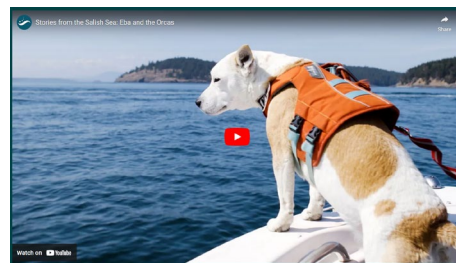
Watch scientists studying orcas

As a class, watch NOAA scientists studying orcas:

<https://videos.fisheries.noaa.gov/search?q=southern%20resident>

Dogs in conservation research

- Read *Superpod* Chapter 12 about Eba, the scat-sniffing dog.
- Watch the 10-minute film [Eba + the Orcas](#) by the Seattle Aquarium featuring Eba, Dr. Giles, and the author of *Superpod*.
- Lead a class discussion. Topics could include 1) how the skills of other animals—not just humans—can be useful in conservation and other work; 2) how using Eba helps Dr. Giles conduct “non-invasive” research on the whales; 3) what pets the students have and whether they think they could train them to do some kind of work together.
- You can also have students research what other conservation work scat-sniffing dogs are doing around the world using the internet and books like *Conservation Canines: How Dogs Work for the Environment* by Isabelle Groc (2021) and *Poop Detectives: Working Dogs in the Field* by Ginger Wadsworth (2016).



Learn the patterns of orca calls

- Have the students [listen to three common Southern Resident orca calls at Orcasound.net](#)—the favorite calls of J pod, K pod, and L pod.
- Ask the students to describe what they hear, and how the calls sound different.
- Have them quiz each other (playing clips while others have their eyes closed) to see if they have learned to distinguish the calls and match them to their pod.

Sustainable seafood

Analyzing and Interpreting Data; Engaging in Argument from Evidence

When people choose to buy and eat sustainably harvested salmon and other seafood, it helps ensure there are enough fish left for orcas and other animals (and people) to eat.

1. Develop a list of 5-10 species of fish that are often commonly eaten by people in the US or in your region.
 - a. You could have students develop this list themselves by visiting or calling (or researching online) a local restaurant that serves fish or a local grocery store that sells fish, and finding out what kind of fish they have on the menu or on the shelves.
 - b. Or, give each group of students 1-3 fish from each column (or write these on pieces of paper and have them draw a few randomly from a hat):

Bluefin tuna Black marlin (caught with drifting longlines) Copper rockfish Atlantic halibut Tilapia (farmed in China) Chinook salmon (wild-caught) Albacore (caught in the Pacific Ocean)	Blue catfish Pacific cod Red lionfish Striped mullet Perch Dover sole English sole White sturgeon Tilapia (farmed in Peru in raceways) Wreckfish
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2. Divide the students into groups to use <https://www.seafoodwatch.org/> to look up the different fish.
 - a. Is that fish sustainably harvested (Best Choice), or rated as Avoid?
 - b. Do the students have all the information they need? For example, sometimes there are different ratings for the same kind of fish, depending on where it was caught or what gear was used by the fishing vessel.
 - c. Have them click on “View details” (bottom right corner) and read about why that kind of fish was given the Best Choice or Avoid rating. Examples:

Dover sole *Microstomus pacificus*

BEST CHOICE
Buy first

Also known as
Hirame, Slime Sole, Slippery Sole, Sole

Fishing gear
Bottom trawls

Other details
IFQ Trawl Fishery

Country or region
United States (California, Oregon, Washington)

Body of water
Eastern Central Pacific Ocean, Northeast Pacific Ocean

[View details](#)

<p>AVOID</p> <p>Find an alternative</p>	<p>Copper rockfish <i>Sebastes caurinus</i></p>	<p>Also known as</p> <p>Rockfish</p>	<p>Fishing gear</p> <p>Set longlines</p>	<p>Other details</p> <p>Outside Rockfish Fishery</p>
	<p>Country or region</p> <p>Canada (British Columbia)</p>	<p>Body of water</p> <p>Northeast Pacific Ocean</p>	<p>View details</p>	

3. Have the students share something they learned with the class.
4. Discuss how choosing sustainable seafood helps with conservation.
5. The students could follow up with the local restaurant or grocery store to:
 - a. Ask for any additional information that they determined was needed to be able to get the rating from Seafood Watch.
 - b. Ask if the restaurant or grocery store has a policy on sourcing only sustainable seafood, and if so, what certification or information they use to evaluate that. If they say no, urge the manager to source only sustainable seafood (marked as “Best Choice” or “Good Alternative” by Seafood Watch). Explain the importance of supporting healthy marine food webs as well as communities that need to rely on fishing for generations to come.

Salmon connections: Read, watch an animation, and play a board game

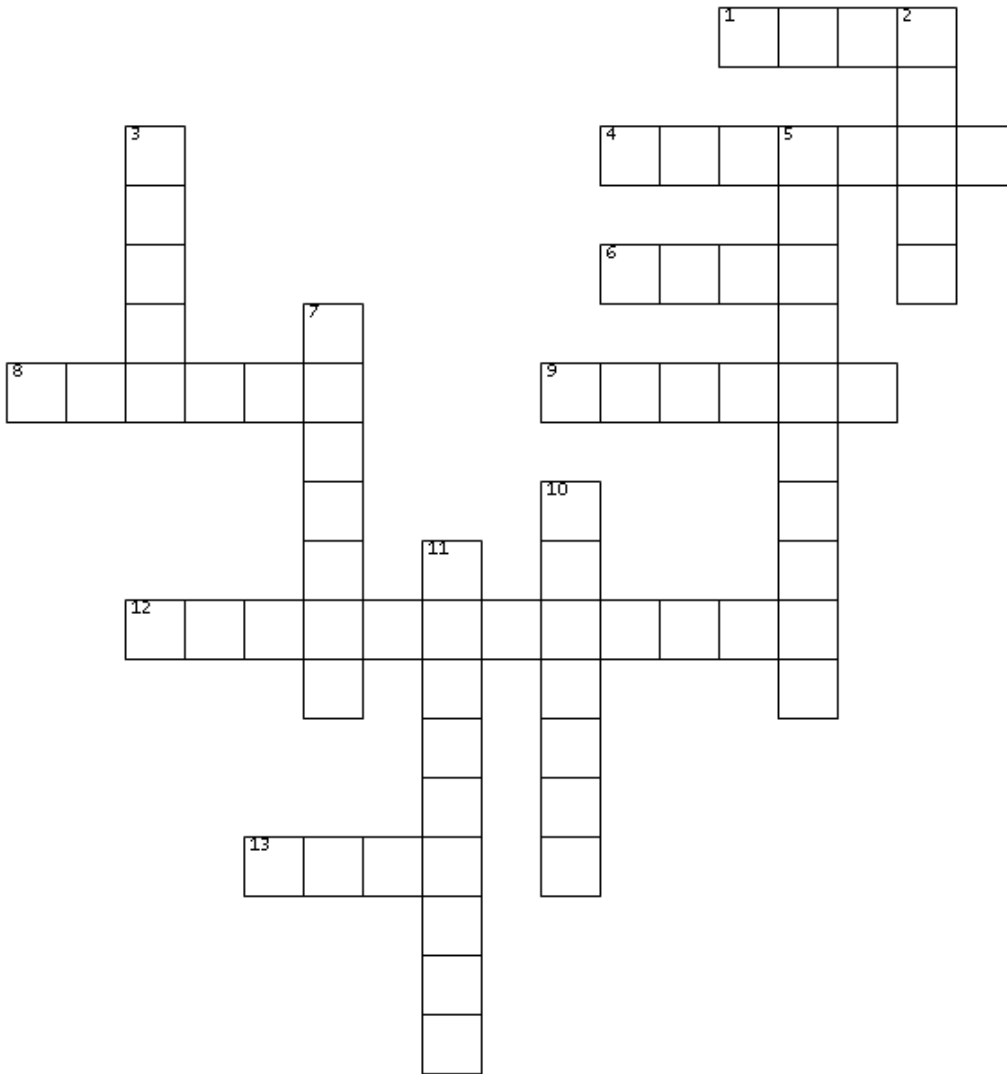
Systems; Cause & Effect

Explore the threats facing salmon, and how salmon are connected not only to orcas, but also the broader ecosystem.

1. Read Chapter 16 in *Superpod* about salmon.
2. Discuss the endangered orcas’ dependence on salmon, and who else depends on salmon (e.g., Coast Salish Tribes, seals, bears, and people who fish for a living).
3. Watch the five-minute NOAA animation: [Life cycle of a Pacific Salmon](#).
4. Then, have students play NOAA’s [Salmon Survival board game](#) ([Spanish version](#)). (A limited supply of board games are available for public schools and nonprofit organizations conducting salmon outreach in the United States; to request a printed copy, email wcr.education@noaa.gov).



Superpod crossword puzzle



ACROSS

1. Another name for animal poop
4. Southern Resident orcas stay with their ____ for their entire lives
6. A salmon nest in a river
8. An orca jump
9. The term for an orca poking its head above the water
12. How the orcas navigate and find food
13. Something the transient (Bigg's) orcas eat, but the Southern Residents don't

DOWN

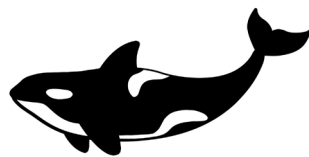
2. The number of Southern Resident orca pods
3. Something scientists use to study orcas from the air
5. An underwater listening device
7. The Southern Resident orcas' favorite kind of salmon
10. The sick orca the vets worked to help
11. Adult male orcas have a tall, straight one on their backs; on female orcas, it's shorter and curvier

Orca quiz!

Students could use *Superpod* or online research to help answer questions, if needed.

<p>1. Orcas are:</p> <ul style="list-style-type: none">A. DolphinsB. WhalesC. Both	<p>8. Different populations of orcas around the world eat different things. Which do they <i>not</i> eat?</p> <ul style="list-style-type: none">A. SharksB. SalmonC. HerringD. Sea lionsE. Other whalesF. Humans
<p>2. The Southern Resident orcas primarily eat salmon. Their favorite kind of salmon (because it's the fattiest and biggest) is:</p> <ul style="list-style-type: none">A. SockeyeB. CohoC. PinkD. ChinookE. Chum	<p>9. What can a scientist learn from whale poop? <u>Circle all that apply.</u></p> <ul style="list-style-type: none">A. What it ateB. Who it is related toC. How stressed out it isD. Whether it's lostE. Whether it's pregnantF. Its birthdayG. Whether it's healthy <p>Hint: see Ch. 12 of <i>Superpod</i></p>
<p>3. Which one of these is <i>not</i> the name of a Southern Resident orca?</p> <ul style="list-style-type: none">A. EchoB. OreoC. TahlequahD. TootsieE. Mike	<p>10. Southern Resident orcas have:</p> <ul style="list-style-type: none">A. GrandmothersB. FriendsC. BabysittersD. All of the above <p>Hint: see Ch. 5 & 13 of <i>Superpod</i></p>
<p>4. Orcas navigate by:</p> <ul style="list-style-type: none">A. SightB. SoundC. SmellD. TasteE. All of the above	<p>11. Salmon live in:</p> <ul style="list-style-type: none">A. FreshwaterB. SaltwaterC. Both

<p>5. For their whole lives, Southern Resident orcas stay with their:</p> <ul style="list-style-type: none"> A. Mothers B. Grandmothers C. Fathers D. A & B E. A & C 	<p>12. People in boats can reduce their impact on orcas and make it easier for them to catch salmon by:</p> <ul style="list-style-type: none"> A. Staying farther away B. Slowing down C. Turning off the motor D. Turning off the echo sounder E. All of the above
<p>6. When an orca pokes its head up above water, probably to get a look around, it's called a:</p> <ul style="list-style-type: none"> A. Spyhop B. Breach C. Cartwheel D. Belly-flop 	<p>13. What do scientists use to study orcas? <u>Circle all that apply.</u></p> <ul style="list-style-type: none"> A. Drones B. Nets C. Scat D. Sound recordings E. Visual observation F. Breath samples G. Tags H. Dogs I. Hawks
<p>7. Southern Resident orcas' range goes at least as far south as:</p> <ul style="list-style-type: none"> A. Washington state B. Oregon C. San Francisco, California D. San Diego, California 	<p>14. When they are ready to spawn, salmon swim:</p> <ul style="list-style-type: none"> A. Upstream B. Downstream <p>Hint: see Ch. 16 of <i>Superpod</i></p>



Answer key for the Orca Quiz: 1C, 2D, 3D, 4B, 5D, 6A, 7C, 8F, 9(all but D & F), 10D, 11C, 12E, 13(all but B & I), 14A

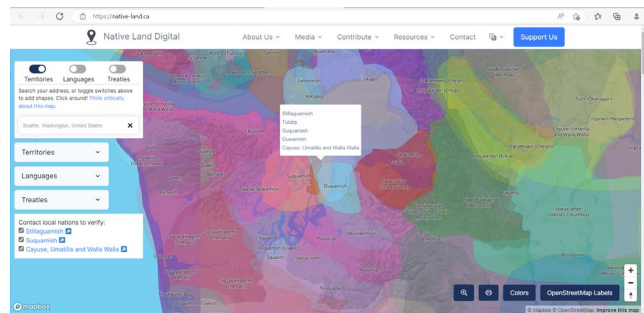
Creative writing

Ask students to each write a short story, poem, picture book, or comic strip that features orcas or salmon (and humans too, if they want). Ask them to incorporate 3-5 facts they found in *Superpod* (e.g., something about orca biology, their family structure, their friendships, or the threats orcas or salmon face).

Explore Indigenous culture, lands, and waters

Learn about the land you live on

With students, check out the Native Land Digital map at <https://native-land.ca/> to learn more about the land you live on, including what Indigenous territories have existed and still do exist. (There is also a [teacher's guide](#) on how to use Native Land, as well as exercises for use by teachers of different levels, from kids to adults. The teacher's guide discusses the pros and cons of the map itself, the importance of learning more about colonialism, and provides resources for teachers to learn more.)



Discuss the Lummi Nation's connection to the orcas

- Have students read Chapter 6 of *Superpod* (or read it aloud) about the orcas that were taken captive for display in marine parks, including Lolita (Sk'aliCh'elh-tenaut) at Miami Seaquarium.
- As a class, watch this two-minute video from the Lummi Nation about how to pronounce Sk'aliCh'elh-tenaut and how they gave her that name: https://www.youtube.com/watch?v=HcZbtwjM_dM.
- Lead a class discussion about what students have learned about the value that the Lummi Nation places on their connection to the orcas and why the Lummi are trying to change things for Sk'aliCh'elh-tenaut.

Read other whale stories

Nora also has stories and articles in children’s magazines about whales and other ocean life, which are available for download, including:

- A fictional story in Cricket magazine (for 9-14 year olds), “[Underwater music](#).” Zara saves a young orca's life from afar by listening to streaming pod calls. Art by Agnes Loonstra.
- An article in Muse magazine (for 9-14 year olds) about how scientists are discovering orca friendships: “[From the air: Drone views of whales deliver some surprises](#).”
- An article in Muse magazine (for 9-14 year olds) about how whales can help combat the climate crisis, and how whales are affected by climate change: “[A whale-sized battle against climate change](#).”



Other good companion books to *Superpod* include:

- *A Whale of the Wild* by Rosanne Parry, illustrated by Lindsay Moore. This middle-grade fiction novel follows a family of Southern Resident orcas.
- *A River’s Gifts: The Mighty Elwha River Reborn*, by Patricia Newman, illustrated by Natasha Donovan (2022). This picture book is for ages 8-12.

Additional curriculum resources

Visit noranickum.com/orca for additional resources, action ideas, updates about the Southern Resident orca population, and the extended bibliography for *Superpod*.


[Grade 4 Life Sciences Unit on the endangered Southern Resident orcas](#) created by the Bainbridge Island School District (NGSS-aligned)

Check out lesson plans from the National Oceanic and Atmospheric Administration (NOAA):

- [Whale lesson plans and activities](#)
- [Saving the Southern Resident killer whales: A project-based learning unit for middle school](#)
- [Salmon: Incredible Journey curriculum for grades 4-5 \(plus 5 min life cycle animation and Salmon Survival board game\)](#)
- [Fin Matching Activity \(noaa.gov\)](#): Participants identify individual killer whales in L Pod by matching their saddle patches and dorsal fins to a matriline guide. Participants will learn to identify individual killer whales by their saddle patches and fin characteristics and how to determine the sex of a killer whale by their size and genital patch.

- NOAA landing page with great resources on Southern Resident orca recovery: <https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/saving-southern-resident-killer-whales>

Seattle Aquarium resources available to download as PDFs and print:

<p>SALMON LIFECYCLE</p>  <p>Spawners As spawners swim upstream their bodies change shape and color. When they reach the spawning ground the female digs a nest called a redd and lays 3000-5000 eggs, then the male fertilizes them. Salmon die after spawning.</p> <p>Egg Eggs in a gravel nest takes about fifty days to hatch in 50°F water.</p> <p>Alevin Alevin hatch from eggs and stay in the gravel nest. They feed off of their yolk sac for about 30 days.</p> <p>Parr Parr leave the nest in search of food. They begin to slowly migrate downstream.</p> <p>Smolt Smolt swim downstream into the estuary where fresh and salt water mix. They stay here until their bodies have adjusted to living in salt water.</p> <p>Adult Salmon spend one to five years in the ocean eating squid, small fish and plankton. When they are ready to breed they return to the stream they were born in.</p> <p>SEATTLE AQUARIUM</p> <p>Salmon life cycle handout/coloring sheet (Seattle Aquarium)</p>	<p>Salmon Life Cycle</p>  <p>Eggs</p> <p>Alevin</p> <p>Parr</p> <p>Smolt</p> <p>Adult</p> <p>Spawner</p> <p>SEATTLE AQUARIUM Inspiring Conservation of Our Marine Environment</p> <p>Salmon life cycle photos/poster (Seattle Aquarium)</p>
<p>SEATTLE AQUARIUM</p> <p>Is it or isn't it salmon?</p> <p>Can you identify which fish are salmon? Put a check mark in the box of the photos below that you think are salmon.</p>  <p>ANSWERS: 1) Chinook salmon, 2) Silver perch, 3) Steelhead, 4) Chinook salmon, 5) King salmon, 6) Coho salmon, 7) Rainbow trout, 8) Steelhead salmon, 9) Coho salmon.</p> <p>Fish quiz (is it or isn't it a salmon?) (Seattle Aquarium)</p>	<p>SEATTLE AQUARIUM</p> <p>Is it a baleen or a toothed whale?</p> <p>Baleen whales use their baleen plates to filter food from the water. Toothed whales use their teeth to catch fish, squid or other marine life. Can you tell the difference? Mark the boxes next to the photos with a "B" (for baleen whale) or a "T" (for toothed whale), then check your answers below.</p> <p>(Hint: Toothed whales are smaller and often travel in pods)</p>  <p>ANSWERS: 1) Beluga whale—toothed, 2) Blue whale—baleen, 3) Gray whale—baleen, 4) Minke whale—baleen, 5) Sperm whale—toothed, 6) Orca—toothed, 7) Harbor porpoise—toothed, 8) Humpback whale—baleen, 9) North Atlantic right whale—baleen.</p> <p>Whale quiz (baleen or toothed whale?) (Seattle Aquarium)</p>