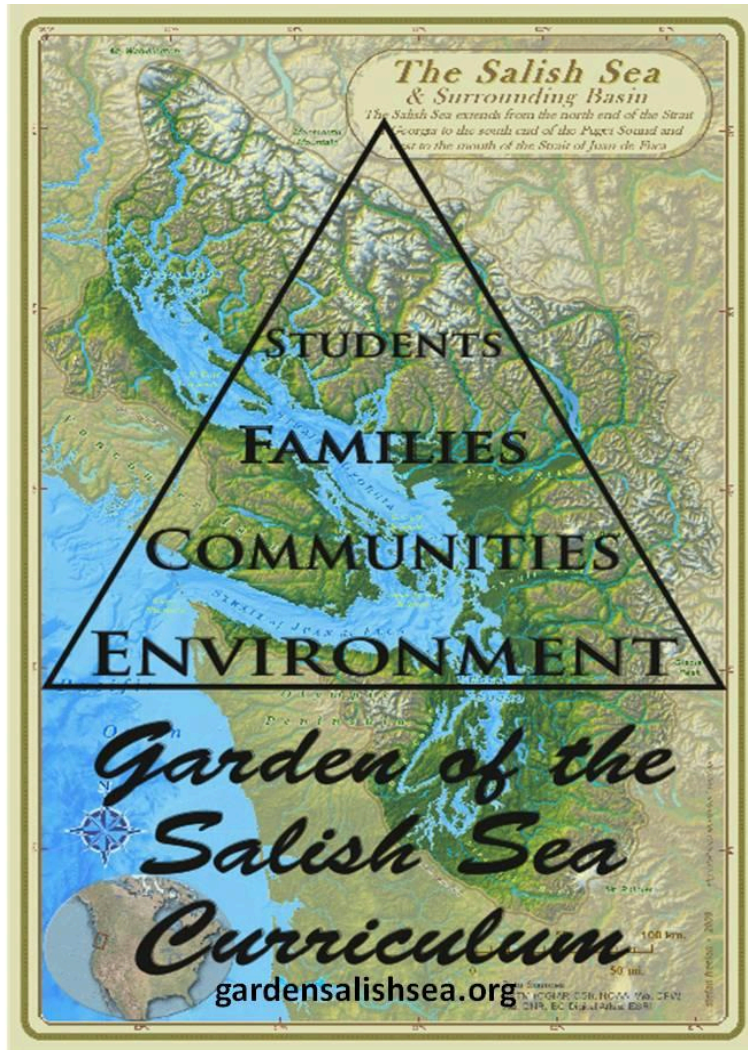


# My Garden of the Salish Sea Science Notebook



Name \_\_\_\_\_

Teacher \_\_\_\_\_

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# Garden of the Salish Sea Curriculum

**Our Goal:** Motivate students, families and communities in practicing stewardship of local watersheds by understanding shellfish, coastal ecosystems and human impacts. Inspire students to study and pursue science careers.

**Our Mission:** Support a healthy Salish Sea that can nourish us, through hands-on (K-12) education and community outreach.

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## Vocabulary

- **Aquaculture** – The human production of aquatic organisms throughout part or all their lifecycle. Examples include oyster farms, fisheries, and hatcheries.
- **Bivalve** – A mollusk with two parts of a shell attached by a hinge; Oysters, clams and mussels are examples.
- **Calcium Carbonate** – An inorganic salt that shellfish use to build their shells.
- **Carbon Footprint** – The total amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions.
- **Climate** – The average weather conditions for a particular location over a long period of time.
- **Conservation** – A movement focused on protecting species from extinction, maintaining and restoring habitats, enhancing ecosystem services, and protecting biological diversity.
- **Crustacean** – An arthropod of the large, mainly aquatic group Crustacea, such as a crab, lobster, shrimp, or barnacle.
- **Ecosystem** – A biological community of interacting organisms and their physical environment.
- **Estuary** – The tidal mouth of a large river, where the tide meets the stream.
- **Filter Feeder** – A type of animal that gets its nutrients from sorting out tiny plants and animals (including disease causing bacteria and viruses) from water as it breathes. An oyster can filter up to 50 gallons of water each day!
- **Foot** – A muscular organ found in all molluscs that they use to move around.
- **Gills** – Organs that allow fish and other aquatic animals to breathe underwater.
- **Greenhouse Effect** – The ability of an atmosphere to absorb radiation because of greenhouse gases.
- **Greenhouse Gas** – A gaseous molecule that can absorb radiation.
- **Habitat** – The natural home or environment of an animal, plant, or other organism.
- **Intertidal Zone** – The area along the shore of the oceans that is exposed during low tides and covered during high tides. Intertidal means between the tides. The intertidal zone is an important habitat for many animals including shellfish and juvenile salmon.
- **Invertebrate** – An animal without a backbone.
- **Larva** – A distinct juvenile form many animals undergo before metamorphosis into their next life stage.
- **Mollusk** - Soft bodied invertebrates that often make a shell and appeared on earth 500 million years ago.
- **Nutrient** – Substances required by organisms to grow and reproduce.
- **Organism** – An individual animal, plant, or single-celled life form.

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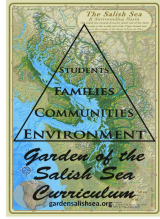
- **Photosynthesis** – The process of turning sunlight, carbon dioxide, and water into energy and oxygen.
- **Phytoplankton** – Microscopic drifting microalgae that obtain their energy from sunlight by photosynthesis
- **Plankton** – Greek for wanderer; they are microscopic plants, animals or bacteria that are carried with the current. They provide a crucial source of food to larger organisms.
- **Salish Sea** – Body of water that extends into both Washington State and British Columbia.
- **Shellfish** – Mollusks like clams and oysters and crustaceans like shrimp and lobsters that have shells.
- **Species** – A class of living things of the same kind.
- **Steward** – Someone who looks after something other than themselves.
- **Substrate** – The surface upon which an organism (juvenile oyster) attaches itself.
- **Transnational** – Extending across national boundaries.
- **Vertebrate** – An animal with a backbone or spinal column.
- **Zooplankton** – Tiny free-floating animals.

## **Cool Facts about the Salish Sea & Shellfish**

- The Salish Sea is named after the Coast Salish peoples who have lived along its shores for over 10,000 years. It includes the Strait of Juan De Fuca, the Puget Sound, the San Juan Islands, the Gulf Islands, the Strait of Georgia, and Hood Canal.
- Over 7 million people live within the watershed of the Salish Sea.
- Most oysters can make pearls with the same material that their shells are made of.
- There are 30,000 species of bivalves and more than 8,000 species of them are oysters.
- Shellfish have growth rings that record the seasons, like trees do.
- Olympia oysters, once abundant in the Salish Sea, are now scarce and efforts are now being made to bring them back.

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# Lesson 1

## Second Grade



### Salish Sea Steward Challenge

Cross off the actions you already take to be a Salish Sea Steward! As you take other actions, cross them off too. Try to cross off as many boxes as you can! Whenever you take these actions over the next two weeks, record them on the next page. After two weeks, put your actions into this form:

<https://forms.gle/AoeZKKQ91kWGUsd6>

<p>Scoop it, Bag it, Trash it! Carry bags to clean up your dog's poop when on walks.</p> 	<p>Learn about your system! Ask an adult if you are on septic or sewer.</p> 	<p>Plant native trees, vegetation or cover crops.</p> 	<p>Buy local products to support our farmers and reduce transportation.</p> 	<p>Turn off lights, appliances, and computers when not in use.</p> 
<p>Recycle! When you use plastic items make sure to clean and properly recycle them.</p> 	<p>Ride a bike instead of driving.</p> 	<p>Put high energy using items like water heaters on timers.</p> 	<p>Clean up! Pick up trash near a local stream or beach.</p> 	<p>Reuse! Get creative and find ways to give your items a second life.</p> 
<p>Properly dispose of toxic materials instead of putting them down the drain, in the trash, or on the ground.</p> 	<p>Reduce your plastics by finding a plastic free or reusable alternative to a single use item.</p> 	<p><b>FREE</b></p>	<p>Keep wildlife wild by not providing easy access to food or shelter that can cause populations to grow too large.</p> 	<p>Don't Strain Your Drain! Spread out laundry and dishwasher loads to avoid overloading the system.</p> 
<p>Take public transportation instead of driving.</p> 	<p>Go to a car wash instead of washing your car in the driveway so soap doesn't go down the storm drains.</p> 	<p>Conserve water! Turn off the tap while brushing your teeth or take shorter showers.</p> 	<p>Buy something used instead of new to lower your carbon footprint.</p> 	<p>Clean up after your pets: scoop the poop, bag it, and trash it.</p> 
<p>Carpool instead of driving by yourself!</p> 	<p>Low carbon diet: emphasize nutrient-dense, plant-based foods!</p> 	<p>Bring a reusable water bottle instead of single use plastic.</p> 	<p>Walk instead of driving.</p> 	<p>Compost food waste.</p> 

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## Lesson 2 Second Grade

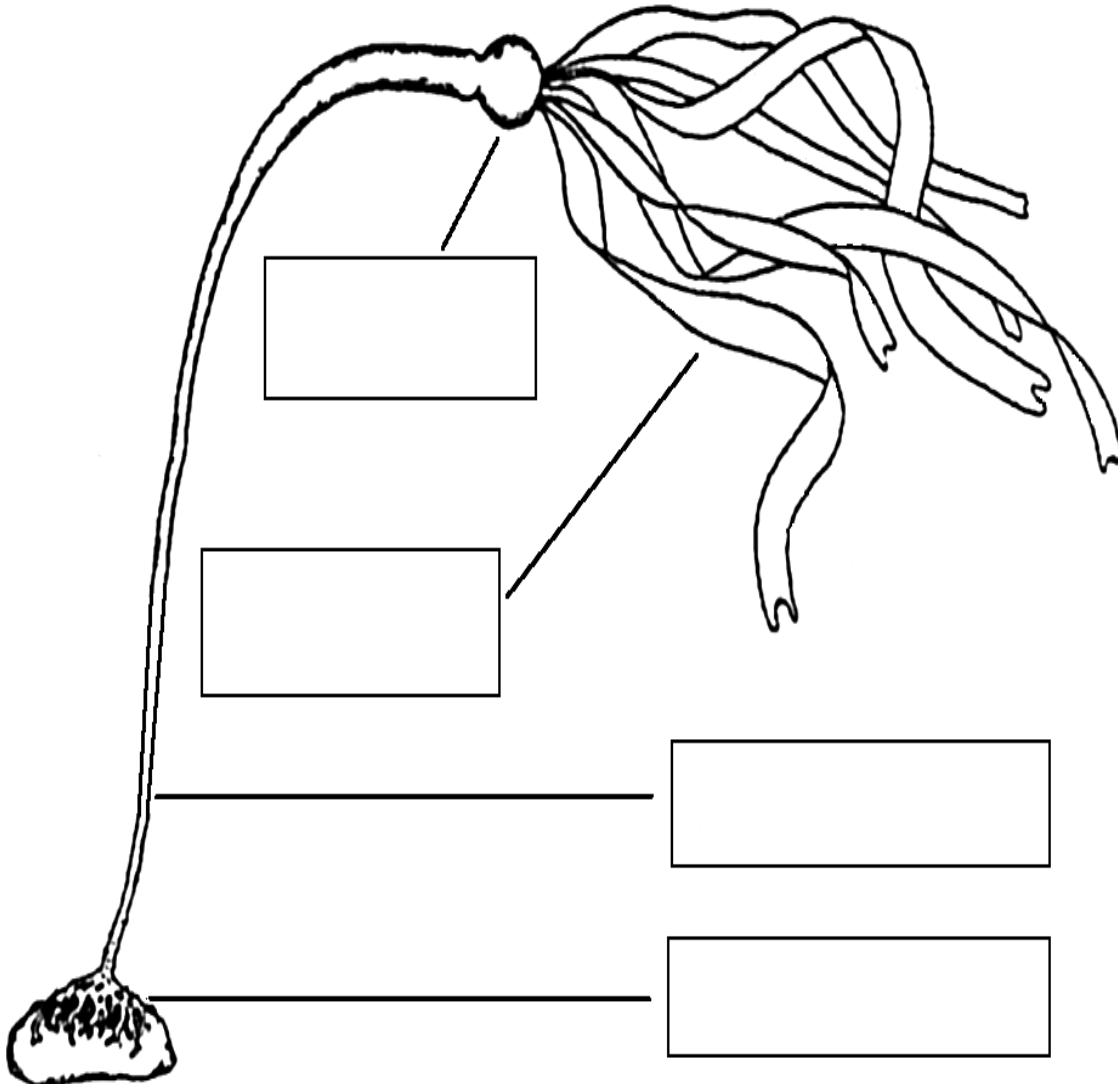


### Kelp

1. Kelp is an \_\_\_\_\_.

Algae or animal

2. Use these words to label your picture: **blades**, **float**, **stipe**, **holdfast**. Then color in the picture!



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3. How do kelp affect their environment? Circle the true statements.

Kelp provides habitat for other creatures.

Kelp provides oxygen.

Kelp makes the water salty.

4. Where do kelp live in the ocean? Circle one.

On the bottom.

In the water.

At the surface.

5. Draw a picture of a kelp farmer!



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## Activity 1 Second Grade



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### Kelp Forest Collage

#### Activity:

- 1) Draw ocean water on their construction paper with a defined ocean bottom and surface layer.
- 2) Cut out kelp from green tissue paper.
  - a) Cut out a long strip of paper about 2 inches wide, folding it hot dog style, and cut “blades” into it, leaving about some connected along one side. Cut the long strip about as tall as the length from the ocean bottom to the ocean surface of the drawing. Make enough kelp pieces to cover the ocean but don’t attach them to the drawing yet.
- 3) Either draw or cut out kelp forest creatures from construction paper/tissue paper.
  - a) Creatures: Sea otters, sea urchins, crabs, fish, anemones, sea stars
- 4) Glue the kelp forest down to the drawing, so that the bottom of the kelp (the holdfast) is on the ocean floor, and the top (the float) reaches the ocean surface.
- 5) Glue the sea creatures in and on top of the kelp forest where you think they live!

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## Lesson 3 Second Grade



# Eelgrass

1. Circle the correct word and write it on the line below.

Eelgrass is a \_\_\_\_\_.

Plant    Animal

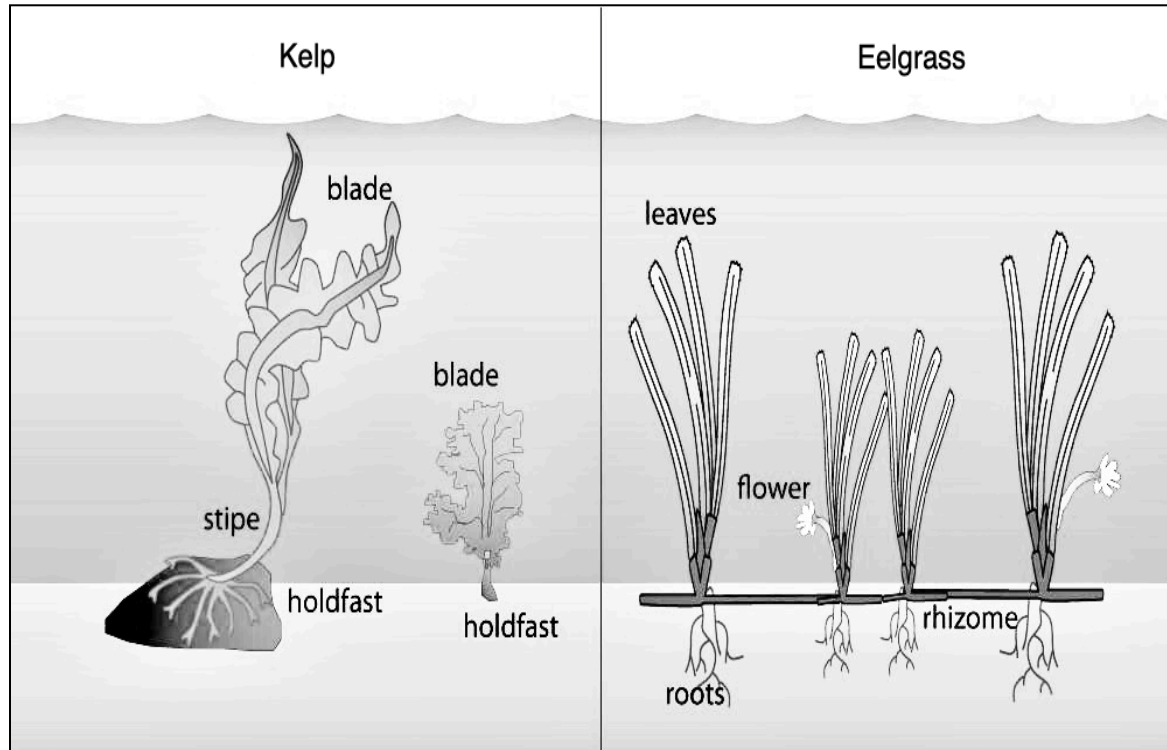
Eelgrasses have \_\_\_\_\_ that absorb sunlight.

Blades    Leaves

Just like your grass at home, eelgrass has \_\_\_\_\_.

Holdfasts    Roots

2. Color in your eelgrass.



*Image from the Integration and Application Network (ian.umces.edu), University of Maryland Center for Environmental Science*

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3. How do eelgrass affect their environment? Circle the true statements.

Eelgrass meadows provide a safe place for fish to lay their eggs.

Eelgrass meadows are home to only a few different animals.

Eelgrass meadows provide food for many species.

4. What makes the eelgrass a plant?

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## Lesson 4 Second Grade



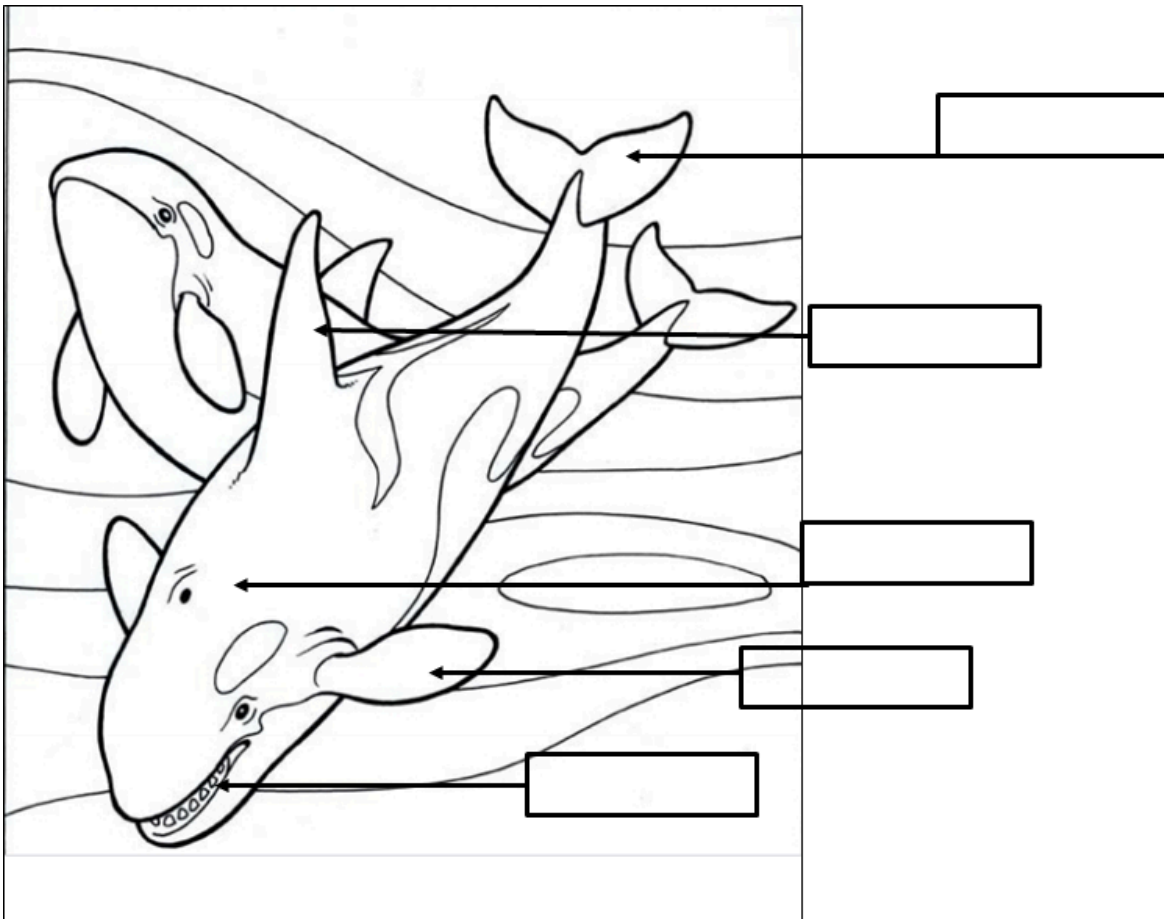
# Whales

Circle the correct word and write it on the line and color in the whales

1. Orcas, also known as killer whales, are closely related to dolphins. Orcas have teeth and are carnivores, which means they eat \_\_\_\_\_.

Plants      Animals

2. Use these words to label your picture and color the orcas below: **blowhole, fluke, dorsal fin and flipper.**



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3. What do you think whales use their blowholes for?

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4. Where do whales live? Circle all true statements.

In the waters of the Pacific Northwest.

In the Atlantic Ocean.

In the Arctic Ocean.

In the Indian Ocean.

5. Have you seen any whales in the Salish Sea? Tell us about your experience! If you haven't, tell us what kinds of whales you would like to see.

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## Lesson 5 Second Grade



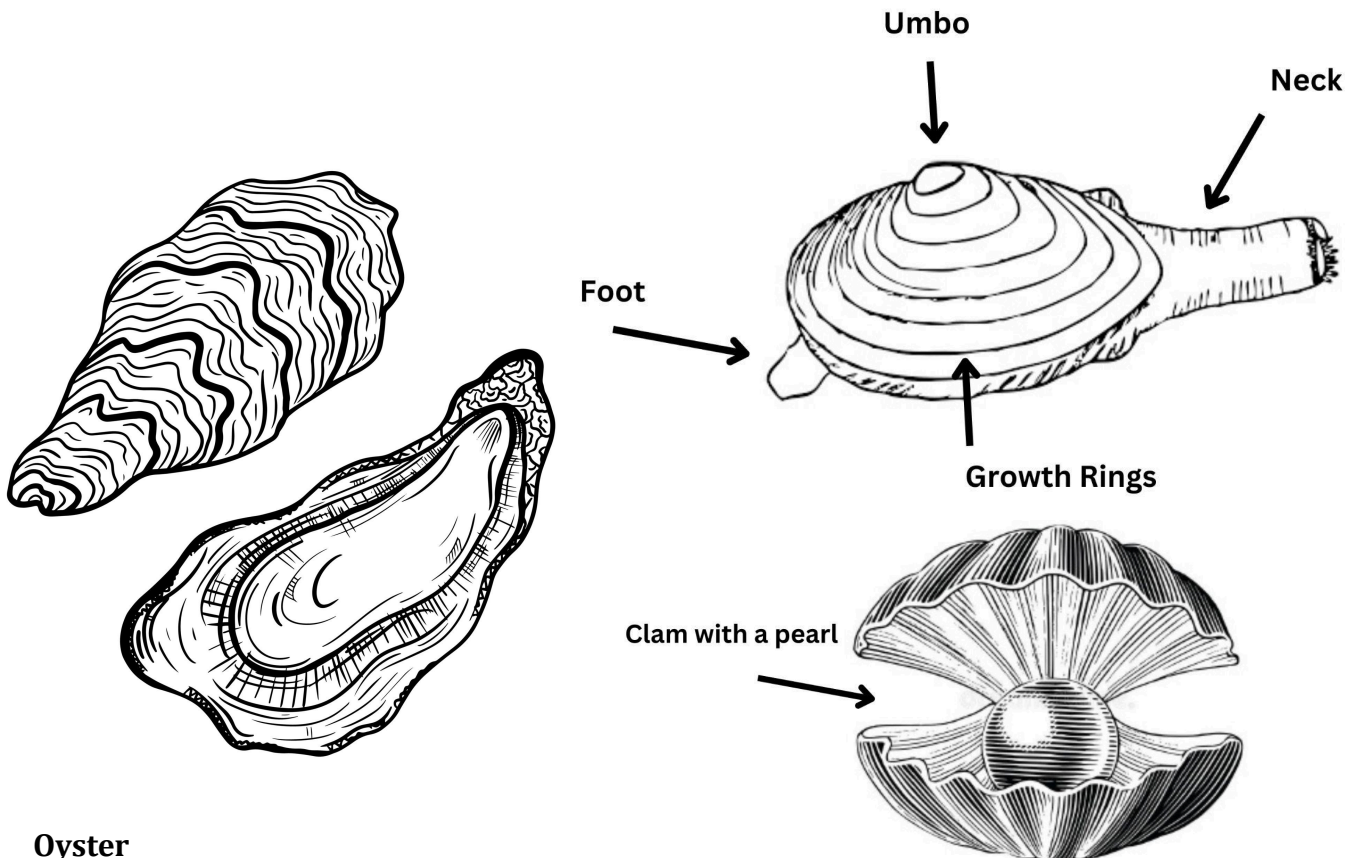
# Bivalves

1. Circle the correct word and write it on the line.

Bivalves are \_\_\_\_\_.

Plants    Animals

2. Clams and oysters are **bivalves** because they have **two** shells. Oysters attach themselves to rocks or to other oyster shells. Clams like to live **in** the sand. They use their foot to burrow and crawl in the sand. **Color the clams and oysters below.**



### Oyster

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3. True or false? Bivalves can tell us about how the watershed is doing. If the clams and oysters are unhealthy, there must be a problem in the health of the watershed. Circle the right answer.

4. Ponder: How do you think oysters and clams make pearls?

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5. Ponder: What is one thing you can do to help make the environment healthier for bivalves?

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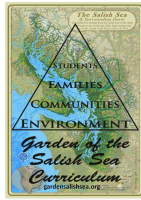
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## Lesson 6 Second Grade



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# Barnacles

Circle the correct word and write it on the line, then color in the barnacles.

Barnacles are \_\_\_\_\_.

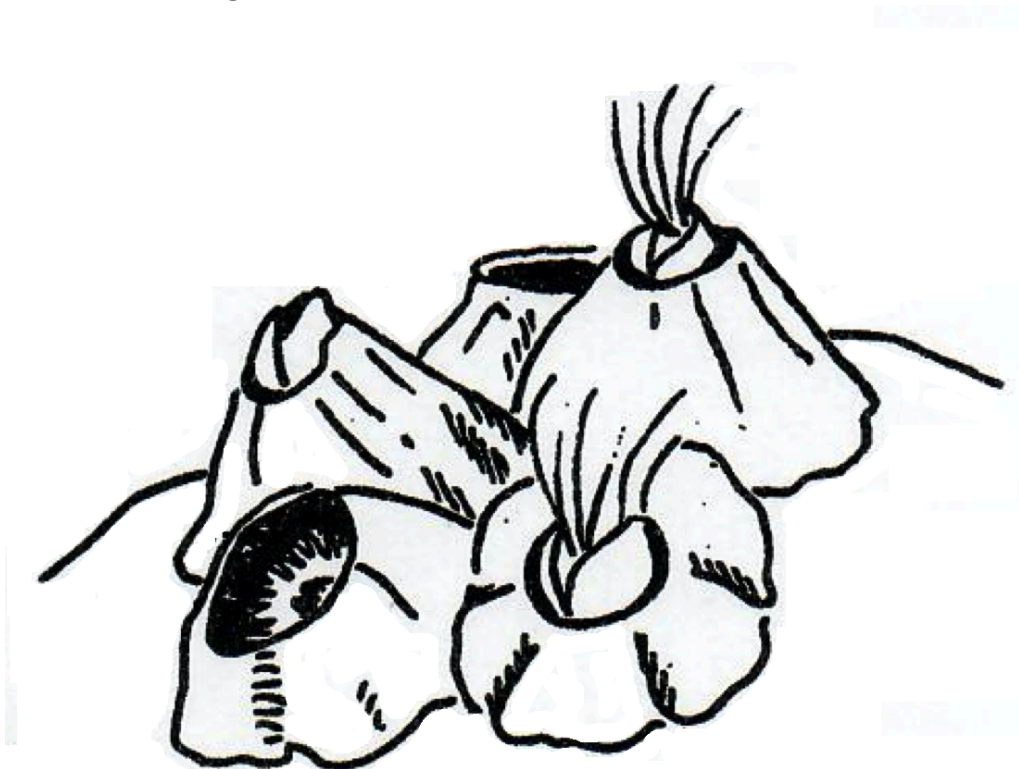
Plants   Animals

Barnacles have \_\_\_\_\_ to hold onto rocks, where they live.

Glue   Arms

Barnacles eat by using their \_\_\_\_\_ to grab food.

Legs   Hands



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## Activity 2 Second Grade



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### Oyster Observation

Observe the oysters in the live tank. Though they may not be moving much, what 2 things are they doing?

1) \_\_\_\_\_

2) \_\_\_\_\_

**Adaptation:** How might the oysters react if all the water was taken out of the tank? Think about how they might act in the intertidal zone when the tide is low.

\_\_\_\_\_

**Experiment:** An adult is going to put some food coloring in the tank's water. What do you think is going to happen? \_\_\_\_\_

Watch the oysters and the water in the tank for a couple of minutes. What happened?

\_\_\_\_\_

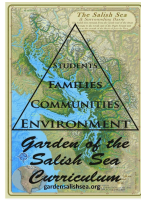
An adult is going to put very hot water into the tank. What do you think is going to happen? \_\_\_\_\_

Watch the oysters for a couple of minutes. What happened?

\_\_\_\_\_

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## Lesson 7 Second Grade



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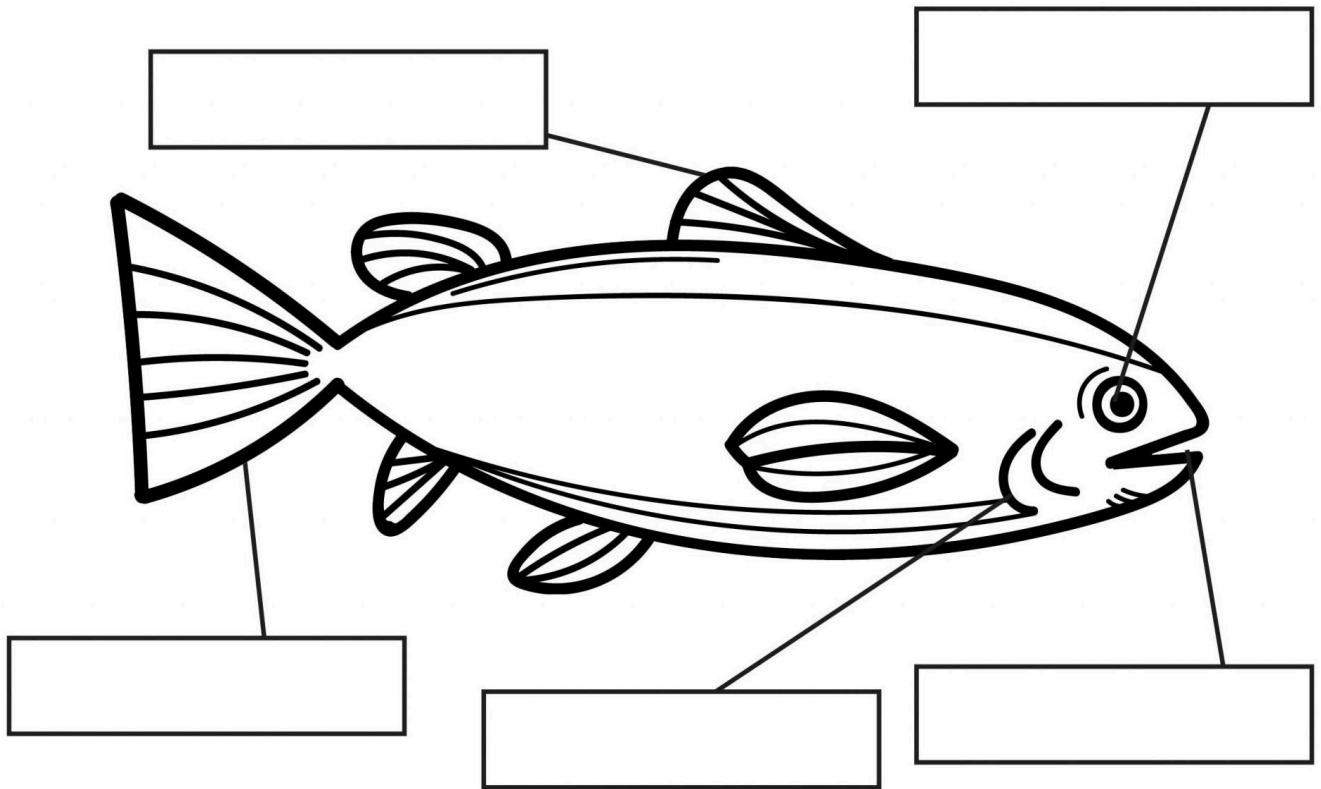
# Salmon

1. Circle the correct word and write it on the line.

Salmon are \_\_\_\_\_.

Plants    Animals

2. Use these words to label your picture and color the salmon below: **eyes, mouth, gills, dorsal fin, and tail fin.** Color in the salmon.



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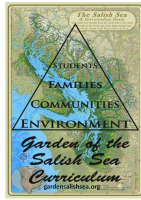
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3. True or false? Salmon not only feed humans and animals like bears and orcas, they also feed trees which use the nutrients to grow! Circle the right answer.
  
4. Salmon are very important to the ecosystem and the economy of the Pacific Northwest. What kinds of jobs deal directly with salmon? Circle them!

Fishermen      Lawyer      Grocer      Tour Guide      Teacher      Policeman

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## Lesson 8 Second Grade



# Snails

1. Circle the correct word, write it on the line and color in the moon snail.

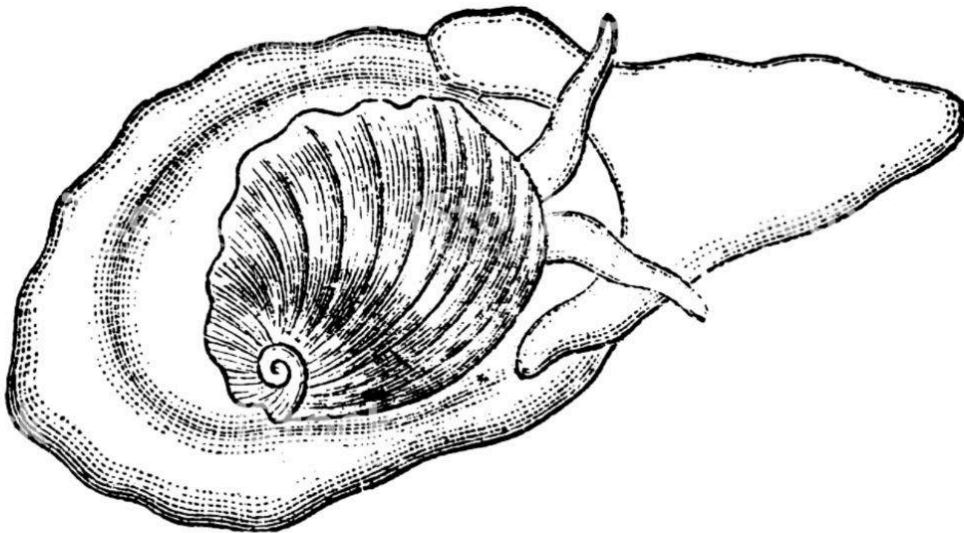
Snails are \_\_\_\_\_.

Plants   Animals

2. Snails have \_\_\_\_\_ that protect them. When the snail outgrows it, they find a new one.

Houses   Shells

3. True or False: The snail's foot (or *mantle*) surrounds almost half of the shell, and can expand to four times the size of the shell. Circle the right answer.



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## Activity 3 Second Grade



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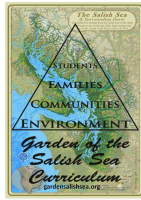
### Match That Habitat!

**Match the animal to the habitat it lives in!**

Use the activity cards to match the animal that you see and the habitat that it lives in. More than one animal card can match one habitat card. If you are unsure about what habitat an animal lives in, use your thinking cap and guess as best as you can!

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## Field Investigations Second Grade



### **What is Biodiversity?**

Biodiversity refers to the different life in the world or in a specific habitat.

### **Why is it important for habitats to have high biodiversity?**

Usually when a habitat has high biodiversity, it means that that habitat is healthy.

### **How do we find out what the level of biodiversity is on our beach?**

We use a quadrat (a square grid), and a transect (a kind of measuring tape) to collect data on the beach. In each quadrat we will count how many squares each species appears in. Once we have the data, we can use a mathematical formula to tell us how biodiverse an area is.

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### Quadrat 1

Organism	How many boxes do they appear in? (?/25 boxes)
Green Kelp or Seaweed	
Purple/Red Kelp or Seaweed	
Other	
Eelgrass ( <i>Zostera marina</i> )	
Japanese Eelgrass ( <i>Zostera japonica</i> )	
Barnacle ( <i>Balanus spp.</i> <i>glandula</i> )	
Blue Mussel ( <i>Mytilus spp.</i> )	
Mossy Chiton ( <i>Mopalia muscosa</i> )	
Periwinkle ( <i>Littorina spp.</i> )	
Dog Whelk ( <i>Nucella spp.</i> )	
Limpet ( <i>Lottia spp.</i> )	
Shore crab ( <i>Hemigrapsus spp.</i> )	
Hermit crab ( <i>Pagurus spp.</i> )	
Anemone	
Ochre Star ( <i>Pisaster ochraceus</i> )	
Leather Star ( <i>Dermaterias imbricata</i> )	

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### Quadrat 2

Organism	How many boxes do they appear in? (?/25 boxes)
Green Kelp or Seaweed	
Purple/Red Kelp or Seaweed	
Other	
Eelgrass ( <i>Zostera marina</i> )	
Japanese Eelgrass ( <i>Zostera japonica</i> )	
Barnacle ( <i>Balanus spp.</i> <i>glandula</i> )	
Blue Mussel ( <i>Mytilus spp.</i> )	
Mossy Chiton ( <i>Mopalia muscosa</i> )	
Periwinkle ( <i>Littorina spp.</i> )	
Dog Whelk ( <i>Nucella spp.</i> )	
Limpet ( <i>Lottia spp.</i> )	
Shore crab ( <i>Hemigrapsus spp.</i> )	
Hermit crab ( <i>Pagurus spp.</i> )	
Anemone	
Ochre Star ( <i>Pisaster ochraceus</i> )	
Leather Star ( <i>Dermaterias imbricata</i> )	

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### Quadrat 3

Organism	How many boxes do they appear in? (?/25 boxes)
Green Kelp or Seaweed	
Purple/Red Kelp or Seaweed	
Other	
Eelgrass ( <i>Zostera marina</i> )	
Japanese Eelgrass ( <i>Zostera japonica</i> )	
Barnacle ( <i>Balanus spp.</i> <i>glandula</i> )	
Blue Mussel ( <i>Mytilus spp.</i> )	
Mossy Chiton ( <i>Mopalia muscosa</i> )	
Periwinkle ( <i>Littorina spp.</i> )	
Dog Whelk ( <i>Nucella spp.</i> )	
Limpet ( <i>Lottia spp.</i> )	
Shore crab ( <i>Hemigrapsus spp.</i> )	
Hermit crab ( <i>Pagurus spp.</i> )	
Anemone	
Ochre Star ( <i>Pisaster ochraceus</i> )	
Leather Star ( <i>Dermaterias imbricata</i> )	

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**Quadrat 4**

<b>Organism</b>	<b>How many boxes do they appear in? (?/25 boxes)</b>
Green Kelp or Seaweed	
Purple/Red Kelp or Seaweed	
Other	
Eelgrass ( <i>Zostera marina</i> )	
Japanese Eelgrass ( <i>Zostera japonica</i> )	
Barnacle ( <i>Balanus spp.</i> <i>glandula</i> )	
Blue Mussel ( <i>Mytilus spp.</i> )	
Mossy Chiton ( <i>Mopalia muscosa</i> )	
Periwinkle ( <i>Littorina spp.</i> )	
Dog Whelk ( <i>Nucella spp.</i> )	
Limpet ( <i>Lottia spp.</i> )	
Shore crab ( <i>Hemigrapsus spp.</i> )	
Hermit crab ( <i>Pagurus spp.</i> )	
Anemone	
Ochre Star ( <i>Pisaster ochraceus</i> )	
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## Sharing and Reflection

### Second Grade



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Write down one thing you've done in the last month that makes you a Salish Sea Steward and draw a picture to share with your classmates. Use another piece of paper if you need more space.

**I am a Salish Sea Steward because....**

*We acknowledge and respect the treaty rights of the Coast Salish Peoples to the unceded lands and waters of the Salish Sea and we recognize their stewardship since time immemorial.*

[Gardensalishsea.org](http://Gardensalishsea.org) 2nd Grade