

Activity 2: Clam Identification

Primary Activity Standard: K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Essential Questions:

- 1) What are some examples of living things, or *organisms*, that can be found in the Salish Sea?
- 2) Inquiry:
 - a) What do you notice?
 - b) What do you wonder?
- 3) What is a bivalve?
- 4) How can bivalve species be identified?
- 5) What are the identifiable characteristics between bivalve species?
- 6) What is a clam garden?

Career Explorer Questions:

- 1) How do indigenous people in Washington work with bivalves?
- 2) How are bivalves farmed in Blaine, and who farms them?

Learning Objectives:

Students will be able to:

- 1) Explain what a bivalve is.
- 2) Recognize patterns in order to identify bivalve species.
- 3) Understand what a clam garden is and why it is relevant to local indigenous peoples.
- 4) Recognize how bivalves are farmed in Blaine.

Key Concept: Bivalves are a type of mollusk. They are called “bivalves” because they have two valves

(shells) that surround their soft, vulnerable bodies to form the exoskeleton. Bivalves include species like clams, oysters, mussels, and scallops. Bivalves are filter feeders. They feed by sucking water in through an incurrent siphon, filtering the water with their gills, and sorting food from waste with their labial palps. Waste is disposed of through the excurrent siphon. Many bivalves dig into sediment using their foot. This protects them from predators and wave action, and some species of bivalves feed by filtering sediment rather than water. Other kinds of bivalves (like mussels and oysters) attach themselves to substrate using naturally-produced glue. While oysters secrete a natural cement, mussels have byssal threads, glue-like strings, that attach them to substrate. Indigenous people of Whatcom County and the larger Salish Sea have created clam gardens since time immemorial to cultivate and harvest large quantities of bivalves, an important part of their

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.

Garden of the Salish Sea Curriculum, © 2023 all rights reserved.

diet. Likewise, oyster reefs have been harvested by indigenous people of the Salish Sea. Historically, they have taken advantage of these natural conglomerations of oysters to feed their people. Oyster reefs are also advantageous because they protect coastlines from erosion, like a coral reef does.

Vocabulary: Bivalve, intertidal zone, clam gardens, neck, hinge, umbo, foot, ring, ridge, rib

Assessment: Worksheet in GSSC Student Notebook.

Lesson Instructions: *All parts of this lesson can be found in this document.*

Please read the page and click on the links as you go.

Teacher Prep/Considerations: Set up computer and projector. Review the Power Point to be sure background information is adequately understood to explain to students. Have the slideshow chart from Lesson 5 ready to review and add to if necessary.

Materials (provided by GSSC):

- Bivalve ID kits (one per table group)
 - Each kit contains at least 3 of each species (Horse Clam, Eastern Softshell, Cockle, Manila, Native Littleneck, Butter Clam, Macoma, Oyster, Mussel) with laminated species labels
-

Slideshow:  2024 Bivalve ID.pptx

Slide 1: Introduction

Shellfish are like the cool characters in our food web, and one special group is called bivalves. We'll have a fun activity today to learn about them! Bivalves are a kind of shellfish that have two shells, like a little treasure chest. These shells can open and close because they have a special hinge. Oysters can form pearls when a grain of sand get stuck within the two shells causing irritation until it is coated in a substance called nacre and becomes a pearl. There are four friends in the bivalve group: clams, oysters, mussels, and scallops. They're like the cool squad with matching shells!



Slide 2:

Bivalves have their homes in the intertidal zone, kind of like a beach hangout. They do something really cool – they clean the water by filtering it to find their yummy food!



*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.
Garden of the Salish Sea Curriculum, © 2023 all rights reserved.*

This is super important for our Salish Sea because sometimes people accidentally put yucky pollution in the water. But our bivalve friends help by cleaning it up, making the water nice and clean for all the sea creatures!

Slide 3:

Sometimes, lots of different clams like to hang out together! People, like the Swinomish, who have been living here for a super long time, figured out a clever way to make these clam hangouts even better.

They made something awesome called clam gardens! It's like making a special space for clams to grow big and strong. They would build walls with rocks on the beach, and behind these walls, they let the clams grow in the shallow water. When the clams were all grown up, they'd gather them and have a yummy feast! It's like having your own secret garden but with tasty clams!



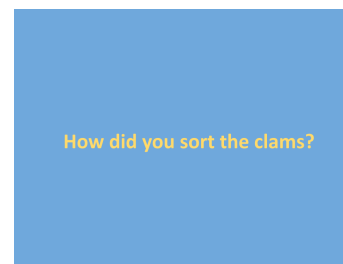
Slide 4:

At your table you have a mix of bivalves that might be found at many beaches in Whatcom County. For the next 10 minutes I would like you to work together in a group to sort the clams into different types. You can sort them however you want.



Slide 5:

Ask students to nominate a group representative to explain to the class the different ways they sorted the clams.



Slide 6: Clam Anatomy

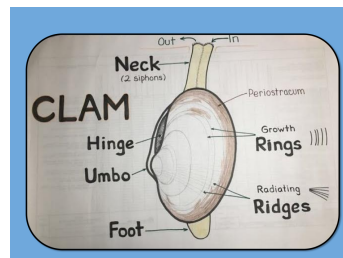
These are some different features of clam anatomy. Explain to students that different features can help them sort the clams into their respective species.

The neck is used to take in and expel water to filter out food particles.

The umbo is the point of connection between the two valves.

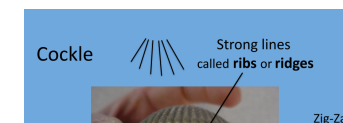
The foot helps the bivalve move.

The rings on a shell are horizontal, while the ridges (or ribs) are vertical.



Slide 7: Cockle Clam

Meet the cool cockle clam! Cockles are special because they have little ridges, like tiny bumps, that go from the middle to the outside of their shell.



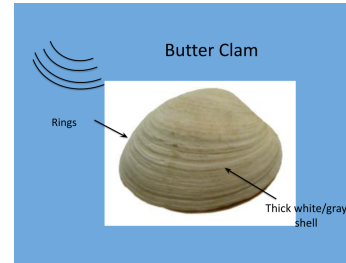
We acknowledge and respect the treaty rights of the Coast Salish Peoples to the unceded lands and waters of the Salish Sea and we recognize their stewardship since time immemorial.

Garden of the Salish Sea Curriculum, © 2023 all rights reserved.

And guess what? Their shells close together like a zipper when they want to keep things snug inside!

Slide 8: Butter Clam

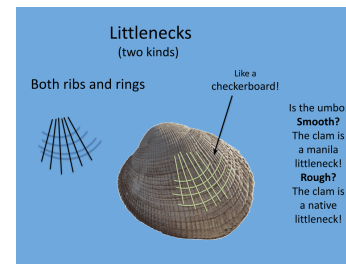
Say hello to the butter clam! These guys are famous because they taste a bit like butter – yummy! If you take a look at their shells, you'll see they have rings, like little circles, but no ribs. They are very common around our part of the Salish Sea.



Slide 9: Littleneck Clam

In our Salish Sea, we have two special kinds of littleneck clams: the native littleneck and the manila littleneck, which comes all the way from the Philippines, like a little traveler!

You can tell them apart because littlenecks have ribs and ridges on their shells that cross each other, making a cool checkerboard pattern. It's like they have their own sea puzzle on their shells!



Slide 10: Varnish Clam

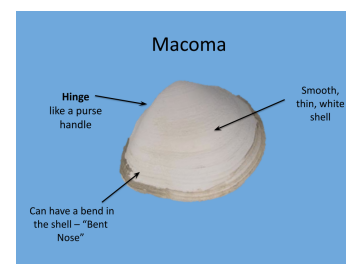
Meet the varnish clam! Inside their shell, you'll find a beautiful purple color, and the outside has a brown, papery coating that's a bit like crinkly paper. It's like they're wearing a fancy, colorful jacket!



Slide 11: Macoma Clam

Say hi to the macoma clam! If you find one, you'll notice their shell is super thin and feels gentle, like a delicate treasure.

Now, to spot them, check for their special "bent-nose" – it's like a little curve on the edges of their shell. The right half is all round, and the left half is pointy like a triangle.



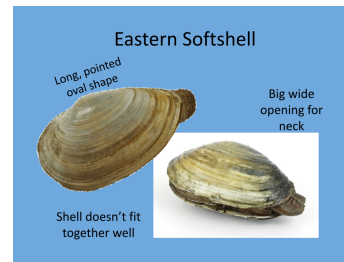
Slide 12: Horse Clam

Meet the horse clam – they're like the big buddies of the sea! You can easily find them because they're pretty large. Look for a space between their shells where their neck comes out, and they have a special hinge that you can't see. It's like they have their own secret door to say hello!



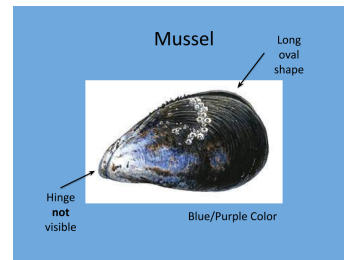
Slide 13: Eastern Softshell Clam

Here comes the Eastern softshell clam, all the way from the East side of the US! They might look a bit like macoma clams, but here's the trick: Eastern softshells are more oval-shaped, and they have a special opening in their shells that can make a cute smile shape. It's like they're the happy clams from the East!



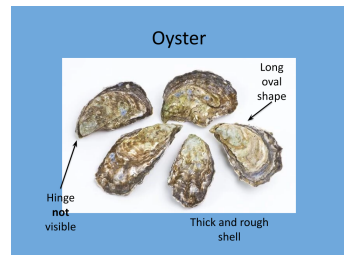
Slide 14: Blue Mussel

Meet the awesome mussels! You can spot them easily because they have the coolest colors ever. In the Salish Sea, their shells can be a mix of blue, white, and purple – it's like they're wearing a rainbow! And here's a little secret: they're long and oval-shaped, with a special hinge that you can't see. Mussels are like the fashion stars of the sea!



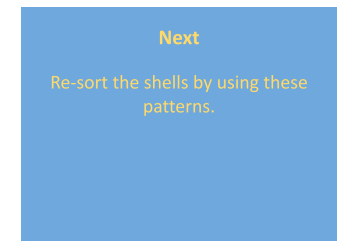
Slide 15: Oyster

Hello, oysters! You probably know these sea buddies because they're pretty common in the Salish Sea. The most popular one is the Pacific Oyster. Check out their white or gray shells – they might feel a bit bumpy. Just like mussels, oysters are long and oval-shaped, and their special hinges are a bit like invisible magic. Here's a fun fact: their two shells are like a matching pair of puzzle pieces. One shell is smaller and flat, while the other one is larger and kinda cup-shaped. It's like they're best friends holding hands!



Slide 16:

Now re-sort the shells according to what you learned about the bivalves just now, and use your guide to separate the bivalves into their different types.



Slide 18:

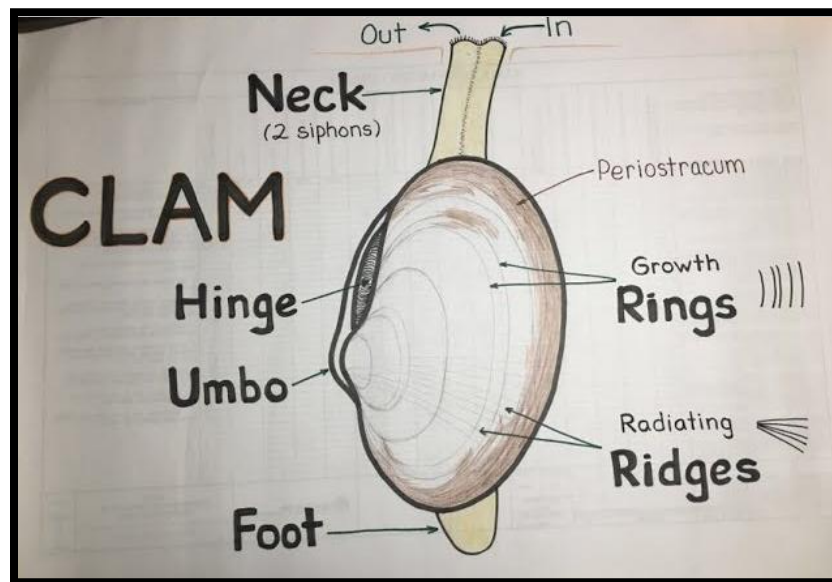
Once you have re-sorted your shells and think they are all correct, raise your hands and I will come check if you are correct. Once your work is checked, you will fill out the worksheet by drawing two shells.

Description:	Drawing of Shell
Color: _____	
Shape: _____	
Markings: _____	
Bigger than 1.5 inches? Yes No	
Type of Clam: _____	

Worksheet: Bivalve Identification Activity

Procedure

1. Sort the shells however you want! Do not use the bivalve identification key yet.
2. Learn about the different kinds of bivalves.
3. Re-sort the shells using the information you just learned.
4. Pick two shells to identify, measure, and draw using the worksheet.



Bivalve Identification Key (Teacher's Version)

Adapted from King County Beach Assessment program

Anatomy Terms

- Umbo
- Hinge
- Siphon
- Periostracum

Things to Note:

Shape: Round vs Oval/Elliptical vs Triangular

Patterns: Concentric Rings vs Radiating Ridges

Color



We acknowledge and respect the treaty rights of the Coast Salish Peoples to the uncultivated and we recognize their stewardship since time immemorial.
Garden of the Salish Sea Curriculum, © 2023 all rights reserved.

Can you see a leathery hinge connecting the shells? (Beside the Umbo, the leathery hinge is visible outside of the live clam or closed clam shell.)

If no, go on to “A”

If yes, skip to “B”

A. No leathery hinge visible:



1. Outlines of both shells are mirror images of each other, flaps are present on the tips of siphons. It is a **Horse Clam**.

[two horse clam species: “Horseneck” (*Tresus nuttallii*) or “Fat Gaper” (*Tresus capax*). They

are often *misnamed* “geoduck” when large, but these are *not* geoducks!]



2. Shells are not mirror images, one shell overlaps onto the other at the top; no flaps are present on the tips of siphons. The shell has an elliptical shape. It is an **Eastern Softshell Clam**.

Both Eastern softshell and horse clams often have a brown-black papery skin (periostracum), on the outer (newer) edge of the shell, wearing off over time. When small, the shells may seem thin and fragile, when large (as large as an adult’s hand!), the shells can get thick and robust.



3. Shells are not mirror images, and the shell is a dark blue or purple color all over. The shell has an elongated oval shape. It is a **Blue Mussel**.



4. Shells are not mirror images, and the shell is rough and irregularly shaped. It can be thick, rough, and sometimes sharp. The inside is white or off-white and has purple streaks. The shell has an elongated oval shape. It is a **Pacific Oyster**.



B. Yes, leathery hinge visible on outside of shell (next page)

B. Yes, leathery hinge visible on outside of shell



1. Shell is half circular, half like a triangle, pointed on one end. Often has brown or black skin-like periostracum, which may flake off older parts of the shell.
 - a. Has a more blunt point. Reddish-brown periostracum may cover the whole shell or is flaking off, or the shell may look purplish-white. It is a **Varnish Clam** (or “purple varnish clam”, “savory clam”)
 - b. Triangular edges are often more pointed, sometimes the tip is curved up. Grayish Periostracum may be worn off or with just a little around the edge. It is a **Macoma** (includes many species: “bent-nose”, “pointed”/”polluted”, sand, and Baltic Macomas)



2. Shell is **mostly circular or oval, and rather thick and strong**. Rings or ribs are easily seen on the shells. No periostracum present.

- a. Shell has **heavy ribs**, and the shell is heart-shaped when viewed from one end. It is a **Cockle**. (aka “heart-cockle”)
- b. **Rings and ribs** are equally visible. Shells may have patterns of color



(1) Shell is elongated, oddly oval. There is a smooth, flattish groove where shells meet near the umbo (non-hinged side of umbo). It is a **Manila Littleneck Clam**.

(2) Shell is rounded, there is no pit near the umbo – more of a ridge that continues all the way to umbo. It is a **Native Littleneck Clam**.



3. Thick oval shell, rounded on both ends, has faint rings. Plain chalky white or stained gray from mud. Live clams have a noticeably strong leathery hinge. It is a **Butter Clam**.



Classroom Clam Shell Sort

Sort out the shells given to your group. Divide them up by common characteristics. In the space below, for each clam, record the attributes, and write a brief description with a diagram of the clam. Be sure to label any identifying features.

Description:	Drawing of Shell
Color: _____ Shape: _____ Type of Clam: _____ _____	
Color: _____ Shape: _____ Type of Clam: _____ _____	

Career Connections: The Drayton Harbor Oyster Company was started by the Blaine community to make the water better in Drayton Harbor, and to sell oysters. Drayton Harbor Oyster Company hires people in many areas.

 [Drayton Harbor Community Oyster Farm Profiled On KVOS](#)

(Optional) Art Project: Paint or color your pet oyster shells with markers. Give them a name! Materials needed for this lesson include markers or paint, and shells dropped off by GSSC or [this](#) printable oyster coloring sheet.

Optional Extensions:

- [Explore the Salish Sea: A Nature Guide for Kids](#) by Joe Gaydos (provided by GSSC upon request)
- Want more worksheets and coloring pages? You can print and work through this [seashore packet](#).
- How do oysters make pearls? Watch this [SciShow Kids video](#) to find out!
- [Restoring Native Shellfish: The Kenneth K. Chew Shellfish Hatchery - YouTube](#)
- [Drayton Harbor Oysters Field Trip - YouTube - DHOC](#)
- [Manila feeding 2 sm.mpg - YouTube](#)
- [The Oyster Is Our Friend - Folk Song - YouTube](#)
- [Lummi Island Oyster Garden1 - YouTube](#)
- [The Gossiping Clams](#), a Coast Salish oral story retold.
- [Sea Creature Yoga Video](#) - follow along with the yoga poses inspired by some of our favorite sea creatures, including eelgrass! Think about how their body parts help them live.