

Lesson 3: Gardens of the Land and Sea

Primary Lesson Standard: ESE Standard 1: Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

Essential Questions:

- 1) Inquiry:
 - a) What do you notice?
 - b) What do you wonder?
- 2) How can organisms found in the intertidal zone be sources of food and products that are used by humans.
- 3) How can resources from the intertidal zone add to our nutrition?
- 4) How have indigenous communities used intertidal zone resources in their diet in the past and today?
- 5) How do intertidal zone resources support the economy of the Salish Sea?

Career Connections:

- 1) How do indigenous people cultivate and preserve intertidal zone resources?

Learning Objectives:

Student will be able to:

- 1) Identify edible plants and creatures of the intertidal zone.
- 2) Explain how different foods from the intertidal zone contribute to human nutrition.
- 3) Understand how the economy of Whatcom County relies on the aquaculture of nearshore species.
- 4) Recognize how their actions impact intertidal species positively and negatively.

Key Concept: A variety of nutritious foods are grown in the intertidal zone and eaten by people around the world. Thus, foods found in the intertidal zone are important for our economy. Historically, foods from the intertidal zone have been essential for the indigenous peoples of the Salish Sea. Some nations, like the Swinomish people, cultivated clam gardens to domesticate the growing and harvesting of clams.

Vocabulary: Agriculture, aquaculture, intertidal zone, high tide, low tide, tide, clams, anemones, crabs, sea stars, sea vegetables, shellfish, harmful algal bloom, clam garden

Assessment: Worksheet in the GSSC student notebook.

Activity Instructions: *All parts of this activity can be found in this document.*

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 3 ready to review and add to if necessary.

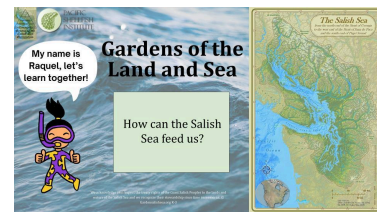
Watch:  Sustainable Shellfish Aquaculture in Washington

Slideshow:  Lesson 3: Gardens of the Land and Sea

Slide 1: How can the Salish Sea feed us?

In our last lesson, we learned that tiny phytoplankton are like the starting point of the underwater food web. And guess what? We humans are at the top of that web because we have figured out how to hunt well and grow our own food!

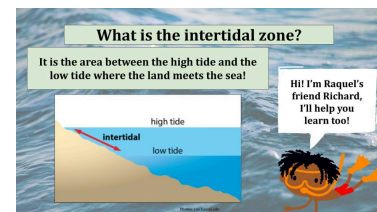
Now, just like how we have gardens on land, we can also have gardens in the sea! It's like underwater farming, and we call it aquaculture. In the water, we can grow cool things like seaweed, fish, and shellfish. Today, we'll chat about what amazing things we can grow right along the shore!



Slide 2: What is the intertidal zone?

What is a tide?

A tide is like the sea giving a big stretch – it goes up and down! Do you know why? It's because the moon is like a friend playing a game with the water. When the moon is close to our side, the water goes up, and we call it high tide. But when the moon goes to the other side, the water takes a little break, and it's low tide. So, the sea is always playing a fun game with the moon! The Coast Salish Peoples have a saying "when the tide is out, the table is set".



Slide 3: Who Lives There?

The intertidal zone is a cool environment for lots of awesome creatures! What makes them special is that they can handle being out of the water sometimes, unlike many other sea friends.

If you take a walk along the shores of the Salish Sea, you might meet some fantastic pals like clams, snails, anemones, crabs, and sea stars. They're like the VIP guests of the beach party!

Have you seen any other interesting creatures in the intertidal zone?



Slide 4: What Else Lives There?

Guess what? The intertidal isn't just for sea creatures – there are sea plants too! Even though many sea plants grow under the water, some like to take a little swim ashore. There are different types of sea "plants."



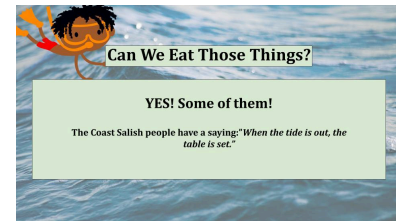
*We acknowledge and respect the treaty rights of the Coast Salish Peoples to the unceded lands and waters of the Salish Sea and we recognize their stewardship since time immemorial.
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One of them is eelgrass, and it's kind of like the plants we see on land. But then, there's something extra special called algae. It's not like the plants on land, but that's what makes it cool because it can be all sorts of shapes! So, any seaweed or kelp you see is a type of this awesome algae!

Slide 5: Can We Eat Those Things?

You might be surprised to find that you can eat a lot of the living things that can be found in the intertidal zone. While it may sound gross at first, you might have already eaten them without realizing it. Algae are used to give things a smooth texture like toothpaste and soft serve iced cream. But, don't eat anything you find in the wild without asking an adult about it first!

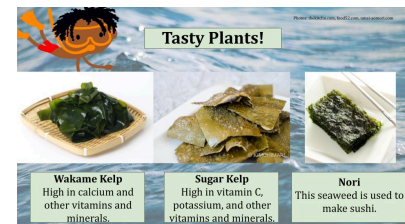
What is your favorite kind of seafood?



Slide 6: Tasty Plants!

Yum, yum! Did you know seaweed and kelp can be yummy snacks? There are lots of tasty sea plants, also known as sea vegetables, in the Salish Sea.

For a tasty treat, you can have wakame kelp and sugar kelp in salads or just munch on them. And there's this special Japanese seaweed called nori – it's so good on its own, but most times, we use it to make delicious sushi!



Slide 7: Tasty Shellfish!

There's another tasty kind of food that comes from the sea – it's from the cool creatures that live there! Maybe you've tried fish or maybe you've had shrimp or lobster – those are called shellfish! Shellfish are sea friends that wear shells.

There are lots of shellfish buddies like crabs, clams, oysters, mussels, and scallops. On our shores, we really like clams, scallops, and oysters.

Did you know that Washington state makes a lot of yummy oysters?

They're super healthy and give us good stuff like omega-3 fats! So, sea friends aren't just cool, they're tasty and good for us too!



Slide 8: Ocean Farmers

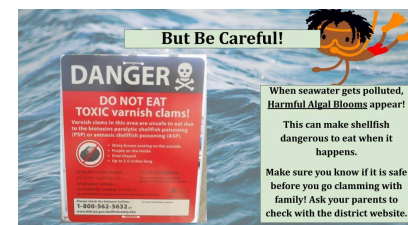
Here are some ocean farmers in action! On the left, you can see a seaweed farmer harvesting seaweed in Bali, Indonesia. On the right, you can see people sprinkling baby clams, "planting" them in a way, on the coast of Maine.



Slide 8: But Be Careful!

Did you know our shellfish friends, like clams, oysters, mussels, and scallops, can sometimes be a bit tricky to eat? This happens when there's something called a harmful algal bloom in the ocean nearby. It's like when too much plant food gets into the water, and the plants grow really fast.

Some of these plants can make yucky things to protect themselves, and if our shellfish buddies eat them, it makes them not good to eat. But



don't worry! If you get your shellfish from good fishers or the grocery store, or if you see a special sign at the beach (maybe a red one!), you'll be just fine if you want to go clamming with your family!

Slide 9: Other Uses!

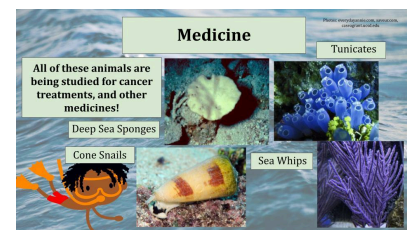
Guess what? The awesome things we get from aquaculture aren't just for eating! They can be used to make lots of cool stuff that we use every day, and sometimes we don't even know it.

Did you know that seaweed is like a secret helper in our toothpaste? Yep! It's also in some yummy plant jellies, jams, puddings, and ice cream. Seaweed is even in some medicines and fertilizers! And here's something super cool: people are using a special seaweed, called Sargassum, to build homes! It's like building with pieces from the sea! (Play the video; approximately 8 minutes long)



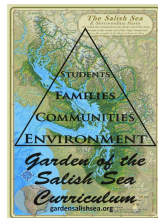
Slide 10: Medicine

Almost every medicine that we have has come from the Earth! For example, aspirin was first found in the bark of willow trees. Scientists are now looking under the water for new types of medicine. Cancer treatments are being studied in tunicates, aka sea squirts, and deep-sea sponges belonging to the group Discodermia, among others. The octocoral, aka sea whip, *Pseudopterogorgia elisabethae* is being studied for wound healing medicine. The cone snail *Conus magnus* could potentially be a source for a powerful painkiller.



Indigenous/Career Connections: Watch this video to learn about the way that today's native people are bringing back an ancient type of aquaculture. Students learn from Marco Hatch, an environmental science professor at Western Washington University. [Clam Gardens in the Pacific Northwest](#)

Worksheet:



son 3
Grade



PACIFIC
SHELLFISH
INSTITUTE

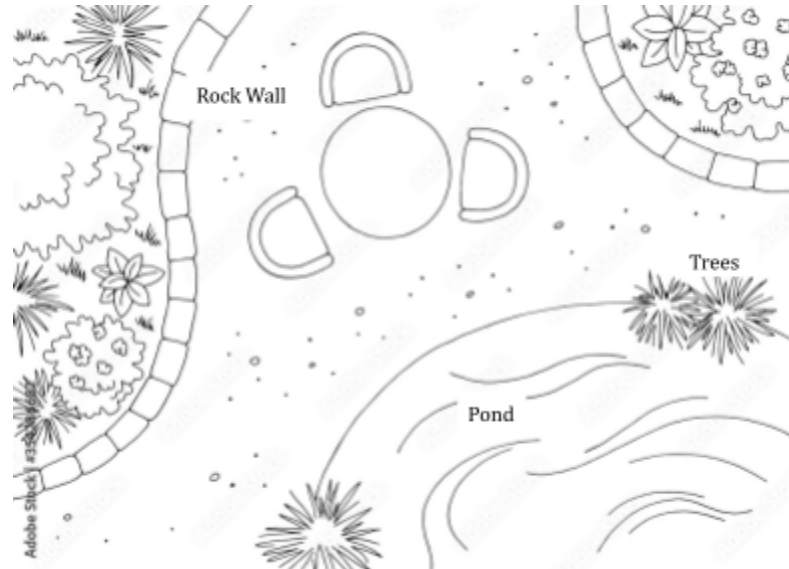
Gardens of the Land and Sea

Compare a clam garden to a home garden.

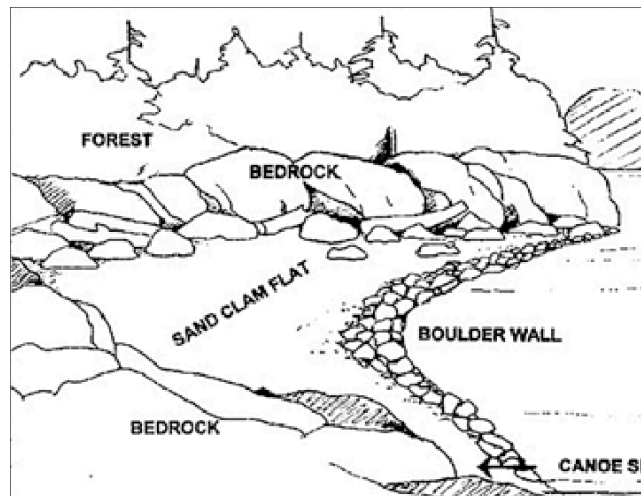
Make a circle around things that are different.

Make a triangle around things that are similar.

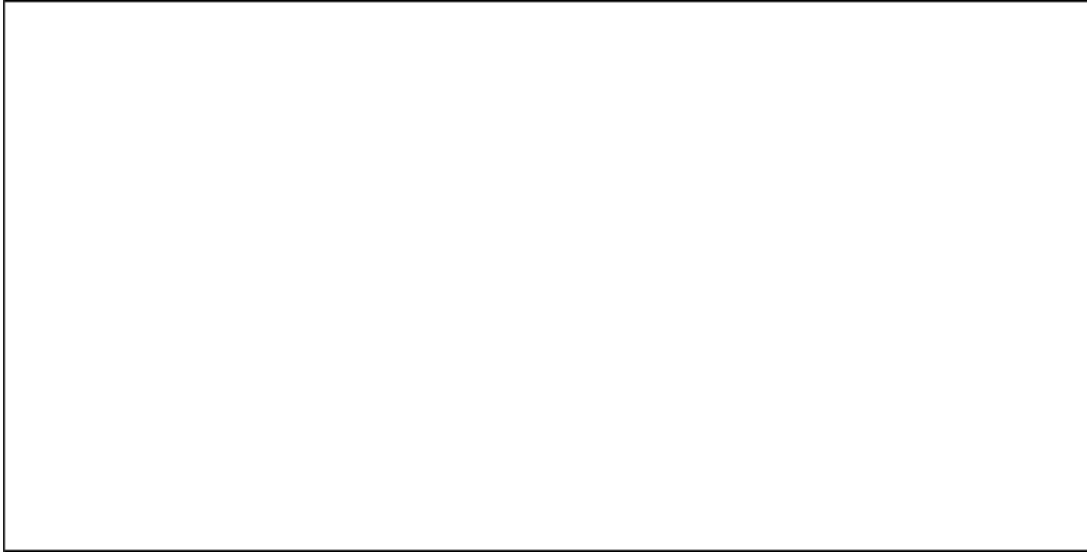
Home Garden



Clam Garden



Draw your own clam garden! Make sure to add clams and other marine animals in the drawing.



Optional Extensions:

- [☰ 1st Grade STEAM Activities](#)
- [Explore the Salish Sea: A Nature Guide for Kids](#) by Joe Gaydos (provided by GSSC upon request)
- [Garden of the Land and Sea Worksheets](#) additional materials
- Want to look at how kelp interacts with other sea creatures in the food chain? [Watch this video](#).
- Want more worksheets and coloring pages? You can print and work through this [seashore packet](#).
- [Sea Creature Yoga Video](#) - follow along with the yoga poses inspired by some of our favorite sea creatures, including kelp!