

Lesson 5: Groups in the Intertidal

Lesson Standards:

- 1) 3-LS2-1. Construct an argument that some animals form groups that help members survive.
- 2) 3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Essential Questions:

- 1) What kinds of intertidal animals form groups? Why?
- 2) How can groups be useful for some animals and harmful for others?
- 3) How can the intertidal be a difficult place to live?
- 4) Why do some animals live in the intertidal? Who can and cannot live there?

Career Connections:

- 1) What is a beach naturalist?

Stewardship:

- 1) How are beach naturalists stewards of the intertidal zone?

Learning Objectives:

Students will be able to:

- 1) Understand the concept of biomes.
- 2) Name examples of intertidal organisms that live in groups.
- 3) Explain why some intertidal organisms live in groups and others do not.
- 4) Recognize the challenges of the intertidal habitat, and why it is not ideal for some organisms.
- 5) Understand how beach naturalists educate about and protect the intertidal zone.

Key Concept: Socially, animals are usually solitary or social. Solitary animals can survive well on their own, and do not rely on others to survive. Social animals need to live in a group population for their own or their young's survival. Large predators are often solitary animals, while smaller prey animals are commonly social. Solitary animals can often be seen grouped together, but they are still classified as solitary because they do not rely on these other individuals. In the intertidal, predators like sea stars, anemones, jellyfish, snails, sea slugs, shrimp, and crabs are solitary. Though they are not predatory, bivalves, chitons, limpets, and sea cucumbers are usually solitary creatures. Intertidal animals that live in groups include barnacles, sea urchins, sand dollars, different kinds of seaweed, and eelgrass. Organisms that live in the intertidal must be adaptable to a changing environment

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with harsh conditions. Often, they have to have the ability to resist desiccation and predation, and compete for space. Any marine organism that cannot do all three is unsuitable for the intertidal habitat. Intertidal zones that are easily accessible by the public are prone to harm via human interaction. Many parks and cities will have either hired or volunteer beach naturalists to educate the public about the habitat and how best to conserve it.

Vocabulary: Biome, spray zone, high tide zone, middle tide zone, low tide zone, desiccation, social, solitary, beach naturalist


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.

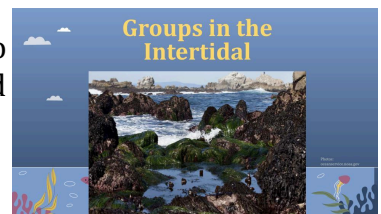
Teacher Prep/Considerations: Set up computer and projector. Review the Power Point to be sure background information is adequately understood to explain to students. Have the slideshow chart from Lesson 5 ready to review and add to if necessary.

Watch: [Intertidal Wilderness-Episode 2: Spring in the Intertidal Zone](#)

Slideshow:  Lesson 5: Groups in the Intertidal

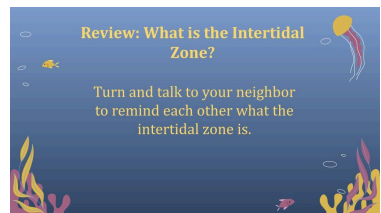
Slide 1: Groups in the Intertidal

We have already learned what the intertidal zone is, but now we are going to dive deeper and learn more about it! We will also be learning about how and why aquatic animals either live in groups or live alone.



Slide 2: Review: What is the intertidal zone?

What is the intertidal zone? Allow students 5-10 minutes to turn and talk with each other about what the intertidal zone is.

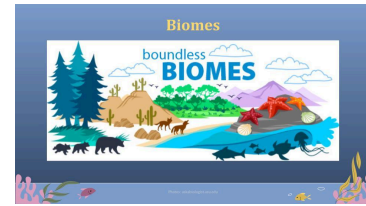


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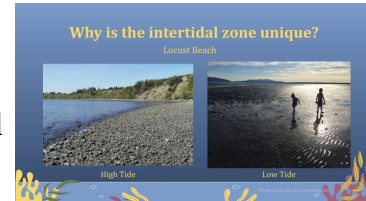
Slide 3: Biomes

The intertidal zone is an example of a biome. A biome is a distinct biological community that has formed in response to a shared physical climate. The intertidal zone is a biome because the organisms found there are often not found in any other marine habitat, and it is a unique physical climate because it is sometimes covered in water, and sometimes exposed to the air. **What are other biomes that you can think of?** Examples include: rainforest, desert, forest, savannah, arctic, mountains, etc.



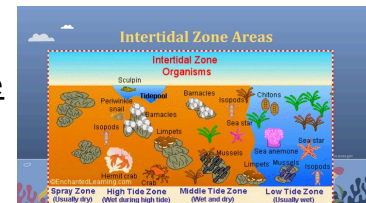
Slide 4: Why is the intertidal zone unique?

The intertidal zone is very unique because it is covered in water sometimes, and open to the air sometimes. This all depends on the tide! The tide is controlled by the moon. When the moon is far away, the tide will go out and expose the intertidal zone. When the moon is close, the tide will come in and cover the intertidal zone. **Can you see the difference between Locust Beach at high tide and at low tide?** Because of the constant change, the animals that live in the intertidal zone need to be hardy and resistant to harsh conditions. They constantly have to deal with the pounding of waves, the hot sun, and all the other animals that live there too.



Slide 5: Intertidal Zone Areas

The intertidal zone is broken up into four main areas: the spray zone, which is the highest point in the intertidal and is only covered at the highest high tide. The high tide zone is only covered when there is a high tide. The middle tide zone is covered during an average tide. The low tide zone is usually wet, and it's only dry during the lowest low tide. Each zone has its own set of creatures that you can find there.



Slide 6: Intertidal Challenges

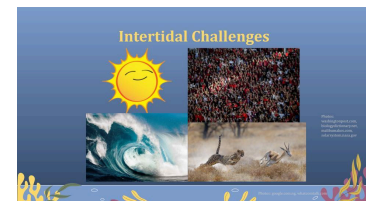
Usually, aquatic animals don't have to deal with the sun or waves. Think of a fish; they usually never go out of the water, and they often don't come near the waves on the shore. However, animals in the intertidal have to deal with these, and other challenges, everyday.

Sun: Animals need to find a way to not lose all their water when they are exposed to the sun. An animal losing all of its water will likely die. The process of an animal losing all of its water is called desiccation. To combat this, some animals hide from the sun under rocks like crabs. Other animals have a protective shell that they can close, like barnacles. Others hide under the sand, like clams and anemones.

Waves: Waves can be very powerful, and very hard on the intertidal animals. To cope with the stress of pounding waves, animals need to hold very tight to substrate, like mussels or oysters do, or they need to move away from the waves, like snails.

Space: Just like with humans, space is very important! Every animal in the intertidal needs to find space to settle or move around. Without this space, an intertidal animal will not do very well. Sometimes, animals like crabs will compete with each other for space.

Predation: Some animals in the intertidal need to avoid predators. These



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animals, like crabs, snails, sea slugs, sea stars, jellyfish, and shrimp, need to eat other animals for survival. However, the other animals don't want to get eaten! They either have to run away and hide from their predators, or have a protective shell.

Any aquatic animal that can't deal with these challenges very well is not very suitable for the intertidal habitat. **For example, can you think of what would happen if an octopus tried to live in the intertidal zone? Why wouldn't it work out very well?**

Slide 7: Creatures of the Intertidal

There are many different kinds of aquatic animals, plants, and algae that you can find in the intertidal. **Before we look at some, can you think of any that you've seen visiting local beaches?**

Two important intertidal organisms are eelgrass and seaweed. Every creature that eats plants relies on them for food, and virtually every animal uses them for habitat and camouflage.



Slide 8: Social vs. Solitary

Every organism in the world (including the intertidal zone) is either social or solitary! Social animals need to live in groups so that they can all survive. Some examples are lions, monkeys, and dolphins. Other animals need to live alone, and don't need to rely on others to survive. Some examples are tigers, polar bears, and foxes. In the intertidal, social organisms include barnacles, sea urchins, sand dollars, seaweed, and eelgrass. They rely on each other to survive, either through avoiding predators through safety in numbers, or through being close to each other to reproduce. Solitary intertidal animals include sea stars, anemones, jellyfish, snails, sea slugs, shrimp, crabs, clams, mussels, oysters, chitons, limpets, and sea cucumbers. Sometimes you can find solitary animals in groups, but they are still viewed as solitary animals because they don't need each other to survive.



Slide 9: Beach Naturalists

Intertidal zones that are easily reached by the public are sometimes harmed very badly by humans who don't know that their actions are hurting it. Many parks and cities will have beach naturalists to educate the public about the habitat and how best to conserve it. Beach naturalists are experts on the beach they work at, the organisms found there, and how to appreciate the beach without hurting it. Many marine biologists are beach naturalists, and many beach naturalists are also marine biologists!



Worksheet: Lesson #5: Groups in the Intertidal

Biomes

What is a biome that you either live in or have visited? **Varies; can include: desert, rainforest, forest, ocean, beach, etc.**

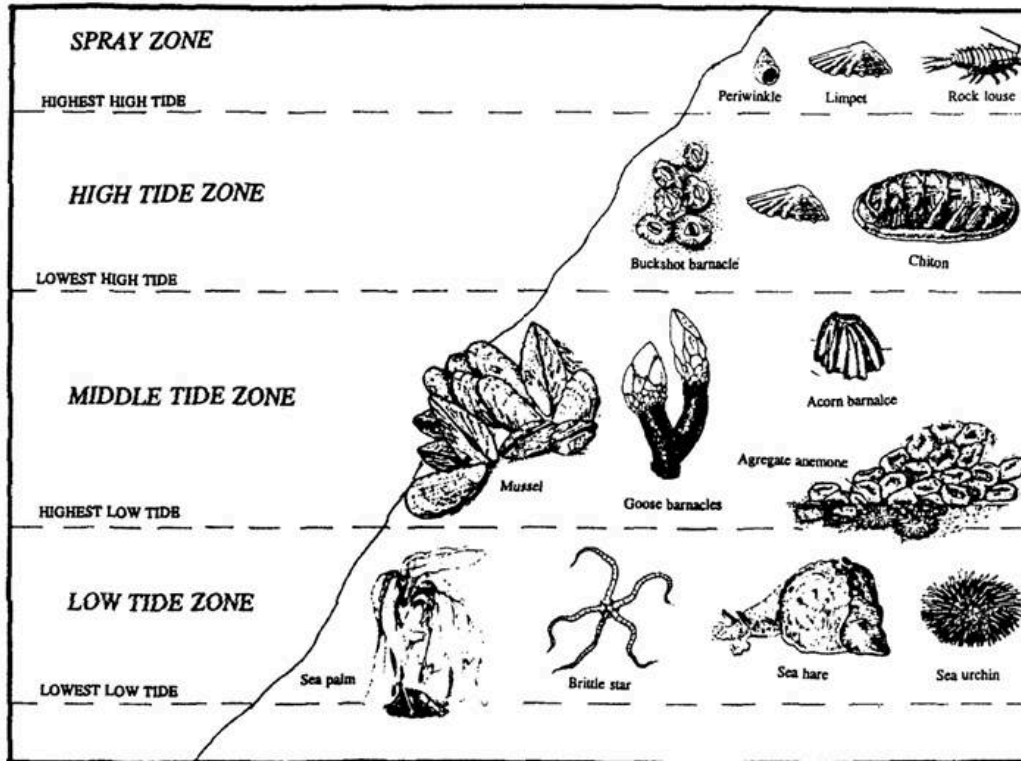
Intertidal Zones



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Label the four intertidal zones on this diagram, then add drawings of some of the animals you would find in that zone.



Intertidal Challenges

What is one challenge of living in the intertidal? Varies; can be sun, waves, space, or predation.

Why is it a challenge? Varies; please refer to the powerpoint for the answer to each kind of challenge.

Career Connections

How does a beach naturalist help take care of the intertidal zone? They educate the public about how to best conserve the intertidal zone.

(Optional) Act It Out: Split students into groups of 4-6. Ask them to act out an intertidal animal and place themselves in order of intertidal zones from spray zone to low tide zone depending on what animal they are. Have each group act out their animals in front of other groups, and ask the groups in the audience to guess what kind of animal each acting student is.

(Optional) Game: [Intertidal Zone Creatures](#)

Play this online memory match game to learn the names and images of different intertidal creatures.



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Salish Sea Challenge- Ask students to update their Salish Sea Challenge tracker.

Optional Extensions:

- [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!



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