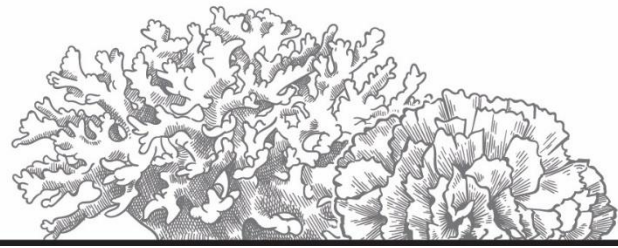


Lesson plan from the Seattle Aquarium



Tide pool Display and Discover (3rd to 5th grades)

At the Seattle aquarium we believe one of the ways to inspire marine conservation is through fostering empathy for all marine life. What is empathy? Empathy is “a stimulated emotional state that relies on the ability to perceive, understand and care about the experiences or perspectives of another person or animal.” When building upon our empathy skills towards marine life, one of the goals is to see marine animals as individual beings who also have needs like us.

In this activity, students will learn about local Pacific Northwest marine invertebrates and the environment that helps them thrive. In addition, students will create tide pool signs that could be displayed at the beach you’ll visit to inspire empathy for marine animals and their environment.

This can be done before or during a tide pool field trip. At the lesson’s completion, students will have learned names and basic anatomy of some marine invertebrates, been introduced to new vocabulary, and built upon their observation, writing, listening and empathy skills.

Standards Covered:

3-LS3-2	Use evidence to support the explanation that traits can be influenced by the environment
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
3-LS4-4	Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change
4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction

Topics to discuss with students before you go

Here are some ways to visit the beach safely and responsibly, including how to treat the animals with care.

Touch animals gently with one science finger.

- A science finger is...
- Have your students touch the top of their ear, eyelashes or nose to practice soft touches that won’t harm animals.

- Remind your students that the animals who live on the beach are alive just like they are and need to be treated with respect.
- Don't try to pick up any animals.

Watch where you step!

- When entering the beach, you and your students are entering the home of marine animals.
- Make sure to step carefully because animals often hide under sand and rocks to stay safe, and we don't want to hurt them.

Don't take home shells or rocks.

- Animals like hermit crabs use abandoned seashells as a home. As they grow, they will move into larger shells. If we remove all the beautiful shells, these animals won't be able to find the bigger homes they need.
- Barnacles, limpets, sea stars and other animals live clinging to rocks. If we remove rocks from the beach, we take away their homes.

Leave the beach cleaner than you found it.

- At the beach, you'll be in the animals' neighborhood. Please make sure all items that you bring to the beach also go back home with you. If you see trash on the beach, please do your best to safely pick it up! Animals can mistake human trash for food and that's not good for them to eat.

Options for approaching activity

Worksheet activities on Page 1/Animals, Page 2/Environment, and Page 3/Tide Pool Signs can be done in the classroom. Or you can do the first two pages at the beach and save the third one for the classroom. The Page 4/Trip Review can be done in class after the beach trip. Note: Students may complete worksheets with a partner, in groups or by themselves

Each class will **bring only three to five tide pool signs to the beach**. Once the students have finished their creations, have them take a "gallery walk" to see the signs made by their classmates. How the final signs are chosen is up to you. Students can simply vote on which signs are most appropriate, choose aspects from different signs to be combined into final signs drawn and written by students, or use another method.

The purpose of the lamination sheets is to make the signs durable and waterproof. If lamination isn't possible, there are alternatives mentioned below. If the weather is sunny and clear the day of your beach visit, feel free to skip the lamination step.

Do not leave the signs at the beach. It is very important that we bring the signs back to our classroom or our homes. Remember, we are guests in the animals' environment, and we want to leave the beach cleaner than we found it.

Materials for sign making

- Copies of activity
- Art supplies: pencils, markers, color pencils, etc.
- Three to five sheets of 11 x 17 inches paper (thick, like cardstock)
- 11 x 17 inches lamination sheets
- Standard paper
- Laminator (Alternatives: self-adhesive sheets, contact paper, protector sleeves, or use a low-temperature iron to fuse laminate sheets.)
- Three to five wooden sticks, 3 feet long and ¼-inch thick in diameter (Sticks should be sturdy. Ask the custodian about any available sticks to use. You can also purchase sticks or repurpose a yardstick.)
- Duct tape
- Scissors
- Instructions for creating signs (at the end of lesson plan)

AN IMPORTANT REMINDER FOR TEACHERS: BRING BACK ALL BEACH SIGNS.

Please be sure to bring back all signs from the beach. Set an alarm to remind you via phone, text or email, or ask a chaperone or student to send a reminder.

INSTRUCTIONS

Before beginning this activity, it might be helpful for your students to see:

- Pictures and names of some of the animals
- Some of the new vocabulary words and examples of them used in sentences
- Diagrams of basic marine animal anatomy to help students identify them
- Photos of the beach and tide pool environment where they live

Prompting questions to ask your students before worksheet

1. Have any of you ever gone tide pooling?

Before handing out activity sheets, ask your students any experiences they've had with tide pools and animals that live there. Some may have stories to share, most will have questions.

2. What is tide pooling?

Tide pooling is a physical activity or a hobby where people go out to a beach during low tide to meet marine creatures that stay behind in little pools of water, under rocks or plants like eelgrass and seaweed.

3. What is a low tide?

Low tide is when the water at a beach stays farther away from the shore. It happens twice a day thanks to the moon's gravitational pull.

4. What animals can you see when you go tide pooling?

Some animals that you might see during low tide are barnacles, sea cucumbers, hermit crabs, shore crabs, snails and if you are very lucky you might see sea stars, sea urchins or moon snails. These animals are called *marine invertebrates* because they share the intertidal habitat (the seashore) and one special trait—they have no spine.

5. What else can you see when you go tide pooling?

You might see different types of marine mammals, seaweed and fish eggs. Many fishes lay their eggs on seaweed or other water plants to protect them from hungry predators. Another aquatic plant, eelgrass, provides a home for fish eggs *and* young fishes. That's why we walk carefully around it. Stepping on eelgrass can destroy fish eggs, fishes and the even the whole habitat. This amazing plant also captures carbon, a greenhouse gas—and that's good for marine invertebrates and us humans.

6. Are these animals in danger when they are out of water?

Their bodies have adapted to their environment, and they can survive long periods of time without water.

7. What kind of water do they live in? Fresh water or salt water?

All these plants and animals live in the Salish Sea which is a mixture of salt water and fresh water.

8. If your favorite beach was covered in plastic bags and other trash, how would you feel? Do you think the animals living on that beach would be healthy?

Just like us, animals need a clean space or **environment** to live in. Pollution and trash in their environment could hurt an animal's body in many ways. Instead we can try to avoid this from happening. We can participate in beach clean-ups, buy locally or reuse materials!

9. Do marine invertebrates look like us? Does that mean we won't treat them with respect?

10. What are some ways we can help their environment? Could your voice help?

Let's get ready to go tide pooling!

This activity begins with worksheets to refresh what they've learned and discover even more about marine invertebrates. Then they'll be ready to create tide pool signs that could go to the beach!

Page 1 is a 'fill-in-the-blank' exercise about the internal and external parts of a marine invertebrate. The Word Bank lists all the words they might need—and more.

Page 2 helps them learn more about the word *environment*. It will also give you a chance to reflect about the space they'll visit.

Page 3 is where students plan what they want to say about what they've seen and learned. There are four parts to this page for students to brainstorm the design and colors of their sign, what it will say, the materials they will need, and other ideas. When they are done planning, they can draw the sign on a piece of paper.

Many people who go to the beach don't know what's going on right under their feet! If our signs get people to see how much life happens in the sand and tide pools, our class will be helping all the marine invertebrates that live there.

Let these messages spark ideas for your tide pool sign.

- There are animals under your feet, please watch your step
- Please walk gently
- Shells are pretty, but they're homes. Please leave them.
- Eelgrass bed below! Walk around the green plants
- Welcome to the Salish Sea!

Here are at some signs Seattle Aquarium uses to remind visitors to be careful.



Page 4 is an optional trip review that asks students to recall what they've seen and how they feel about it. You might find it helpful to also ask the questions below before students complete this worksheet.

REMINDER: Our class will bring only three to five signs to the beach, and the signs we bring must be brought back. We don't want to create more trash by accidentally leaving a sign. [Teacher: Proceed with how all students will be contributing to the tide pool signs we take with us (voting, selecting certain aspects of different signs to combine, or another method you chose).]

Questions to ask your students after the field trip

These questions will help your students reflect on their learnings and emotions, and connect them to a physical environment they want to respect and care for. In other words, to build empathy.

Visiting a beach or a lake is fun and, if you live close to water like here in Seattle, Washington, it may be easy. But for a lot of people in the United States, it's not that easy to go to a beach, a lake, a river or even a pond.

What did you like best about tide pooling?

Why is tide pooling important?

Why do you think it is important for people to be able to visit natural places that have water?

INSTRUCTIONS: How to assemble final tide pool signs

1. Once students have finished their contributions, enclose the final 11 x 17 inch tide pool signs in laminator sheets and pass through the laminator **OR** mount on self-adhesive sheets **OR** enclose in protective sleeves.
2. Align the top of your wooden stick or yardstick with the top of the back of your 11 x 17 inch sign. Make sure your wooden stick or yardstick is centered.
3. Cut four 10-inch pieces of duct tape and use them to secure your stick or yardstick to the back of your sign—place one each at the top and bottom of the sign and two in the middle.
4. TA DA! Your beautiful tide pool sign is complete. At the beach, insert your sign about nine inches into the sand to make sure it stands strong.

PLEASE REMEMBER TO BRING BACK ALL TIDE POOL SIGNS

Tips for teachers

How to plan for a safe and smooth beach field trip

Make sure that you and your chaperones know where the bus will load and unload, where bathrooms and water fountains are, the terrain of the beach, and how long the walk from the buses to the beach will be. You can find this information about some of the local beaches on our [webpage](#).

You and your chaperones should be prepared to safely clean up any trash you encounter on the beach. Do not pick up items that could pose a risk to your health. Remind your students to always let their adult know before picking up any trash that they might find.

Recommended beach supplies

- Trash bags for trash found or produced on the beach
- Writing utensils
- Wet wipes or another way to clean hands
- Extra sunscreen
- Printed or pdf version of the beach guide for your beach for you and chaperones to reference
- Extra water
- Basic first aid kit
- Printed or pdf version of a species identification (ID) guide