

Tidepool Introduction:

Your first rule of safety is to always know the tide, including any calculations for the specific area.

Tidepools, or the rocky intertidal zone, is the narrow boundary between the land and sea. The tidepools are covered during high tide, yet exposed during low tide. The animals in this zone are exposed to extreme changes in temperature, oxygen level, wave force, and salinity, and pH.

Basic Rules of the Tidepools

Ask a student when they visit a friend's house if they:

Turn over couches and chairs?

Remove family members and place them in other neighbor's houses?

Take home pieces of furniture or other decorations, just because we think they are neat?

Tidepools are like neighborhoods, explain to the students about respecting the organisms that live there.

Ask students to come up with rules and go over these rules!

STUDENT SAFETY AND SAFETY OF TIDEPOOL ORGANISMS ARE NUMBER ONE! (BE PREPARED TO SIT STUDENTS OUT IF THEY MAKE POOR CHOICES)

Be Careful! The rocks can be extremely slippery due to algae and other organisms living on the rocks. **Never turn your back on the ocean. No running!** Make sure your footing is secure before you take your next step. Be prepared to put your hands down to stabilize yourself. Set boundaries for students, with larger groups this works best by putting adults as the boundaries the students cannot pass (put adults farthest out on rocks towards the ocean). Be very aware of the tide and the water and crashing/sneaker waves. If the tide is coming in it is a good idea to start farther out and make your way back toward the shore, always with the adults moving the boundaries in. The tide can come up very fast, so be aware!

Do Not Pry! Many types of animals such as sea stars, sea urchins, limpets, chitons, and mussels live attached to the rocks. Do not pry these off, if an animal is harder to pick up than a set of keys then leave it on the rocks. If a seastar does not come off easily, then do not pull it off. Prying tidepool animals off of the rocks could hurt the organisms, making them unable to fasten themselves on again. Discuss with students why these animals need to hold on to the rocks in this habitat.

Return all organisms to their home! Many organisms in the tidepools can be touched or held, but make sure that the organisms go back into the spot and pool that they came out of. Many tidepools have different living conditions such as temperature, amount of wave activity, salinity, and predators, and organisms might not survive if put back into the wrong pool. Tell the students that moving organisms from one pool to another is like an

alien picking someone up from tropical Hawaii and putting them down in freezing Siberia.

Be Gentle! Do not poke or prod the organism. Fingers can be used to gently touch the organisms. Wet your hands before touching an organism; salts and oils on your hands may prevent an animals' ability to take in water or gases by clogging it's pores.

No Collecting: Point Reyes is a National Park. Please leave everything where you found it. Like other wildlife, tidepool organisms are protected by federal law. Also, encourage students that it is their responsibility to protect the organisms of Pt. Reyes so future visitors can enjoy what they explore today. Leave only footprints, take only pictures and memories.

Why do Tides Occur?

Tides are caused by the gravitational pull of the earth, moon, and sun upon each other. The moon has a greater affect on the tide because it is closer to the earth.

Daily tides: The ocean is always being pulled toward the moon, but the earth is rotating, making a complete turn every 24 hours. As the earth rotates the gravitational pull changes the tide daily (with two low tides and two high tides daily being about 6 hour and 15 mintues apart).

Spring and Neap Tides:

Spring tide is when the sun and moon are in line with the earth, during the times (full and new moon) the tides are the highest highs and lowest lows of the month. During these times there re great low tides to check out the tide pools, but remember that there is a very high tide after the low tide and water levels can change rapidly.

Neap tide is when the sun and moon are at right angles to the earth, and their gravitational pulls balance each other (first and last quarter of the moon). High tides aren't as high, and low tides aren't as low.

Activities

Spring and neap tides: Have students stand in circle, choose one student to be the "moon" and one to be the "sun", the rest will act as the oceans upon the earth. First have the students stand in a round circle. Have the "moon" and "sun" stand on opposite ends of the "earth". Have the students that are near the "sun" and "moon" take two steps out. This will demonstrate the bulging of the oceans during spring tides during full and new moons. Then, have the "sun" and "moon" stand at right angles to each other and have the "ocean" that is closest to them again take two steps out. This will demonstrate the neap tides during the first and last quarter.

Daily tides: Keeping the "sun" and "moon" in their place, have the students take one step out when they are near the "moon" as the earth rotates- the circle of students walk

around. You may designate one student to be the “California Coast.” This will show how the tides change daily, depending on where the moon is and at what position the rotation of the earth is at.

Tidepool Map: Break students into groups and have students take inventory of different tide pools. How many organisms can the students find inside each tide pool? What is the temperature? What is the geology like? Students can make a map of their little community: name the tiny oceans, important landmarks, underwater gardens, and residents. They can even take other groups on tours of the community they have discovered. If there’s time you can have students compare two different tide pools, perhaps in different tidal zones.

Tidepool transects: Transects are a method of research that scientists use to explore the numbers and types of organisms living in a specific area. Break the “scientists” into groups (it is fun to give them funny names like “Dr. Echinodermata”) You can take one or two fifty foot transects with students taking measurements at either five or ten foot intervals. Have students test temperature, pH, and count the number of organisms at the transect intervals. (Mussels and anemones are good organisms to count) Have students note the number and size of different organisms along the transect. Why the difference?

Closing

In closing review the concepts learned, ask questions (what is a tidepool? Name some ways organisms prevent drying out. What was your favorite creature? What is the strangest thing you felt? What were different ways that organisms held on to the rocks, etc...)

Point Reyes Summer Camp Activity Logistic Guide

- Activity: Tide Pool Exploration

- Materials: FIRST AID KIT AND CAMPER MEDS
 - Plastic containers
 - Laminated tidepool identification sheets
 - Pacific Intertidal Life by Russo and Olhausen
 - Tide chart

- Objective: Learn about ocean safety
 - Respect for intertidal organisms
 - Explore the life in the Intertidal Zone
 - Learn about invertebrates
 - Tides and what causes them

- Considerations: Set boundaries for students
 - Go over tidepool rules to keep students and tidepool organisms safe, and enforce them!
 - Know what time low and high tide occur

- Activity Ideas:
 - Free exploration
 - Spring and Neap Tides
 - Daily Tide
 - Tidepool mapping
 - Tidepool transect
 - Poetry
 - Organism count