

OIMB GK12 CURRICULUM

3rd Grade

2 short field trips to docks

TIDES AND SALINITY: IDEAS FOR A FIELD TRIP TO THE DOCKS

Oregon Science Content Standards:

3.1 Structure and Function: Living and non-living things vary in their characteristics and properties.

3.1P.1 Compare and contrast the properties of states of matter.

3.2 Interaction and Change: Living and non-living things interact with energy and forces.

3.2P.1 Describe how forces cause changes in an object's position, motion, and speed.

3.3 Scientific Inquiry: Scientific inquiry is a process used to explore the natural world using evidence from observations and investigations.

3.3S.1 Plan a simple investigation based on a testable question, match measuring tools to their uses, and collect and record data from a scientific investigation.

3.3S.2 Use the data collected from a scientific investigation to explain the results and draw conclusions.

3.3S.3 Explain why when a scientific investigation is repeated, similar results are expected.

Ocean Literacy Essential Principles:

1. The Earth has one big ocean with many features.

Goals: Have the students observe and measure changes in tidal height and salinity, and make connections between the two.

Concepts:

- At high tide, ocean water moves up into estuaries; at low tide, ocean water moves out.
- Salinity is the saltiness, or dissolved salt content, of a body of water.
- Tides, together with streams and runoff, influence the salinity of bays.

Materials:

- Sign (cardboard or paper plate, waterproof markers)
- Strong tape, string, or hammer and nails (to attach sign)
- Tape measure
- Tide Table <http://www.saltwatertides.com/dynamic.dir/oregonsites.html>
- 3-4 Simple hydrometers
- 3-4 Quart size containers
- Salt
- Tap Water
- 3-4 spoons for stirring

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Lesson Plan:

Tidal Height Comparison

1. Go to the docks with your students at high tide. The docks must be floating docks that go up and down with the tides (this includes the Charleston, Empire, Bandon and Coos Bay City docks). Tie a sign to a piling (or have each group of students tie a sign to a piling).
2. At low tide (preferably the next day) return to the docks and look for your signs. They will probably be WAY above the students' heads!
3. Have the students calculate the difference (using a tape measure and comparing measured distance to tide tables, which are available online) between the high tide when they placed their sign and the low tide when they went back. *This is most dramatic during spring tides—the times during the month when there is the largest difference between high and low tides.

Simple Salinity Experiment

In the classroom:

1. Begin by going over the concept of salinity and what it has to do with the ocean habitat.

Salinity is the saltiness or dissolved salt content of a body of water. Ask the students whether they think freshwater or salt water has a higher salinity (they'll easily be able to answer which one is saltier, it's getting the hang of using the term "salinity" that can take some practice).

2. Show the students a map of the dock (Google Earth images work well). Have the students point out where the rivers are and where the ocean is. Ask which one they think has a higher salinity.
3. In the classroom, do an example and practice reading hydrometers. Inexpensive plastic hydrometers are available for use with home aquariums. Have the students mix up different salt solutions and measure the salinity of each using a hydrometer. Tell them that freshwater has a salinity of zero and pure seawater has a salinity of 35.
4. Have them take their measurements several times and compare results. Discuss variability in measuring and the need for replicates in scientific experiments.

At the docks:

5. When at the docks during high tide, have the students measure and record salinity. Have them repeat this a few times.
6. When back at the docks during low tide, have them again measure and record salinity.

Tides and Salinity Combined

1. Have the students complete their field trip worksheets.
2. Discuss the data. How much did salinity change? Why? Was there variability in the measurements? What were the average salinities for high and low tide? Why is it good to have more than one measurement? What would changes in salinity

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mean to things living in the water? Would they expect different salinities during different seasons (rainy vs dry)?

Assesment: Worksheet and classroom discussions

Extension: Combine with examinations of what is living on the docks (belly biology)

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TIDES AND SALINITY

1. Use the tide table to find out what the tidal height was when you placed your sign.
2. Now use the tide table to find out what the tidal height was when you returned the next day.
3. How much did the tide change?
4. Where does the additional water come from when the tide is high?
5. Do you predict there will be a difference in the salinity of the water at high tide compared to low tide?

Circle one:

YES

NO

Why?

6. When do you predict the salinity will be higher?

Circle one:

HIGH TIDE

LOW TIDE

Why?

7. What was the salinity at high tide?

8. What was the salinity at low tide?