

The Effect of Salinity on Layering in the Ocean

Time:

One 50 minute class period.

Standard:

California earth science 5d. Students know properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical currents, and the geographic distribution of marine organisms.

Topical Objectives:

Observe the layering effect of various salinities and temperatures on water bodies.

Safety Rules:

Safety Goggles, Don't drink the salt water.

Materials:

Food coloring, 4 cups per group, 4 test tubes per group, 4 larger cups for primary solutions, water, salt, droppers (1 per group)

Preparation:

Prepare one tap water solution and three different salt solutions. To make the salt solutions put $\frac{1}{8}$ cup, $\frac{1}{4}$ cup and $\frac{3}{8}$ cup of salt into separate cups. Add 2 cups of water to each cup. Add a couple drops food coloring into each of the four different water cups using a different color for each cup.

Science Notebook Ideas:

Students predict what will happen when equal amounts of the different water solutions are placed into the same test tube.

Procedure:

1. Using an eyedropper, squeeze a small amount of liquid from one of the cups into the test tube.
2. Add approximately equal amounts of water solutions from each cup into the same test tube.
3. Record observations.
4. Observe the results of other groups. Did they get the same result even though they may have added the water solutions to the test tube in a different order?

Extensions:

Make four water solutions that are at different temperatures. Dye each solution a different color. Repeat the procedure above without salt. What effect did different temperature waters have on the layering in the test tube?

Synthesis:

The saltier the water, the denser the water solution will be. The denser water will sink below less dense water. Cold water is denser than hot water. It will sink and the hot water will rise. Use the above activity to teach students about one part of Earth Science standard 5D, "properties of ocean water, such as temperature can be used to explain the layered structure of the oceans.

Sources:

California Department of Education Earth Science Frameworks.

Resources:

Ocean instruments and how they work;
www.whoi.edu/science/instruments