

Experimenting with Density

Educator Lesson Plan

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About This Activity

Target Grade Levels: K, 2, 5, 7, 9 - 12

South Carolina State Science Standards: K.P.4; 2.P.3; 5.P.2; 7.P.2; H.C.5; H.E.6

Ocean Literacy Essential Principle: #1 The Earth has one big ocean with many features.

Focus Questions

- How do the properties of different liquids compare?
- Which is more dense – freshwater or saltwater?
- How does the density of freshwater and saltwater impact Earth’s ecosystems?

Objectives

- Compare the densities of different liquids.
- Discuss how the different densities impact Earth’s ecosystems.

Materials

Activity 1: Eggbert

- Three eggs (unboiled)
- Three clear containers that can be filled with at least 2 cups of water each (enough to cover an egg when placed in the container). You may need to adjust the volume of water depending on the container
- Three-fourths ($\frac{3}{4}$) cup of salt divided into $\frac{1}{2}$ cup and $\frac{1}{4}$ cup
- Six cups water
- Optional: tongs

Activity 2: Mystery Water

- Two cups rubbing alcohol
- Two cups water
- Two clear containers
- Two ice cubes

Preparation

Group size: Varied

Time: 15 – 20 minutes for both activities (Mystery Water will require that a container be left overnight.)

Set-Up

Eggbert

- Fill three containers: one with two cups of plain water, one with two cups of plain water mixed with $\frac{1}{4}$ cup salt, one with two cups of plain water mixed with $\frac{1}{2}$ cup salt.
 - Place the three containers out on a table or desk.
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Mystery Water

- Fill one container with two cups of rubbing alcohol. Let sit overnight until the smell dissipates.
- Fill one container with two cups plain water.
- Freeze two ice cubes.

Directions

Eggbert

- Have one member of the group carefully place one egg into one of the mixtures using their hands or tongs. Observe.
- Repeat the process with the other two eggs in the other two mixtures. Observe and compare.
- You can reveal the type of liquids in each container to the group either before or after the discussion.

Mystery Water

- Have one member of the group carefully place an ice cube in one container. Observe.
- Repeat the process with the other container of liquid. Observe and compare.
- You can reveal the type of liquids in each container to the group either before or after discussion.

Discussion (for both activities)

- How did the egg “behave” in the different liquids? (Answer: The egg in the freshwater sinks to the bottom; the egg in the mixture of $\frac{1}{2}$ cup salt and water floats at the top; the egg in the mixture of $\frac{1}{4}$ cup of salt and water neither floats nor sinks.)
 - How did the ice cubes behave in the different liquids? (Answer: One ice cube floated and one did not.)
 - What can you infer about the different densities of the liquids in the containers? (Answer: Items float better in denser liquid; therefore the containers where the egg and ice cube floated at the top hold the most dense liquid; the containers with the least dense liquid have the egg and ice cube sitting on the bottom.)
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- Where are sources of freshwater and saltwater on Earth? (Answers will vary. Examples might include lakes, streams, ponds for freshwater sources, and oceans and estuaries for saltwater.)
- How does the density of freshwater and saltwater impact the Earth? (Answers will vary. Possible answers include different animals and plants are adapted to live in different densities, part of the hydrologic cycle, thermohaline circulation that impacts climate and weather patterns.)

Adaptations and Extensions

- Science: Compare the densities of other liquids by mixing different ones together to determine the most and least dense of each.

