



LESSON PLAN

Oceans

GRADE LEVEL: MIDDLE SCHOOL

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Oceans

Middle School Lesson Plan

OVERVIEW OF ACTIVITY

Students explore the effects of salinity and temperature on density through a hands on activity and a teacher demonstration.

DURATION

Approximately 1 class period

STANDARDS ADDRESSED

Next Generation Science Standard

- **MS-ESS2-6 Earth's Systems** - The Roles of Water in Earth's Surface Processes. Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.

Common Core Learning Standards in Writing

- **CCSS.ELA-LITERACY.WHST.6-8.1** - Write arguments focused on *discipline-specific content*.
- **CCSS.ELA-LITERACY.WHST.6-8.4** - Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

OUTLINE OF LESSON

- Warm Up: Students will respond to the question: "Which weighs more, a pound of feathers or a pound of bricks?"
- View the Brainchild "Oceans" episode.
- Students will read background information about salinity and ocean currents. They will explore the effect of increasing salt concentration on the ability for an object to float.

ACTIVITY PROCEDURE

- Warm Up: Students will respond to the question: "Which weighs more, a pound of feathers or a pound of bricks?" After sharing some answers out, come to the agreement that they both weigh the same. Draw a brick on the board and a large bag or box labeled 1 lb, label the brick and the bag of feathers. Bring the discussion to the physical property that is different given that they weigh the same. Students should notice that the pound of feathers takes up much more space and we can define this as volume. Introduce the ratio

of mass and volume as the physical property density. Introduce episode. **Note: You may choose to make the distinction between weight and mass at this point or wait until an Astronomy unit.

- Whole class will view the “Oceans” episode, with special attention to density.
- Students will independently, in partnerships, or as a whole class read background information regarding salinity and density of water and its effect on deep sea currents and layering of the ocean. Then they will carry out the procedure in partnerships: *Fill the plastic cup about halfway with water. Drop a grape in the water and record your observations in the table. Comment on the relative densities of the water and the grape. Stir in salt to dissolve until you notice a change in the grape, record your observations and comment on the relative densities of the water and grape.*
- Students will observe a teacher demonstration of temperature and density:
 1. Fill a jar to the brim with cold water tinted with blue coloring.
 2. Fill a second jar to the brim with hot water tinted with red coloring, cover with an index card (or piece of plastic overhead transparency), invert and place on the blue jar.
 3. Make another identical setup but have the red on the bottom and blue on the top.
- Students will make predictions of what will happen when the index card is removed from between the jars.

FOLLOW-UP

Either for homework or during a following class period, students will respond to the following prompt and discuss responses in class: *What trend in temperature and salinity would you expect to find as we go deeper down through the seven layers of the ocean based on your experience? Explain.*

MATERIALS LIST

- Grapes, 1 per partnership
- Clear plastic cups, 1 per partnership
- 2 index cards per partnership
- Water
- Blue and red food coloring
- Salt
- 4 glass jars
- Student Activity Resource, 1 per student