

Oceans of Fun

Grades 4-5

Overview

In groups, the students will experiment with salt water and fresh water to see which has more buoyancy. In groups, the students will make a wave jar to observe the shapes and movement of waves.

Objectives

- To help students have a better understanding of salt water
- To help students have a better understanding of why the ocean is salty
- To help students have a better understanding of how ocean waves are formed

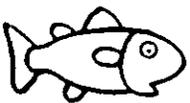
Materials

For the presenter:

- copy of directions
- plastic tub filled with water
- paper towels
- 4 each -- 1/4 cup & 1/2 cup measuring cups

For each group of 4 students:

- Two - 16 oz clear plastic glasses
- an egg
- tablespoon
- 1/2 cup salt
- water
- 1/2 cup of mineral oil
- 1/4 cup alcohol
- glass jar with lid
- blue food coloring
- One copy of the directions & materials sheet for experiments 1 and 2



Getting Ready

Students should be divided into groups of 4. They will need a shared work space for experiments. Place the following items in an area for easy access by students: tub of water, measuring cups, eggs, containers of salt, paper towel, mineral oil, alcohol, glasses, jars/lids, and blue food coloring.

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Procedures

Activity 1: A Salty Solution & Activity 2: Making Waves

Begin by telling the students that they will be doing ocean experiments. Use the questions below to get the students interested and help you find out what they already know about fresh water, salt water and waves.

Questions

Ask the students: "Have you ever been swimming in the ocean or a lake? Is there a difference between the ocean and a lake? (*ocean/salty, lake/fresh water*) Can you give some examples? Do objects float better in fresh water or salt water? How do you know? Why do some things float and some sink? What is *buoyancy*? (write it on the board for reference later) Why is the ocean salty? What causes waves in the ocean? Have you ever observed the shape of a wave? Have you ever wondered what causes their shape?"

Discussion

As rivers flow into the ocean, they bring dissolved salt with them. You cannot taste it because there is only a very small amount of salt. The water in the ocean evaporates and the salt remains in the ocean. Over the years, the ocean gets saltier and saltier. Today, each gallon of ocean water contains approximately 1/4 pound of salt. The reason things float better in salt water is because salty water is heavier than fresh water and pushes the object towards the surface.

Wind, earthquakes and the gravitational pull of the moon and sun cause waves. The wind moves across the water and causes part of the water to rise. The wind then pushes on the raised water and creates waves. Waves have a *crest* and *trough*. (*Crest* and *trough* should be written on chalkboard for reference later by students)

Tell the students that they are going to do an experiment that will test the *buoyancy* of salt water. They will also be creating a wave in a jar to observe the motion of waves and their shapes. Before handing out any materials, explain the steps involved in the experiments and review rules.

Rules:

- ◆ Water is for experimenting only and it should remain in jar.
- ◆ Any spills need to be cleaned up.
- ◆ Anyone not following directions will not be allowed to experiment with their group.
- ◆ Return materials to the table as you finish with them.

Experiment Steps:

1. Each group needs to choose 2 getters (pick up supplies).
2. Each group needs to choose a director (read directions).
3. Each group needs to choose a recorder.
4. Show the directions for Activity 1 and Activity 2 to the class. Go over the directions and show the students where they will find the materials that they will need for the experiment.
5. Ask if anyone has a question; if not, hand out copies of the directions for the experiments to the director of each group. When the groups are ready the getters may pick up materials on the table.
6. When they have completed Experiment 1, and you have checked their recording sheet, they may begin Experiment 2.

Discussion

As you move around the classroom, check to see if any groups are having problems. Ask the students what they are discovering about the buoyancy of salt water, what items floated in salt water but not fresh water, and what they observed about the water. Ask them if they were able to find the crest and the trough. If time permits, have each group share with the class what they discovered.

Clean Up

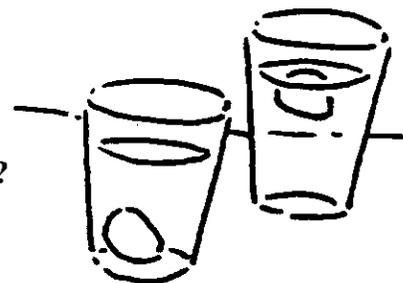
Each team is responsible for cleaning up their area. The wave jars may be saved for further observation or shared with students from other classes.

Experiment 1 - A Salty Solution

(Group directions & recording sheet)

Did your team:

- choose 2 getters that will be in charge of getting materials?
- choose a director that will read the experiment for your group?
- choose a recorder to record your groups observations and findings?



Materials

- 2 glasses filled with water, leave about 2-3 inches at the top
- egg
- tablespoon
- 1/2 cup salt

Directions

1. Dissolve 3 or 4 tablespoons of salt in one of the glasses.
2. Place the egg in the salt water. If it does not float, add more salt until it does.
3. Now place the egg in the fresh water.
4. Record what happened.
5. Look around the room or in your desk for other items that you can test in the fresh water and salt water. (Examples: paper clip, crayon, etc.)
6. Discuss with your group why some things floated in the salt water and not in the fresh water.

-----Recording Sheet-----

Objects that float in:

Objects that sink in:

Objects that float in:			Objects that sink in:		
Salt & Fresh Water	Salt Water Only	Fresh Water Only	Salt & Fresh Water	Salt Water Only	Fresh Water Only

Conclusions (what did we learn):

Experiment 2 - Making Waves

(Group direction & recording sheet)

Materials

- 1 jar with a lid
- 1/2 cup mineral oil
- 1/4 cup alcohol
- 1/4 cup water
- blue food coloring

Directions

1. Pour water into the jar.
2. Add a couple drops of blue food coloring -- enough to make it color the water.
3. Add alcohol and mineral oil.
4. Mix the ingredients in the jar.
5. Screw the lid on the jar as tight as possible.
6. Slowly move the jar in a side to side motion to make a wave. Observe what is happening to the liquid. "Can you see the *crest* and the *trough*? Does the water seem to be pushed upwards? What are you doing that is like the wind on the ocean?"

-----Recording Sheet-----

Observations

Draw a sketch of your experiment.

Conclusions(what we learned):