Saltwater Floaters

Edited by Pat Williams, Eugene, OR

Key Concepts

1. Dissolved substances affect the properties of water.
2. Objects are more buoyant in saltwater (because it is more dense) than in freshwater.
3. Some things float in saltwater that will not float in freshwater.

Background

It is a mystery to many people why some things float and others sink. An object floats in a fluid only if its weight is less than the weight of an equal volume of the fluid. An object sinks if it weighs more than an equal volume of the fluid. To state this in another way, if the density of the object is less than that of the fluid, the object floats; if the density of the object is greater than that of the fluid, the object sinks.

A floating object sinks deep enough to displace a weight of liquid equal to its own weight. An “egg amount” of freshwater will not support the weight of an egg, so the egg will sink. An “egg amount” of the denser saltwater will (should) support the weight of the egg, so the egg floats. In both cases, the volume (an egg amount) of the displaced water is the same but the weights should differ significantly.

Because saltwater is denser and heavier than many other liquids, including freshwater, some things float in saltwater that will not float in freshwater or other less dense liquids.

Materials

For each teacher demonstration:

- two clear glasses
- water
- masking tape
- salt (3 tablespoons)
- tablespoon
- fresh egg

For each group of two students:

- two clear glasses
- water
- masking tape
- salt (3 tablespoons)
- tablespoon
- carrot piece
- peanut, dry roasted, shelled
- sunflower seed, shelled
- other vegetable pieces (radishes, potato slices, etc.)
- cork or Styrofoam pieces, pebbles, etc.

Teaching Hints

Teacher Demonstration:

1. Discuss with children things they have seen floating in water. Ask if they think the same things float in all kinds of water. Write this question on the board:

   Do the same things float in all kinds of water?

   Say:

   "Let's see if we can experiment to find the answer."

2. Take out the two clear glasses. Have a student use tape to label one "F" for freshwater. Have the same student add tap water to the glass until it is about 3/4 full.

3. Have a second student use tape to label the other glass "S" for saltwater. Have the same student add tap water to the glass until it is about 3/4 full. Then have the student add 3 teaspoons of salt to the glass and stir well.

4. Begin testing with the egg. Ask students to predict what will happen when you add the egg to the glasses. Note their predictions on the board. Add the egg to the freshwater. Ask:

   "What happened to the egg?"

   (It usually sinks.)

   Next add the egg to the saltwater. Again, ask:

   "What happened to the egg?"

   (It usually floats. It is usually a big surprise to students that it sinks in freshwater and floats in saltwater.)

Discuss how the results compared with student predictions.

Say:

"Now it's your turn to test some other objects."

Student Activity:

1. Tell students that they are to work in pairs and repeat the experiment you just demonstrated using other items in place of the egg. Hand out "Saltwater Floaters Data Sheet." Show them that there is a picture of the experimental set-up at the top of the data sheet.

2. Write the name of the items to be tested on the board. Include a drawing or symbol for each item if reading the names is difficult for the class.

3. Explain that they will write the name of the object or draw its symbol on the lines beneath the name and picture of the egg.

4. Next say that after they test an item in the freshwater, they are to record whether it floats or sinks by putting a check in the proper column. They will they do the same for saltwater.

5. Have teams prepare their glasses of fresh and saltwater.

6. Pass out the first item to be tested to each team. Help the groups write the name or draw the symbol for that item on the first blank line of the data sheet.

7. Have them place the item in the freshwater and observe the results. Help the groups record their observations. Repeat these steps with the same item in the saltwater.

8. Have student groups test each of the collected items, first in freshwater then in saltwater, and record their results.

Questions for discussion:

"Does everything that floats in freshwater also float in saltwater?"

(Yes, all of the items that float in freshwater also float in saltwater.)

"Does everything that floats in saltwater also float in freshwater?"

(No, the egg, peanut, and sunflower seed float in saltwater, but not in freshwater.)

"Which items floated in both fresh and saltwater?"

(Cork or Styrofoam float in both.)

"Which items sank in both fresh and saltwater?"

(Pebbles, for sure, sink in both.)

"Which items sank in one and floated in the other?"

(Carrot, peanut, and sunflower seed usually sink in freshwater but float in saltwater.)

"For the items that sank in one and floated in the other, which kind of water did they float in?"

(The items float in the saltwater.)

"Do objects float better in freshwater or saltwater?"

(Objects float more readily in saltwater.)

"Some fish live in saltwater for part of their lives and in freshwater for the rest of their lives. In which kind of water is it easier for these fish to swim?"

(In terms of staying afloat, it is easier for the fish to swim in saltwater.)

"Do tidepool animals live in freshwater or saltwater?"

(Tidepool animals live in saltwater.)

9. Read the question from the board and ask how they would answer the question now. Ask them why they would answer as they did.

Key Words

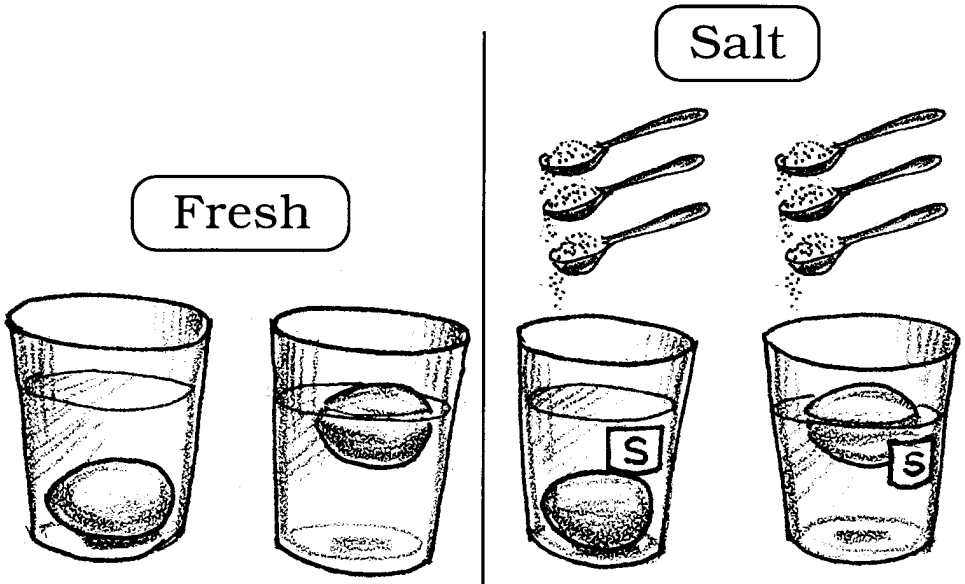
float - to remain suspended within or on the surface of a fluid without sinking

freshwater - water with low concentrations of dissolved salts

saltwater - water with high concentrations of dissolved salts

Saltwater Floaters

Name _____



	Fresh		Salt	
	Sink	Float	Sink	Float
Egg