

Science Action

Science Action Grade 2: Sink and Float

Teacher Preparation: Introduce the concepts of buoyancy and density and the effects of air on both.

Lab Summary: Students will conduct experiments and observe how buoyancy is affected by size, weight, shape and density of an object. Students will also observe the effect of air and salinity on buoyancy.

Note to grade coordinator: This lab contains perishables/ consumables (salt, raisins, fresh eggs, white distilled vinegar). Replacements may need to be purchased. Raisins need to be very dry to work well in the floating experiment. Old raisins work best. You might dry some in the oven, or leave out on the counter to dry out for a few days.

Key Points:

- Buoyancy - the tendency of an object to float when supported by liquid
- Density – the weight of an object relative to its size
- The buoyancy of an object is affected when enough air is affixed to the object to support the object's weight.
- The buoyancy of an object is affected by changing the salinity (thus density) of water.

Materials:

Activity 1

Prediction W.S.	golf ball	eraser	cork
clear plastic bowl	ping pong ball	pipe	paper clip
shell	film container	penny	flat wood
Styrofoam ball	straw	rock	

Activity 2

1 cup
4 tablespoons vinegar
3 teaspoons baking soda
raisins

Activity 3

Rubbermaid container
container with salt
1 egg
2 cups

Lead Parent – Density and Buoyancy

Welcome to Science Action. (Introduce yourself and have the other parents do the same.) **Today we are going to talk about what objects do when we put them in water. Some objects sink and some objects float. If an object is heavy for its size it has a high density and it will sink. For example, what would a brick do if you threw it in the water? (sink) What would a piece of wood the same size do if you threw it in the water? (float, it has a lower density) Objects that are the same size can have different densities, like the brick and the wood.**

In our lab today we will see how density affects an objects buoyancy. Buoyancy is the tendency for an object to float when supported by liquid. We will also see how the salinity or the amount of salt in the water affects an objects ability to float.

We will now break into small groups and do some experiments.

Activity #1:

1. Pick up the bag full of objects. Give each student a prediction worksheet. Take **only the first object listed on the worksheet from the bag** and pass it around. Have the students predict whether the object will sink or float circle their prediction on the worksheet. Return the object to the bag and continue making predictions **one at a time** until all objects have been done.
2. Fill the plastic bowl half full of water and place in the middle.
3. Have a child place the first object in the bowl of water and note whether it sinks or floats. Ask the students if their prediction was correct and why they made the prediction they did. Have the students write what really happened to the object (on the right hand side of the worksheet) if their prediction was incorrect.
4. Dry the wet object with a paper towel and return it to the bag. Repeat this process for each object listed on the worksheet.
5. Discuss the types of objects that sink and the types of objects that float. (The shell can do both depending on how it is put in the water.) Compare the density of pairs of objects such as the eraser vs. the cork, the rock vs. the Styrofoam ball, the golf ball vs. the ping pong ball, etc.

Activity #2:

Now we are going to talk about air and buoyancy. Remember buoyancy is the tendency of an object to float when supported by liquid. Air attached to an object makes it lighter and more buoyant much like a life jacket works. Has anyone here ever worn a life jacket? What did it do? Now we are going to drop some raisins into a solution of water, vinegar and baking soda and see what happens.

Fill plastic cup $\frac{1}{2}$ full of water, add four tablespoons vinegar and three teaspoons baking soda. Allow each student to drop one raisin into the cup. Bubbles of carbon dioxide will attach themselves to the wrinkles on the raisins, causing the raisins to float to the surface. The bubbles will pop once they reach the surface which will cause the raisin to “lose its life jacket” and sink back to the bottom of the cup. New bubbles will adhere to the raisins and the process will repeat itself. Some raisins, however, will be duds and will never rise to the surface because they are too dense.

See how the carbon dioxide bubbles help the raisins to float, air can make objects more buoyant.

Activity #3:

Have any of you ever gone swimming in the ocean? Most people are able to float in the ocean without treading water or floating on their backs. The high level of salt in ocean water makes this possible. The salt in the water makes the water denser so that the water can support your body weight. We are going to do an experiment now and see what happens to an egg in fresh water and salt water.

Fill one cup with plain tap water. Fill the Rubbermaid container with 175 ml of water and add about 4 heaping spoonfuls of salt. Fit the lid securely and shake the salt and water vigorously. The water should become cloudy and fizzed. Pour the salt water into the second cup. Try floating an egg in the fresh water, ask the students ***What do you notice?*** Now try floating the egg in the salt water? Ask ***Does it float?*** (it should). ***The egg floats in the saltwater because the salt has made the water dense enough to support the weight of the egg.***

Closure:

When the students have finished the lab activities have them work on the word search worksheet while other groups finish up. When all groups have finished the lead parent closes the lab by asking the students to share something they learned from the lab or their favorite part. Thank the students and teacher.