

Marbled Eggs



Science
Film
Festival

Knowledge
Through
Entertainment

FILM

GUB Explorer Channel - Experiment with Eggs

KEY OBJECTIVES

- 1) To understand density
- 2) To understand that liquids have different densities
- 3) To understand buoyancy

INTRODUCTION

Density can be a tough concept to grasp. Density refers to how much mass there is in a particular space. If an object is heavy and compact, it has a high density. If an object is light and takes up a lot of space, it has a low density. Imagine a drawer full of socks. It has a certain density. If you take a sock out, the density of the drawer changes. This is because the mass of the socks has changed, but the volume of the drawer has stayed the same. Generally the more dense an object is, the heavier it feels.

Liquids too have different densities. Some liquids are heavier than others. The lighter liquids float on the heavier ones. Have you ever thought about why some things float on water while other things sink? Think about throwing a pebble in the water: does it sink or float? How about a basketball, does it sink or float? Little pebbles sink while a giant basketball floats, but why is that?

The secret is **buoyancy**, or the ability of objects to float in water or air. Whether or not an object has buoyancy depends mostly on two factors: the amount of water an object displaces and the density of an object. A pebble is dense and displaces very little water, therefore, it sinks. However, a basketball is not very dense and displaces more water; therefore, it floats.

This is a fun art activity to perform while learning about density and buoyancy.

TOPICS

Physics Chemistry

KEYWORDS

Density mixture immiscible

reaction buoyancy

LEVEL

Early Learner

RESOURCE TYPE

Experiment

INTENDED AUDIENCE SIZE

Small Group

MODE OF DELIVERY

Online

TIME FOR ACTIVITY

45 min.

Marbled Eggs



GUIDING QUESTIONS

- Why does the oil float on top of the water?
- Why don't the water and the oil mix?
- Why does the food color mix with the water and not the oil?

MATERIALS/PREPARATION

- Hard-boiled Eggs
- Oil (Vegetable, Canola, or any oil will work)
- Food Coloring (Assorted Colors)
- Vinegar
- Water
- Plastic Cups
- Small Bowls

TASKS/PROCEDURE

- 1 Place 1 cup of very hot water in a plastic cup, add 3-4 drops of food coloring and 1 tsp of vinegar. Mix well. Repeat with other colors.
- 2 Add the eggs in each cup and let sit for about 3 minutes. Remove and set on paper towels.
- 3 In each bowl, add about 1 inch of water. You only want about $\frac{1}{2}$ of the egg to be covered. Next, add 1 Tablespoon of oil to each bowl and 6-8 drops of food coloring.
- 4 Place one egg into each bowl. With a spoon, spoon the water/oil mixture over the egg and let sit for about 3-4 minutes. Then roll the egg so it turns over and let sit for another 3-4 minutes.

- 5 Take out and lay on paper towels. Let sit for a few minutes, then wipe off each egg with additional paper towels.

FOSTERING DISCUSSIONS

The science behind these colorful marbled oil and vinegar eggs is in the dyeing process!

Simple food coloring from the grocery is an acid-base dye and the vinegar traditionally used to dye eggs helps the food coloring to bond to the eggshell. The oil floats on top of the water because it is less dense or lighter than water. The food coloring has the same density as the water so it sinks through the oil and mixes with the water. When you put the egg in the final colored oil mixture, the oil keeps parts of the egg from bonding with the food coloring giving it a marbled appearance.

AUTHORS AND SOURCES

Submitted by Discovery Centre Kenya