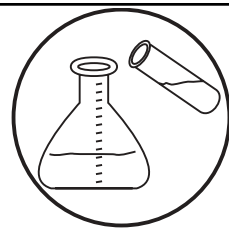


Density



Chemistry

7

Introduction

Overview

In Program Seven, students explore density as a property of matter. Students use this characteristic of matter to compare and seriate objects based on their density. Students observe that some crayons will sink in tap water but float in salt water. Salt is added to tap water in increments to determine which colors of crayons will float first. As an inquiry problem, students are shown two different cans of soda pop in an aquarium filled with water. One can floats and the other sinks. Students inquire into the problem, “Why does one can float and one can sink?”

Teaching strategies emphasize exploration, experimentation, and inquiry. Scientific thinking processes include observation, communication, comparing, seriating, categorizing, and relating.

.....
Big Idea: The properties of matter can be observed, described, and compared.
.....

Purpose

For students to do

1. Share and compare data from previous investigations.
2. Explore that some liquids will mix and others will not.
3. Observe, compare, and describe that some materials sink in tap water but float in salt water.
4. Investigate the concentration of salt needed to make different colors of crayons float.
5. Infer from experience that buoyancy is related to the density of both the floating object and the liquid it is in.
6. Inquire into a discrepant event.

For students to know

1. Density is a property of matter.
2. Objects can be sorted and classified based on density.
3. Density refers to the mass of an object compared with its volume.

Materials and Preparation

Kit Materials

- beakers
- crayons
- stirring sticks
- salt
- medicine cups
- plastic cups

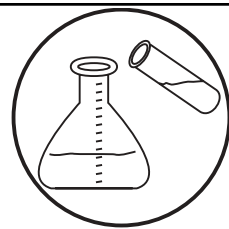
Teacher Provided Materials

- water
- rags or towels for clean-up

Duplication

Student Activity Sheet, page 7:4

Density



Chemistry

7

Outline

Viewing Activities: Let's Do Science!

Teaser: Floating Liquids

If two liquids won't mix, what will they do? Water, cooking oil, alcohol, and mineral oil are added to a cylinder in layers and then mixed by shaking the cylinder. After a moment new layers form. Students consider why some liquids appear to "float" on other liquids.

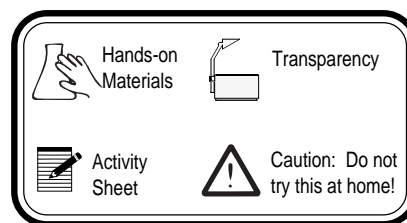
Sharing Data: Vitamin C Testing

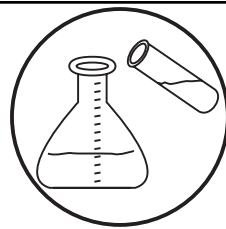
Students share the results of any additional investigations they have completed as a follow-up to Program Six.

Hands-On: Floating Crayons

Although paraffin wax floats, crayons generally sink in clean water but will float in salt water. Students investigate how changing the density of the water influences whether an object will float or sink in the water. Students also explore how the pigments used in crayons affect their density. (Viewing Activity #1, page 7:3)

Notes





Viewing Activity #1

Hands-On: Floating Crayons

Description

Although paraffin wax floats, crayons generally sink in tap water but will float in salt water. Students investigate how changing the density of the water influences whether an object will float or sink in the water. Students also explore how the pigments used in crayons affect their density.

Materials

for each student:

- 1 Student Activity Sheet

source:
page 7:4

for each group:

- 1 beaker
- w/ 300 ml water
- 1 piece of red crayon
- other crayon colors
- 1 stirring stick
- 1 medicine cup
- salt, in a plastic cup
- rags or towels

source:
kit
classroom
kit
kit
kit
kit
classroom

Note: Prepare cups of salt and beakers of water for each group in advance so that they can be quickly distributed during the telecast. Fill the beakers with 300 ml water. Remove the paper from the crayons in advance and break pieces for each group.

Leading the Activity

The studio teacher will introduce and describe the activity. Circulate in the classroom and assist the students as they complete the activity and discuss their ideas. Encourage the students to compare their own observations. Encourage the students to discuss their ideas about buoyancy and make note of concepts that need additional exploration.

The studio teacher will direct all the students to begin with one color to explore the initial idea that crayons will sink in fresh water and float in salt water. Different colors of crayons will be investigated following this first experience.

Procedure

1. Fill a beaker with 300 ml of water and add a piece of crayon (or several crayons) to the water.
2. Use the medicine cup to measure and add 5 cc (1 tsp.) of salt to the water and stir it with a spoon or stirring stick. Observe the crayons and record your results.
3. Continue to add salt, 5 cc at a time and record the observations. Be sure to stir the water long enough, each time, to dissolve all of the salt. Continue until all of the crayons are floating or no more salt will dissolve.

Range of Results

Density is a fundamental property of matter but may be a difficult concept for most students in this age range. Additional explorations may be useful to help students construct useful concepts of density and buoyancy.

A common naive concept is that things float and sink based on size. Although students have experienced that very big and heavy things can float, the notion that size or weight determine buoyancy are very persistent. Students may express that a large red crayon will be more likely to sink than a small piece of red crayon—or that more salt will be needed to make a large piece float than a small piece. Encourage the students to explore this concept by having them test large and small pieces *from the same crayon*.

Different brands of crayons contain differing ratios of pigment to wax and some crayons (typically less expensive crayons) will float in clean, fresh water. You may wish to explore this idea by testing several brands. You might try a certain color from several brands and see which floats first as salt is added. Test the crayons for the quality of the color they produce on a sheet of paper and compare this to the float and sink data.

Student Activity Sheet

FLOATING CRAYONS								
	BLACK	WHITE	RED	YELLOW	BLUE	BROWN	ORANGE	PURPLE
predicted rank								
number of scoops of salt								
rank								
comparison data								
comparison data								
comparison data								
NOTES/INFERENCES:								

