RAFT IDEAS

Topics: Density, Observation Skills, Physical Properties

Materials List

- ✓ Transparent water-tight container at least 23 cm (9") deep (e.g. – fish tank or 100 CD spindle)
- ✓ 10 or more cans of soda representing various beverage types (diet, regular, colas, non-colas, etc.)

This activity can be used to teach:
Next Generation Science Standards:

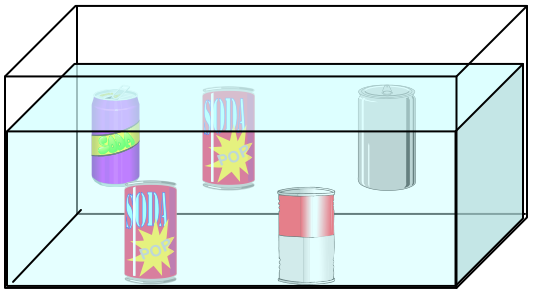
- Properties of materials (Grade 5, Physical Science 1-3)
- Mixtures (Grade 5, Physical Science 1-4)
- Changes of state (Middle School, Physical Science 1-4)

raft resource area for teaching www.raft.net

Diet Root Beer Floats

The Density of Carbonated Beverages

Volume measures the amount of space taken up by an object.



Density measures how tightly packed the matter is in an object (density = mass/volume).

Mass measures the amount of matter in an object.

Students investigate the physical properties of various types of soda in this eye-opening activity.

To Do and Notice

1. Place full cans of soda in a water-filled tank, either 1 at a time or more than 1 together (depending on the size of the container).
2. Record observations of which cans of soda float in the water tank and which cans sink. Encourage students to note as many attributes of the soda cans as possible (regular vs. diet, caffeinated vs. non-caffeinated, brand, can color, cola vs. non-cola)
3. Analyze data to conclude which soda attribute (caffeine, sugar, cola) determines whether a soda can is a "floater" or a "sinker".

The Science Behind the Activity

The 4 general properties of matter are: Volume, Mass, Weight, and Density. Density measures how tightly packed the matter is in an object, and the measurement is expressed using properties of mass and volume (Density = Mass of object(g)/Volume of object(ml); density = g/ml). For objects in liquids (soda cans in water) objects of greater density than surrounding fluids sink. Students should conclude that cans of regular soda sink, while cans of diet soda float. Increased dissolved solids (sugars) in regular sodas result in greater total soda can density (> 1 g/ml of water). Aspartame and other artificial sweeteners are much "sweeter" than regular sugar, so fewer dissolved solids are required to achieve the same amount of drink sweetness. Because of fewer dissolved solids, diet sodas have total soda can density of less than 1 g/ml and will therefore float in water.

Densities:	Water:	1 g/ml
	Air:	.0013 g/ml
	Aluminum:	2.7 g/ml

Taking it Further

Tape a portion cup to the top of a can of diet soda. Add a measured amount of sugar in a can of regular soda (usually about 45 grams!) to the attached cup and watch the whole thing sink.

Web Resources (Visit www.raft.net/raft-idea?isid=121 for more resources!)
For more information on beverages and their ingredients, visit:
http://www.bevnet.com/ and http://www.ameribev.org/

Written by Coral Clark (RAFT)