

Float or Sink Sodas?

GRADE 3 BENCHMARKS

SC.3.N.1.1 Raise questions, investigate them, and generate appropriate explanations.

SC.3.N.1.2 Compare observation made by different groups using the same tools.

SC.3.N.1.3 Keep records in charts of investigations conducted.

SC.3.N.1.6 Infer based on observations.

SC.3.N.1.7 Explain empirical evidence, observations and measurements that are used to validate explanations.

GRADE 4 BENCHMARKS

SC.4.N.1.1 Raise questions, conduct an investigation, and generate appropriate explanations based on exploration.

SC.4.N.1.2 Compare observation made by different groups using the same tools and seek reasons to explain differences across groups.

SC.4.N.1.4 Attempt reasonable answers to scientific questions and cite evidence in support

SC.4.N.1.6 Keep records that describe observations, distinguish between observations and inferences.

GRADE 5 BENCHMARKS

SC.5.N.1.1 define a problem, carry out a scientific investigation, collect and organize data and interpret it in charts, make predictions, and defend conclusions.

SC.5.N.1.3 Recognize and explain the need for repeated experimental (test) trials.

SC.5.N.1.4 Identify a control group and explain its importance in an experiment.

SC.5.N.1.6 Recognize and explain the difference between personal opinion (inference) and interpretations verified by observational data .

Teaching Background and Procedure

Float or Sink is an intermediate (grades 3-5) model investigation that investigates the relationship between the volume and mass of an object and how that affects its buoyancy (floating or sinking). The purpose of the activity is to model the steps involved in completing a mathematics or science fair project. Print the *Float or Sink* worksheet (and *Soft Drink Product information*) and gather the list of materials to demonstrate how to conduct an experiment to test a question about math or science. Have the class generate reasonable hypotheses (*questions*), about how they think the mass of a soda can will affect its floating or sinking in a tank of water, that can be answered through conducting an experimental test. Next have the students record the volume of each soda they will be testing from the Product Label Information (*worksheet*), then generate their own predictions of what might happen to each type of soda when it is tested in the tank of water. Conduct the experiments, record the results of three (3) separate trials. Last have the students weigh and record the mass (in grams) of each soda can.

Guide a discussion of the results. Ask, "Why did some soda cans sink (below the water level) while other soda cans floated (at the water level)?" Have the students identify any evidence from their recorded data that helps explain the differences in the soda cans (regular and Diet). Match each claim with the evidence (*observation data*) that supports it. Help the students compose a conclusion that accepts or rejects their original hypothesis and explains the results of their investigation.

Tell your students, "For any projects they want to enter in the math fair competition, they need to include an explanation of what math skills, computations, or processes they used in their investigation." Have them identify the math skills they used in this experiment. Confirm each correct skill, then have the students write a description of the math skills they used to complete their *Float or Sink* investigation.

Float or Sink Sodas

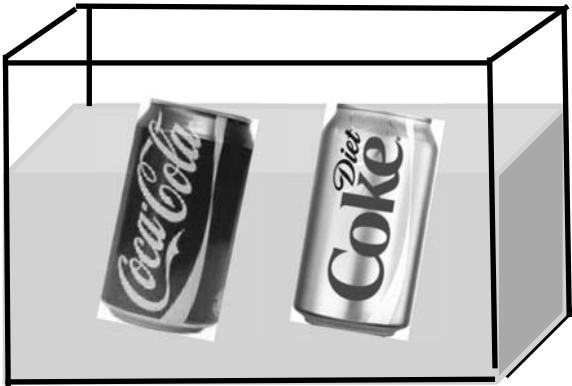
PURPOSE

Does mass affect whether a soda can floats or sinks in the water?

HYOTHESIS

MATERIALS

clear fish tank of water
1, can of CocaCola Classic, Diet Coke, Pepsi, Diet Pepsi, and Sunkist Orange Soda
Balance scale with gram masses.
Float or Sink worksheets



PROCEDURE

1. Read the product label and record the volume (mL) of each soda.
2. Predict and record which sodas you think will float (F) or sink (S).
3. Write your hypothesis statement.
4. Test each soda three times in a tank of water.
5. Weigh and record the mass (g) of each soda can.
6. Explain why some sodas float yet others sink.

DATA

FLOAT OR SINK TEST TRIALS

Soft Drink	Volume (mL)	Prediction	Test Trials			Mass (g)
			1	2	3	
CocaCola						
Diet Coke						
Pepsi						
Diet Pepsi						
Sunkist						

RELATIONSHIP TO MATHEMATICS

CONCLUSIONS

Soda Can Product Label Information

Coca Cola Classic

Serving Size: 1 can = 355 mL

NUTRITION FACTS

Calories 140

Fat 0g

Sodium 50 mg

Total Carb. 39g

Sugar 39g

Protein 0g

Pepsi

Serving Size: 1 can = 355 mL

NUTRITION FACTS

Calories 150

Fat 0g

Sodium 30 mg

Total Carb. 41g

Sugar 41g

Protein 0g

Sunkist Orange Soda

Serving Size: 1 can = 355 mL

NUTRITION FACTS

Calories 190

Fat 0g

Sodium 45 mg

Total Carb. 52g

Sugar 52g

Protein 0g

Diet Coke

Serving Size: 1 can = 355 mL

NUTRITION FACTS

Calories 0

Fat 0g

Sodium 40 mg

Total Carb. 0g

Sugar 0g

Protein 0g

Diet Pepsi

Serving Size: 1 can = 355 mL

NUTRITION FACTS

Calories 0

Fat 0g

Sodium 45 mg

Total Carb. 0g

Sugar 0g

Protein 0g