

Film Can Challenge

Objectives:

- to determine the buoyant force needed to make an object suspend in water.
- to compare the buoyant force to the weight of an object to determine if it will sink, float, or be neutrally buoyant

Materials:

- displacement tank
- graduated cylinder
- scale
- 1 empty film canister
- beaker
- cup with small objects of various masses (marbles, paper clips, pennies, etc.)

Procedure Part 1:

1. Using the materials at your desk, modify the film canister so that it will sink to the bottom of the tub of tap water.
2. Measure the volume of water displaced by the film can (see board)
3. Measure the weight of the water displaced in grams (see board)
4. Record the volume, weight, and buoyant force in your chart:
5. Have your teacher check your measurements before you proceed to the next part.

Procedure Part 2:

1. Once you have completed Part 1, modify the film canister so that it will float, sink, or remain suspended in the middle of a tub of tap water.
2. First make the canister sink and measure its mass
3. Next make it float (it must have cargo!)- measure its mass
4. Last it should remain suspended (3)- measure its mass
5. Copy the chart into your notebook and record the information in the Table.

Analysis and Results: (answer these questions with complete sentences!!)

1. What is the mass of an empty film canister?
2. Did the mass of the canister change at all? Explain.
3. Did the volume of the film canister change at all? Explain.
4. What caused each canister to stay at their level in the water? Explain what caused the canisters to float, sink, or suspend using the term buoyancy.

ANSWER In WORDS AND DRAWINGS WITH LABELED VECTORS:

Use the words: BUOYANT FORCE, DENSITY, WEIGHT, NET FORCE, FLOAT, SINK, DISPLACED WATER

DRAW FILM CAN, VECTORS LABELED WITH WORDS & MEASUREMENTS FROM LAB

(How does the buoyant force compare to the weight of the displaced water?)

NB
55

Film Can Challenge- or- Archimedes Principle

The buoyant force on an object in water is equal to the weight of the water displaced.

Objective: to compare the buoyant force to the weight of an object to determine if it will sink, float, or be neutrally buoyant

Canister	Mass of film can (grams)	Volume of water displaced (mL)	Weight of water displaced (grams)	Buoyant force (grams)
SINKS				
FLOATS				
Suspended in middle				

Analysis and Results: (answer these questions on NB page 55 with complete sentences!!)

- How does the buoyant force compare to the weight of the displaced water?
The buoyant force is the _____ as the weight of the displaced water because....
- Did the mass of the canister change at all? Explain.
The mass of the film can because....
- Did the volume of the film canister change at all? Explain.
The volume of the film can because....
- In each canister, how did the BUOYANT FORCE compare to the MASS of FILM CAN?
 - When it sank, the buoyant force was than the mass of the film can.
 - When it floated, the buoyant force was than the mass of the film can.
 - When it suspended, the buoyant force was than the mass of the film can.
- What caused each canister to stay at their level in the water? Explain what caused the canisters to float, sink, or suspend using the terms in the word bank.

ANSWER In WORDS AND DRAWINGS WITH LABELED VECTORS:

Use these words: BUOYANT FORCE, DENSITY, WEIGHT, NET FORCE, FLOAT, SINK, DISPLACED WATER

DRAW FILM CAN, VECTORS LABELED WITH WORDS & MEASUREMENTS FROM LAB
(How does the buoyant force compare to the weight of the displaced water?)