

Buoyancy Activity

Today you will be testing Archimedes' Principle which states:

Archimedes' principle indicates that the upward buoyant force that is exerted on a body immersed in a fluid, whether fully or partially submerged, is equal to the weight of the fluid that the body displaces and it acts in the upward direction at the center of mass of the displaced fluid.

To do this, you will be placing a plastic container into water and seeing how far down into the water it goes. You will be varying the weight of the container and observing the change in submersion. From this you can calculate the density of the water and if Archimedes' Principle is valid, then you should get close to the known value for the density of water.

Draw the force diagram of the plastic container below:



To add mass of your container, you will be added tablespoons of either flour or sugar.

Mass of 1 tablespoon of flour $\approx 9 \text{ g}$

Mass of 1 tablespoon of sugar ≈ 12.6 g

Data:

Cross sectional area of container: _____

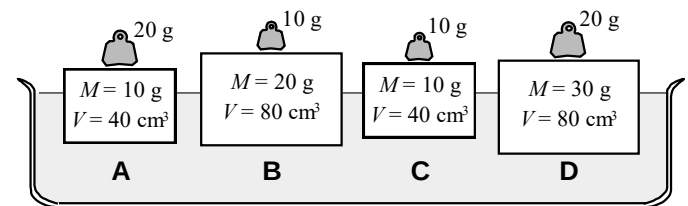
Total height of container:_____

[illegible]

For this lab, your goal is to find the density of water **GRAPHICALLY** so think what you need to graph on which axis to find the density. You must discuss what the slope AND y-intercept represent from your data. The density of pure water is 1 g/mL (1 mL = 1 cubic cm) and slightly differs due to temperature and contaminants in the water. In your report, you should find a % error and indicate if the water you used is pure water.

Post Activity Problems:

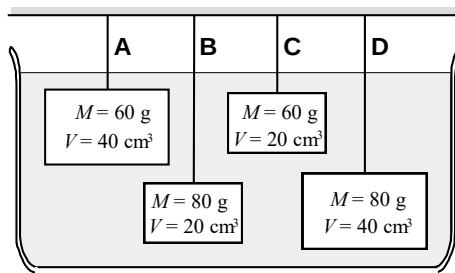
1. Wood blocks that have different masses and different volumes are floating in water. On top of these blocks are additional masses as shown.



Rank the buoyant force exerted by the water on the wood blocks.

				OR			
1	2	3	4		All	All	Cannot
Greatest			Least		the same	zero	determine

2. Four blocks are suspended from strings in water. Cubes A and C are at the same depth, as are B and D.



Rank the tensions in the strings.

				OR			
1	2	3	4		All	All	Cannot
Greatest			Least		the same	zero	determine