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Density Lab #1

## Research Question

How are density units determined? What is the real world application of density?

## Introduction

Density is defined mathematically as the ratio of a substance's mass and volume.

$$\rho = \text{mass/volume}$$

It uses derived units; in chemistry, the derived units are usually g/mL or g/cm<sup>3</sup>. The latter is equivalent to the former because 1 mL equals 1cm<sup>3</sup>.

## Procedures

First, we measured the mass of the gray plastic PVC sample using an electronic scale. We filled our graduated cylinder with 51 mL of water and then slid the sample into the cylinder. We then measure the new volume of the water, being careful each time to measure at the meniscus. Next, we subtract the two volumes to obtain the same volume. The sample's mass was divided by its volume to obtain density. Each lab group then announced their findings and a comparison of these was made.

## Results

1. 5.30 g
2. 51.0 mL
3. 55.0 mL

$$55.0 \text{ mL} - 51.0 \text{ mL} = 4 \text{ mL}$$

$$5.30 \text{ g} / 4.0 \text{ mL} = 1.325 \text{ g/mL}$$

Volume of the PVC sample: 1.325 g/mL

## Conclusion

The units of density are determined by the units used for mass and volume and then dividing those units with their respective quantities. These are derived units, renowned by computation.

Density is a physical trait that determines if an object will sink or float in a liquid. If the object's density is greater than the liquid's density, it sinks. If the object's density is less than the liquid's density, it floats.

The PVC had a greater density than H<sub>2</sub>O, and therefore it sank.

Mass - How much matter is in an object

Density - How tightly matter is packed together

Buoyancy - The ability of an object to float in a liquid or fluid

Physical Property - A measurable property of an object