

Density, volume & mass

Objective:

Students will learn about measurements and the properties of density, mass and volume, as well as where each can be applied and implemented.

Introduction:

Volume – How much space an object or substance takes up.

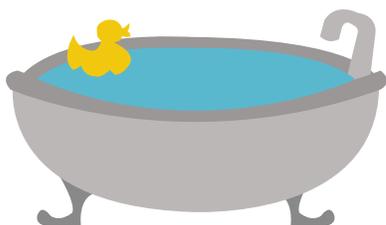
- Measured in cubic meters (m³), liters (L) & milliliters (mL).
- We use measuring cups (like the ones in your kitchen!) to find out how much volume a substance has, though we can also find the volume of an object by measuring its sides.
- <http://study.com/academy/lesson/density-lesson-for-kids-definition-facts.html>

Mass – Measurement of the amount of matter in an object or substance.

- Measured in grams (g) and kilograms (kg).
- We use a balance to measure mass.
- Unlike weight, mass doesn't change due to changes in gravity. A huge block of ice, for example, weighs much less in space because of lower gravity, but its mass is always the same.
- <http://study.com/academy/lesson/density-lesson-for-kids-definition-facts.html>

Density – How much space an object or substance takes up (its volume) in relation to the amount of matter in that object or substance (its mass). The amount of mass per unit of volume.

- If an object is heavy and compact, it has a high density. If an object is light and takes up a lot of space, it has low density.
- Measured in gm/L or mg/mL.
- Density = (Mass/Volume)



When you get in to a full bathtub your body takes up volume so the water spills out.

Materials:

- Balance
- Pipetteman
- Pipette tips
- 3 Beakers
- Liquids – water, salt solution, isopropanol

Protocol:

1. Place beaker on balance and tare/zero it.
2. Pipette 1 ml or 1000 μ l of the liquid to test into the beaker.
3. Record the weight (equal to mass on earth)
4. Calculate density (Mass/Volume) (1ml)
5. Compare densities of different liquids

Expected Results:

Students will be able to understand and replicate properties of volume, mass, and volume with liquids.

Supplemental:

For younger students:

Use plastic pipettes to squirt different amounts of colored water on to a filter paper

Materials:

- Plastic pipettes
- Colored Water
- Paper - filter or rice

Protocol:

Pipette different volumes of colored liquids on to the paper. This will demonstrate how different volumes diffuse on the paper.

