

Sinking and Floating Density Lab

Name _____ Period _____

Definitions

- Mass is a measurement of the amount **of matter or inertia that an object has**. In the metric system it is measured in kilograms (kg) or grams (g).
- Volume is a measurement of the **amount of space that an object takes up**. In the metric system, it is measured in liters (L), milliliters (ml), cubic centimeters (cm³) or meters cubed (m³).

Driving Questions:

1. Does the mass of an object tell you whether or not the object will sink or float?

Hypothesis: (must use the word “BECAUSE” in your statement)

2. What about the volume (do bigger objects sink compared to small ones)?

Hypothesis: (must use the word “BECAUSE” in your statement)



Density is defined as the amount of mass per unit volume. As a mathematical formula

$$Density = \frac{mass}{volume}$$

or

$$D = \frac{m}{V}$$

Part 1: Density of wood blocks.

You are going to determine the density of 3 of the wood blocks labeled A-H.

Materials: Wood Blocks, Scale, Ruler

Pre-experimental Hypothesis: Which block will have the greatest density?? Least density?? Why?? (must use the word "BECAUSE" in your statement and be SPECIFIC)

Data Table

Block Letter	Mass (g)	Measurements (cm)	Volume (cm ³)	Density (g/cm ³)
		L		
		W		
		H		
		L		
		W		
		H		
		L		
		W		
		H		

Round your density calculations to the nearest tenths place!

Questions:

How do the densities of the three blocks compare?

If you had a block of the same wood that was 10 ft long, what would you expect the density to be?



Part 2: Density of water

Determine the density of water using 3 different volumes of water using a graduated cylinder. Make sure the volumes are at least a difference of 10 ml between them.

Materials: 100 ml beaker, water

Mass of empty graduated cylinder: _____

Trial	Mass of water and grad. Cylinder (g)	Mass of water only (g)	Volume of water (ml)	Density of water (g/ml)
1				
2				
3				

How do the densities compare for your three different volumes of water?



Part 3: Density of Sand.

Determine the density of sand using a method of your choice. **Show all of your work below.**

Materials: Sand

List the densities you found in the three sections of the lab.

Density of wood _____

Density of Water _____

Density of Sand _____

Based on your data, explain why wood floats and sand sinks when placed in water.



Part 4: Internet Simulation

Using the internet, go to the following website and **work through the instructions**.

<http://ww2.unime.it/weblab/mirror/ExplrSci/dswmedia/density.htm>

- 1) Find the mass and volume of each object by dragging the each object and dropping it into the graduated cylinder and then onto the scale. Record these in the table below.
- 2) Calculate the density of the objects. Round each to the tenths place.
- 3) Overall Density Rank: Number the objects from lowest density (1) to highest density (10).
- 4) Now, with the density of the liquid in the pail set to 1.0 g/cc, set all the objects in the liquid and then indicate “YES if the object floats or “NO” if the object does not float.
- 5) With all the objects still in the liquid, adjust the liquid density to 0.8 g/cc and again indicate if each one floats or not with a YES or NO.
- 6) Click and drag the Green Triangle to the middle of the liquid and let it go. Click and drag the Red Oval to the middle of the liquid and let it go. Click and drag the Purple Oval to the middle of the liquid and let it go. Explain what happens to the Purple Oval and why!

- 7) With all the objects still in the liquid, adjust the liquid density to 2.0 g/cc and again indicate if each one floats or not with a YES or NO.

Description	Mass (g)	Volume (ml)	Density (g/ml)	Overall Density Rank	Does it float? Liquid density = 1.0 g/cc	Does it float? Liquid density = 0.8 g/cc	Does it float? Liquid density = 2.0 g/cc
Blue Square							
Blue Triangle							
Red Square							
Red Oval							
Pink Square							
Purple Oval							
Green Triangle							
Grey Triangle							
Tan Rectangle							
Red/Black Rectangle							

- 8) You should notice a correlation (pattern) between the density of an object and its ability float in a liquid. Complete the general rule below relating the density of an object to the density of the liquid it is in and whether it will sink or float. **Complete the following sentence explaining when object sink or float.**

If the density of the object is ...

