

# DENSITY LAB

**Purpose:** This lab emphasizes analytic measurements, experimental technique, and problem solving, in determining measurements. You will determine the mass and the volume of given materials to find their density (density = mass/volume). You must show ALL WORK! Never DROP UNITS!

## Equipment Needed:

Triple Beam Balance  
Ruler  
Pennies

Graduated Cylinder  
Calculator  
Unknown liquid

Beaker  
Blocks of materials

## Method:

You will break up into teams to perform this experiment. You will need to get your equipment for your workstation. To find the density, you will need to measure mass and volume. If your specimen has smooth, measurable sides (like a block or cylinder) measuring with a ruler to find the volume will be the most accurate. Otherwise you will need to find the displacement of the object to measure its volume. Be as accurate as possible.

## Procedures:

1. **(Liquid)**- Place a 10 mL graduated cylinder on the balance and record its mass. Put exactly 10 mL of the unknown liquid into the cylinder and find its mass again. Record your data in your data chart.
2. **Solid (regular shape)**- Use a ruler to measure the height, width, and length in cm. Record your data in your data chart. Use triple beam balance to find the mass of an object. Ensure your balance is calibrated. Calculate the density and fill in the data table.
3. **Solids (irregular shape)**- Put approximately 50 mL of water into a 100 mL graduated cylinder and record the exact amount in your data table. Gently place the object into the cylinder and record the new volume. Place the object on the balance and record its mass in your data table.

**Data:**            **SHOW ALL WORK!!!**

## Liquid:

Mass of empty graduated cylinder \_\_\_\_\_ g

Mass of cylinder and unknown liquid \_\_\_\_\_ g

Mass of liquid \_\_\_\_\_ g

Does this liquid float or sink in water? How do you know?

Data table

Specimen	Mass	Volume	Density
Black block			
White block			
Clear Block			
Sphere 1			
Sphere 2			
Masonry Nails			
Blue Screw			
Unknown liquid			

Find the density of pennies by graphing.

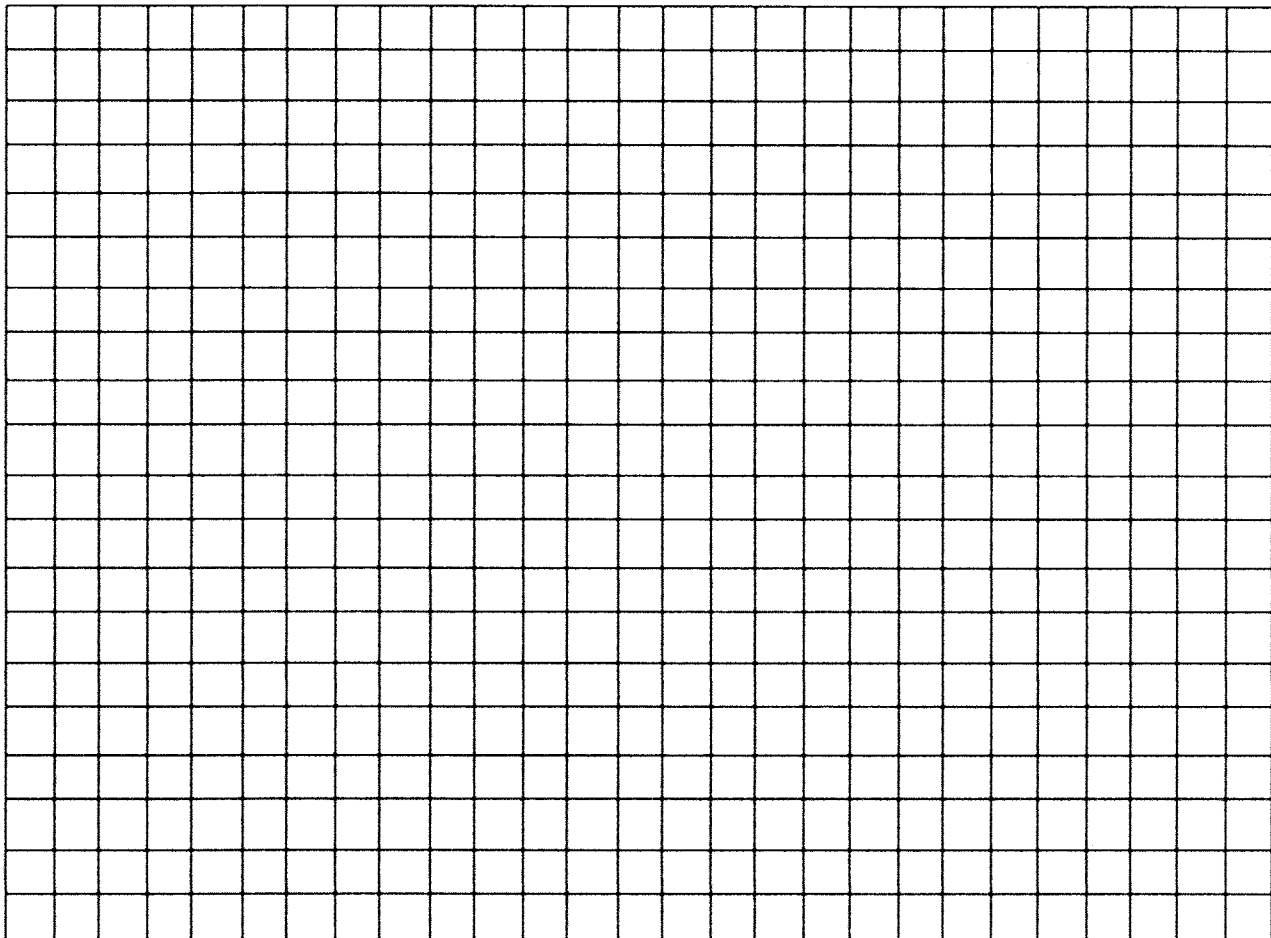
Procedure:

Volume by Displacement

- Place 25 ml water in the graduated cylinder and record the level.
- Place pennies into the water and record new volume
- Subtract the values to obtain the volume of the pennies
- Continue to add pennies to the cylinder to find the volume of 5,10,15,20,25 pennies. Remember to subtract the original volume of water. Record your measurements on the data table.
- Remove the pennies from the graduated cylinder and dry them with the paper towels.
- Find the mass of 5,10,15,20,and 25 pennies and put into data table

Number of Pennies	Mass of pennies (g)	Volume of pennies (ml)
5		
10		
15		
20		
25		

**Penny Density Graph**



Volume (ml)

Come up with and use an appropriate range of data to graph mass and volume of pennies. Ensure your increments are consistent and start at 0. Plot data points and then draw a best fit line to determine slope. Pick any two points on the line and find the slope. Hint: use numbers that are easy to see on the graph. Find the slope of your pennies' best fit line.

$$\text{Slope} = \frac{y^2 - y^1}{x^2 - x^1}$$