

# Density Lab

## Introduction

Think about common things around you: a dime, a cork, a ping-pong ball, a bowling ball, a battleship. Which of these things sink and which float? Do heavy things always sink? Do light things always float? In this activity, you will explore what determines whether an object floats or sinks.

In this lab, you have 10 objects that can be placed on a scale to measure mass, placed in a graduated cylinder to measure the volume, and dropped in a pail of liquid to view the effect of density.

<http://www.explorelearning.com/science/DensityLab/> Figure 1



## Procedure

Log on to the website in figure one. Familiarize yourself with the equipment in this virtual laboratory. Choose an object, and drag it onto the scale to determine its mass. Then determine its volume by placing it in the graduated cylinder. Finally, drop the object in the container of liquid. Did it sink or float? Experiment with objects **a** through **j** and record your calculations in table 1 below.

1. Make sure the density of the liquid is set to 1.0 and complete the following table:

Table 1

Object	Float (Y/N)	Mass	Volume	Density= Mass/Volume
a.				
b.				
c.				
d.				
e.				
f.				
g.				
h.				
i.				
j.				
<b>Density of liquid in pail =</b>				

2. Look for trends that determine the floatation of objects by examining the data in your table. First look at the relationship between mass and floatation.
  - Do the objects with high mass all sink?
  - Do the objects with low mass all float?
  - Could you tell, just from the mass of an object, whether it would sink or float?
3. Next, look at the relationship between volume and floatation.
  - Do the objects with high volume all sink?
  - Do the objects with low volume all float?
  - Could you tell, just from the volume of an object, whether it would sink or float?
4. The density of an object is defined as its mass divided by its volume. If two objects have the same volume but different masses, the one with the larger mass is more dense. For example, a golf ball is more dense than a ping-pong ball - they are about the same volume, but the golf ball is heavier. Similarly, if two objects have the same mass but different volumes, the one with the larger volume is less dense. For example, a nickel is more dense than an inflated balloon - they weigh about the same, but have different volumes.
  - Do the objects with high density all sink?
  - Do the objects with low density all float?
  - Will all objects with a density greater than a particular value always sink or float? How does this compare with the density of the liquid?
5. **Remove all objects from the pail.** Change the density of the pail liquid to 5 g/cc. Refer to table **1** and make a prediction about which objects will sink in this new liquid and which will float. Test your predictions by placing the objects in the pail. Record your calculations in table **2** below:

Table 2

Object	Float (Y/N)	Mass	Volume	Density= Mass/Volume
a.				
b.				
c.				
d.				
e.				
f.				
g.				
h.				
i.				
j.				
<b>Density of liquid in pail =</b>				