

Name:

Period:

## LAB 10.3 – DENSITY GRAPHING

### BACKGROUND

We have been working on understanding how the properties of matter called mass and volume relate to an object's density and also to how those relate to the buoyancy of an object. One of the methods of determining density is using a density graph. Another method is to calculate the density using the formula:

$$\frac{\text{Mass (g)}}{\text{Volume (mL or cm}^3\text{)}} = \text{Density (}\frac{\text{g}}{\text{mL}}\text{ or } \frac{\text{g}}{\text{cm}^3}\text{)}$$

### OBJECTIVE

Use data provided to create a density graph and then use the formula to calculate the density.

### MATERIALS

Graph Paper

Ruler

Markers/Colored Pencils

Resource Packet

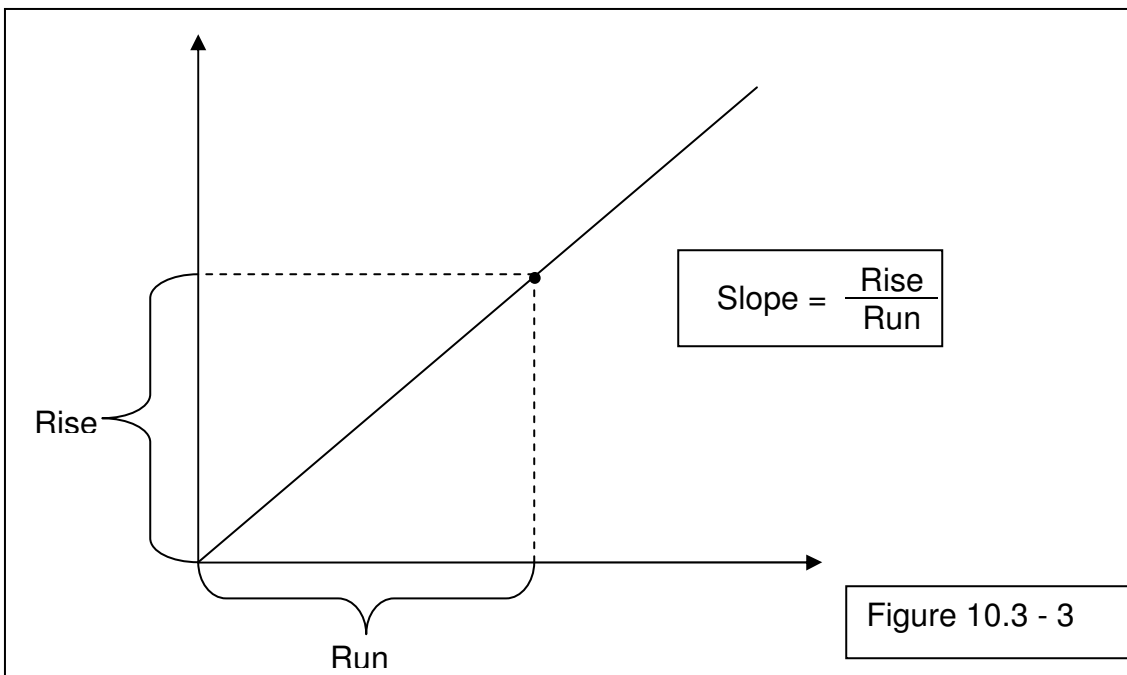
### PROCEDURE

1. Examine the data in table 10.3-1. Using the computer, create a density graph of the data.
2. Print the graph to the appropriate printer
3. Draw a density line to each point on the graph.
4. Choose one point on the density line (not the data point itself). Choose a point that is on or close to an intersection of two grid lines. Record the Rise and the Run of the point in Table 10.3-2.
5. Calculate the slope of the line by dividing the rise by the run. (See figure 10.3-3) Record the slope in Table 10.3-2.
6. Calculate the density of each object. Record your results in Table 10.3-1.
7. The calculated density should be the same as the slope of the density line. If not, repeat the steps above.

DATA

Table 10.3-1: Buoyancy, mass, volume and density of various floating and sinking objects				
Object	Buoyancy	Mass (g)	Volume (cm <sup>3</sup> )	Density (g/cm <sup>3</sup> )
Fishing weight	Negative	15	4	
Empty pill bottle	Positive	12	16	
Large piece of clay	Negative	19	10	
Small piece of clay	Negative	16	8	
Foam ball	Positive	3	12	

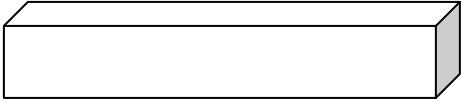
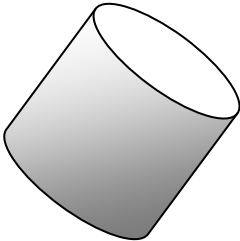
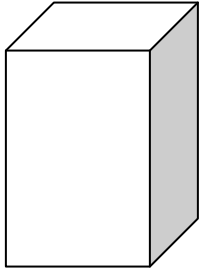
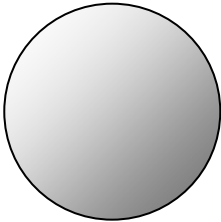
Table 10.3-2: Buoyancy and calculated density of various floating and sinking objects			
Object	Rise	Run	Slope
Fishing Weight			
Empty pill bottle			
Large piece of clay			
Small piece of clay			
Foam ball			



## SUMMARY

Fill out the **mass and volume** of each object below. Make sure that you have at least one each of positive, negative, and neutrally buoyant objects. Have your **lab partner or a parent** determine the density of each object and predict whether the object will be positively, negatively, or neutrally buoyant. Check their work and explain to them what they got wrong and why.

*Fill out the mass & volume information for each object. Have your lab partner/parent determine the density and buoyancy for each object.*

<p>a.</p> 	<p>Mass: _____</p> <p>Volume: _____</p> <p>Density: _____</p> <p>Buoyancy: _____</p>
<p>b.</p> 	<p>Mass: _____</p> <p>Volume: _____</p> <p>Density: _____</p> <p>Buoyancy: _____</p>
<p>c.</p> 	<p>Mass: _____</p> <p>Volume: _____</p> <p>Density: _____</p> <p>Buoyancy: _____</p>
	<p>Mass: _____</p> <p>Volume: _____</p> <p>Density: _____</p> <p>Buoyancy: _____</p>

## CHALLENGE

You have been placed in charge of creating LAB 11 – DENSITY OF LIQUIDS. Use this Lab Sheet to create a lab that will help you determine the density of liquids.

## LAB 11 – DENSITY OF A LIQUID

### BACKGROUND

### PROBLEM

### HYPOTHESIS

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independent variable

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dependent variable

The predicted relationship between the variables is:

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### MATERIALS

### PROCEDURE