Name:

Period:

LAB 10.2: VIRTUAL DENSITY LAB

BACKGROUND

We have explored the concept of the relationship of mass & volume of an object to an object's density. We have also collected data on the densities of floating and sinking objects to establish the relationship between an object's density and whether it sinks or floats.

PROBLEM

What is the relationship between an object's density and its buoyancy?

HYPOTHESIS

MATERIALS

- Pen
- Laptop computer
- Calculator

PROCEDURE

1. Get a laptop computer, turn it on, open up Firefox and browse to http://www.explorelearning.com.
   a. Click the "Browse Gizmos" button near up top, left corner.
   b. Under the Gizmo Catalog, click the drop-down menu for Science.
   c. Click on **Grades 6-8 – Physical Science**
   d. Click on **Physical properties of matter**
   e. Scroll down to "Density Laboratory." Click on **Launch Gizmo**.

   Note: If you are asked to install the Plugin for this activity, please do so.

Wait here for further instructions

DO NOT RANDOMLY EXPERIMENT WITH THE EQUIPMENT
If you finish early, you will have time to do your own experimentation

2. Use the virtual scale to measure the mass of each object. Record the data in table 10.2-1.

3. Use the virtual graduate to measure the volume of each object. Record the data in table 10.2-1.

4. Calculate the density of each object and record the results in table 10.2-1.

5. PREDICT whether Object 1 will float. Record your prediction. Make sure the density setting below the container of liquid is set to 1.0g/cc. It must stay at this setting for the entire experiment.

6. Test your prediction for Object 1. Record your results. Repeat steps 6 & 7 for the rest of the objects.

7. If you finish early, please feel free to experiment with the equipment as you choose. Please note that you will probably not be able to run other "Gizmos", but you are welcome to try.

8. Shutdown your computer.

9. Put your computer away and begin working on your summary questions.

DATA

Table 10.2-1:					
Object	Mass (g)	Total Volume (mL)	Density	Prediction (+, -)	Actual (+, -)
1 – Red Cone					
2 – Pink Egg					
3 – Purple Egg					
4 – Yellow Block					
5 – Green Ovoid					
6 – Blue Cube					
7 – Teal Cone					
8 – Grey Block					
9 – Purple Cone					
10 – Red Block					
11 – Red Ovoid					
12 – Green Ovoid					
Crown A					
Crown B					
Crown C					

SUMMARY

1. Can you tell, just from the mass of an object, whether it would sink or float? If so, why? If not, why not?

2. Can you tell, just from the volume of an object, whether it would sink or float? If so, why? If not, why not?

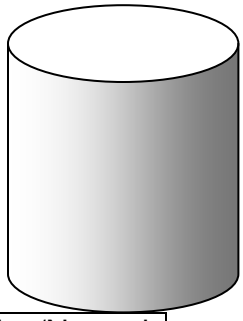
3. How does the density of negatively buoyant objects compare to the density of positively buoyant objects?

4. Which objects, if any, were neutrally buoyant? Were there any objects that were almost (but not quite) neutrally buoyant? What was the density of the neutrally buoyant objects?

CHALLENGE

1.

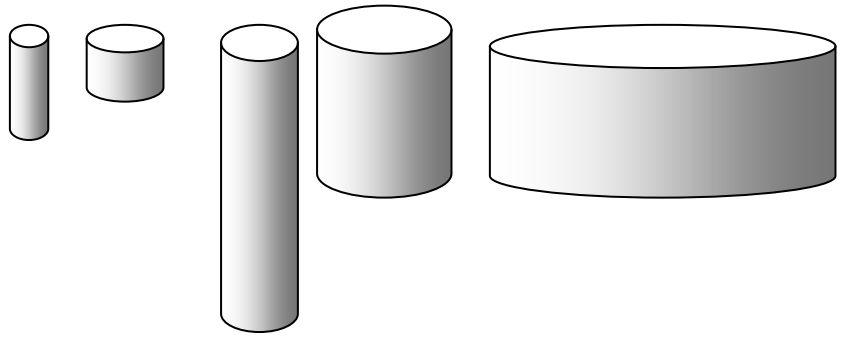
$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$



The can at the right as a total volume of $10cm^3$. Calculate the density of the can for each given mass, then state whether the object would be positively, negatively, or neutrally buoyant.

Mass (g)	Density g/cm^3	Negative/Positive/Neutral
2		
5		
10		
16		
20		

2. The five cans below have the volumes $2cm^3$, $5cm^3$, $10cm^3$, $16cm^3$, & $20cm^3$. If the mass of each can is 10g, calculate the density for each given volume. Then state whether the can is positively, negatively, or neutrally buoyant.



Volume (cm^3)	Density (g/cm^3)	Negative/Positive/Neutral
2		
5		
10		
16		
20		

3. Write a summative statement that describes what you now know about positive, negative and neutrally buoyant objects and their mass, volume and density.

4. This box has a density of 3.5 $^{g}/_{mL}$. How could you use the volume given to determine the mass of the box?