Name: ____________________________ Class: __________ Date; ________

Calculating the Density of Various Fluids

Learner Outcomes:

- Observe the mass and volume of a liquid and calculate the density using the formula d= m/v

Key Terms:

Mass	Volume	Density

Background Information:
Density explains why some substances will float in others and some will sink. For example, a grape will sink in cranberry juice, but float in peach juice. Oil will float on top of water, as will ice. We can predict whether a substance will sink or float in another by comparing their densities.

Research Question: What is the density of four different fluids?

Hypothesis: Predict the order of the substances from the most dense (heaviest) to the least dense (lightest)

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(most dense) (least dense)

Materials:

Water	Ethanol	Triple beam balance
Glycerine	Ethylene glycol (antifreeze)	50 mL graduated cylinder
Vegetable oil		

Procedure:

1. Dry and weigh the empty graduated cylinder. Record it's mass.
2. Add 25mL of water to the cylinder and weigh again. Record the mass and volume of the water.
3. Add water so the volume reaches 35 mL and record.
4. Add water so the volume reaches 50 mL and record.
5. Repeat steps 2-5 with the other liquids. Record your results.

Observations:

Substance	Volume of Substance (mL)	Mass of Container (g)	Mass of Container and Substance (g)	Mass of Substance Only (mass of beaker and substance – mass of beaker)	Density = Mass of Substance ÷ Volume (g/mL)
Water	25 mL				
Water	35 mL				
Water	50 mL				
Glycerine	25 mL				
Glycerine	35 mL				
Glycerine	50 mL				
Vegetable Oil	25 mL				
Vegetable Oil	35 mL				
Vegetable Oil	50 mL				
Ethyl Alcohol	25 mL				
Ethyl Alcohol	35 mL				
Ethyl Alcohol	50 mL				
Ethylene Glycol	25 mL				
Ethylene Glycol	35 mL				
Ethylene Glycol	50 mL				

Analysis:

1. From your results, rank your substances from most dense to least dense:

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   (most dense) (least dense)

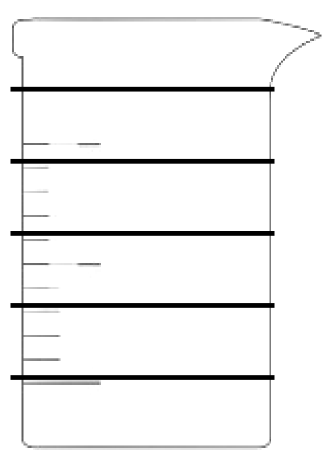
   Does your hypothesis match your results?

2. Which of these fluids has the fewest particles in the volume of space that it occupies? How do you know that?

3. If you wanted to float an object on one of these fluids, which would have the greatest buoyant force and why?

4. If you were given the following fluids, how would you arrange them in the "density cocktail" diagram below?

Fluid	Density
Water	1.0 g/mL
Mercury	13.55 g/mL
Vegetable Oil	0.9 g/mL
Glycerine	1.26 g/mL
Ethyl Alcohol	0.79 g/mL



Conclusion: Answer the research question.

Extension:

1. A can of regular soda pop will float in water, but a can of diet soda will not. Design an experiment to investigate why.
2. Objects are more buoyant in salt water than they are in fresh water. Design an experiment to investigate why.
3. Challenge!! Make an egg float!