Regents Chemistry
Ms. Randall
Lab Activity: Calculating Density

Background

Density is an important property of matter because it can often be used to identify a substance. There are several techniques that can be used to determine the density of a substance including water displacement, mass displacement, and geometry (LxWxH). Remember 1mL = $1cm^3$. Be aware of units!
Intensive properties depend on inherent properties of a substance, not the quantity of the substance (color). *Extensive properties* depend on the amount of the substance (length). For example, mass and volume are extensive properties and luster would be an intensive property.

Research Question: *Does density vary with sample size?*

Pre-lab Questions: (complete in lab notebook and have Ms. Randall check before going to next section)

1. Find the density of a substance with a mass of 123.4 grams and a volume of 56.2mL.

2. If substance A has a density of 2.3g/mL and water has a density of 1.00g/mL will substance A float or sink in water? Explain your answer.

3. Describe, *in terms of* particle arrangement, why substance A and water have different densities.

Procedure:

1. As a group, determine what your claim is going to be that addresses the research question "Does density vary with sample size?"
2. As a group, develop a model in your notebook that you will test through experimentation to support your claim. Remember to get feedback on your model from other groups and Ms.; Randall.
3. Conduct your experiment and collect data that you will use to support your claim.
4. As a group, determine if you need to make any adjustments to your model and or claim based upon the evidence that you gathered (this may include carrying out the experiment again) and then discuss your findings with Ms. Randall.
5. Complete your lab conclusion which includes a CER summary.

<u>Lab Conclusion Questions:</u> Calculating Density

1. Summary of your experimental claim, evidence and reasoning (6)

2. Base your answer to the following question on the information below.
A method used by ancient Egyptians to obtain copper metal from copper (I) sulfide ore was heating the ore in the presence of air. Later, copper was mixed with tin to produce a useful alloy called bronze.

Calculate the density of a 129.5-gram sample of bronze that has a volume of 14.8 cubic centimeters. Your response must include a correct numerical setup and the calculated results. (2)

3. Using a balance and a graduated cylinder, a student collected data on a sample of an element (2)

Mass of sample – 10.9 g
Volume of water – 30.0 ml
Volume of water and sample – 34.0 ml
Calculate the density of the sample. Answer must include unit.

Lab Grading Rubric

Component	Level		
	0	1	2
Claim - A conclusion that answers the original question.	Does not make a claim, or makes an inaccurate claim.	Makes an accurate but incomplete claim.	Makes an accurate and complete claim.
Evidence – Scientific data that supports the claim. The data needs to be appropriate and sufficient to support the claim.	Does not provide evidence, or only provides inappropriate evidence (evidence that does not support the claim).	Provides appropriate but insufficient evidence to support claim. May include some inappropriate evidence.	Provides appropriate and sufficient evidence to support claim.
Reasoning – A justification that links the claim and evidence. It shows why the data count as evidence by using appropriate and sufficient scientific principles.	Does not provide reasoning, or only provides reasoning that does not link evidence to claim	Provides reasoning that links the claim and evidence. Repeats the evidence and/or includes some – but not sufficient – scientific principles.	Provides reasoning that links evidence to claim. Includes appropriate and sufficient scientific principles.