

Names (Lab Partners): _____

Density & Buoyancy**Part II: Fundamental Measurements / Lab Applications**

Unknown Bag #	
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Using your data from the Measurements Lab clearly show your calculated results for the respective densities of the unknown materials in g/cm^3 , identify the respective metals based on their experimental densities in comparison to a list of accepted values, which can be found at:

<http://chemconnections.org/general/chem106/density-metals%20table.png>

The accepted density of the marble unknowns is 1.35 g/cm^3 . Using the accepted values, calculate the error in the experimental density versus the accepted value; ($\% \text{ error} = [\text{accepted} - \text{experimental}] / \text{accepted} \times 100$).

Metal Shot:

Experimental Density of the metal		Accepted Density of the metal		Identity of the metal	
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[Accepted Density – Experimental Density]	
Error (%)	

Metal Cylinder:

Experimental Density (geometric)		Accepted Density of the metal		Identity of the metal	
Experimental Density (displacement)					

[Accepted Density – Experimental Density] (geometric)		[Accepted Density – Experimental Density] (displacement)	
Error (%)		Error (%)	

Marble:

Experimental Density (geometric)		Experimental Density (displacement)	
[Accepted Density – Experimental Density] (geometric)		[Accepted Density – Experimental Density] (displacement)	
Error (%)		Error (%)	

Unknown Liquid:

The accepted density of unknown A is **1.20 g/cm³** and the accepted density of B is **1.00 g/cm³**. Using the closest one of the accepted values, calculate the error in the experimental density versus the accepted value for your unknown liquid.

Experimental Density	
[Accepted Density – Experimental Density]	
Error (%)	

The accepted boiling point of unknown A, (a sodium chloride salt solution) is **108.7°C**. and B, pure water, is **100.0°C**. Using the accepted value, identify your unknown as Salt Solution or Pure Water.

Unknown	
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Questions:

- Which experimental density method is more accurate: geometric or displacement? Briefly explain why this is the case.
- If a caliper were used instead of a ruler, the accuracy of the geometric method will change. Briefly explain in what way it is expected to change and how this would affect the accuracy relative to the displacement method.
- Explain what changes in your experimental procedure, that is, the equipment used and the sample handling methods could be made to improve the accuracy of the liquid unknown's density determination.
- Could density be used to distinguish between (a) gold and "fools" gold, iron pyrite (density = 5.01 g/cm³); (b) iron and zinc?; (c) manganese and chromium? Briefly explain your answers.

(a)

(b)

(c)