

Density Cubes Lab Name: _____ Date: _____ Period: _____

Pre-Lab:

Think about times when you have seen things float and other things sink. Discuss with your group what the difference is between things that float and things that sink. Fill in this sentence based on your discussion: "I think that _____ and _____ affect whether or not something floats."

Materials:

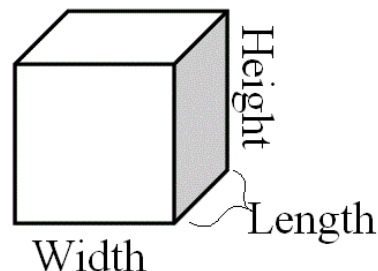
Unknown metal cubes

Graduated cylinders

Triple beam balance

Displacement cup

Metric ruler



Purpose: To determine the density of unknown metals.

Procedure:

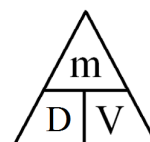
1. Write the type of metal of each of your samples in the data table below. If you do not know the type of metal, include a description such as "shiny silver" vs. "dull silver."
2. Using your metric ruler, measure the length, width and height of each of your samples and record them in your data table.
3. Use the length, width and height to calculate the volume of each cube and record that in the last data table column.
4. Use the following data table to complete your calculations:

Data Table #1:

Type of Metal	Length (cm)	Width (cm)	Height (cm)	Volume (cm ³)

5. Copy your descriptions of the metal from Data Table #1 to Data Table #2.
6. Using your triple beam balance, measure the mass of each of your samples and record it in the second data table below.
7. Use the information you collected to determine the density of each type of metal and record it in the second data table below.

$$D = \frac{m}{V}$$



Data Table #2:

Type of Metal	Mass (g)	Volume (cm ³)	Density (g/cm ³)

Analyzing Questions:

1. What is the same about each cube? What is different about each cube?
2. Would any metal cube float in water as is? Why or why not?
3. What would be necessary to make any of the metals float?
4. List the metals in order from the *least dense* to the *most dense*.

Calculation Questions:

Using the density for each material (Zinc, Aluminum, Steel, Brass, Bronze, and Lead) that you found to complete each of the following questions:

5. Aluminum is a material that is plentiful and inexpensive so it would be easy to get a large amount of it. How much mass would a 1000 cm³ piece of aluminum have?

Givens	Unknown	Equation	Substitution	Solve

6. Steel is also readily available, very strong but is quite heavy. If you didn't want a sample of steel to exceed 1000 g, what would be its volume?

Givens	Unknown	Equation	Substitution	Solve

7. An artist wants to make an art piece but can't decide if they want it to be out of brass or bronze. The piece will take up 10,000 cm³ of space and the stand it must sit on cannot hold a lot of weight. Should the artist make the piece out of brass or bronze if she wants it to be light?
 - a. Calculate the mass that volume would have if it was brass.

Givens	Unknown	Equation	Substitution	Solve
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b. Calculate the mass that volume would have if it was bronze.

Givens	Unknown	Equation	Substitution	Solve