LAB – Density Blocks

Purpose: To find the densities of substances by measuring the objects' mass and volume. Then, using your knowledge of density and the known densities of various substances (provided in the chart and calculated by you), predict which blocks will sink and which blocks will float when placed in water.

Materials:

- set of density blocks
- ruler
- triple-beam balance
- beaker
- calculator
- Density Chart (below)

Procedure:

1. Using a metric ruler, measure the length, width and height of a block and calculate its volume using the formula **V = l•w•h**. Record in the data table.
2. Using the balance, measure the mass of the block to the nearest tenth of a gram. Record in the data table.
3. Calculate the density of the block using the formula **D = m÷v**. Record in the data table.
4. Compare your results with the Density Chart and identify the name of the substance. Record in data table.
5. Using your calculated density and the actual density (from the Density Chart) of the block, predict whether the block will sink of float when placed in water. **D<1.0 = float; D>1.0 = sink**. Record in data table.
6. Test your hypothesis by filling a beaker approximately ½ full of water. Carefully place the block in the water so that it doesn't splash or crack the beaker. Record your observation in the data table.
7. Dry the block, and confirm identity with the teacher.
8. Return the block to the location from which you received it and obtain another block.
9. Repeat steps 1 – 8 for the remaining blocks.
10. Return all materials and make certain your data table is complete.
11. Answer the conclusion questions at the end of the lab.

Density Chart

Substance	Density (g/cm^3)
acrylic	1.1 – 1.2
aluminum	2.7
brass	8.3 – 8.7
copper	8.9 – 9.2
oak	0.60 - 0.90
pine	0.45
polypropylene	0.90 – 0.93
PVC	1.4
steel	7.9 - 8.2
Water	1.0

DATA TABLE – DENSITY BLOCKS

Unknown Substance	Volume Of Object (cm^3)	Mass Of Object (g)	Calculated Density Of Object (g/cm^3)	Prediction: Sink or Float?	Observation: Sink or Float	Identity Of Substance
1						
2						
3						
4						
5						
6						
7						
8						
9						

Conclusion:

1. What two quantities do you need to know to calculate density? _____ and _____
2. Is density a qualitative or quantitative observation? _____
3. How did you use density to identify an unknown substance? _____

   _____
4. If you drop a block of gold and a block of wood into water, the gold sinks and the wood floats. What can you conclude about the density of the gold compared to the density of water? The density of wood compared to the density of water?

   _____

   _____
5. Many objects are made of parts of different densities, such a metal scissors with a plastic handle. Metal sinks, but plastic floats. If the scissors sink when placed in water, what can you determine about the overall **density of the whole object** compared to the **separate densities** of the metal and plastic parts? _____

   _____

   _____.