

Buoyancy Worksheet

****Always check units!**

Unless they cancel:

Mass → kg

Length → m

Velocity → m/s

Force → N

Density → kg/m³Volume → mL or m³

1. Consider a block of material that is 12 cm × 7 cm × 2 cm and has a mass of 155 g.
 - a. Will it float in water (density of water = 1000kg/m³)? Show how you figured this out.

 - b. What is the buoyant mass of this object in water?

 - c. Will it float in cooking oil? Show how you figured this out. ($\rho_{\text{cooking oil}}=0.92 \text{ kg/m}^3$)

 - d. What is the buoyant mass of this object in cooking oil?

2. If I placed 3 cubes in a beaker that is exactly full of water, approximately how much water will overflow out of the beaker? All cubes have sides measuring 5.00 cm, two have a mass of 5.01 g and the other one has a mass of 16.78 lb. (1 L = 1 kg = 2.20462 lb) Hint: What will sink and what will float?

3. An empty, massless cube is measured to have all sides equal to 11 cm. It is floating in water and will slowly be filled with sand that has a density of 3.5 g/cm³. What volume of sand will cause the box to sink? ($\rho = \text{mass} / \text{Volume}$)