Name: _____

Class: _____

Due Date: _____

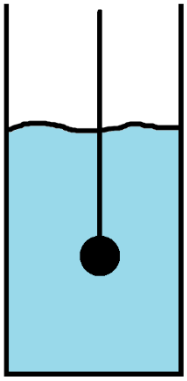
Physics Topic 11E – Applying Newton's Second Law of Motion to Buoyancy and Viscous Drag Force

Answer the following questions. The solutions to this worksheet can be found on the YouTube channel Go Physics Go.

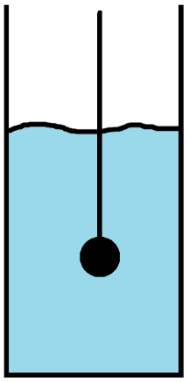
1. C: What is the *buoyant force*? State its equation and define each variable. Draw an image.

2. C: State the equation for the viscous drag force acting on a small sphere opposing its motion through a fluid. Define each variable. Draw an image.

3. E: A cube of gold with sides of 2 cm is hung from a string and submerged in water. Calculate the force of tension in the string. Gold has a density of approximately 19,300 $\frac{\text{kg}}{\text{m}^3}$.



4. E: A metal alloy has a mass of 115 g when measured in air and 105 g when measured in water. Calculate the volume and density of the metal alloy.



5. E: A wooden cube with a side length of 1 m has open top and a total mass of 125 kg. It is floating above the water.

   a. How deep will the wooden cube sink below the water?

   b. How much added dirt will be needed to get the wooden cube to be 0.500 m below the water?

6. E: The coefficient of viscosity of blood at 37.0°C is approximately $4.00 \times 10^{-3}\ \frac{\text{kg}}{\text{m}\times\text{s}}$. What will be the acceleration of a metal sphere with a mass of 0.500 g and a diameter of 1.00 cm the moment it is falling vertically down a tube of blood with a speed of 0.200 m/s? The density of blood is approximately $1{,}025\ \frac{\text{kg}}{\text{m}^3}$.