Lab 13 Pre-lab write up

Materials:

* Metal cylinder
* Assorted masses
* Beaker
* String
* Force Sensor
* Sparklink

For this lab, the goal is to determine the density of 7 different cubes made of different types of material. To achieve this, we will be using Archimedes’ principle and investigating the buoyant force. From the brief, we know that if the density of the object is less than the density of the fluid it’s placed in, it will float; and the reverse happens for an object with a greater density than the aforementioned fluid. To help us determine the density of the objects we will use in our experiment, we could do two types of tests: 1) Visual, and 2) Mathematical. The visual test involves identifying if the object floats or sinks to determine if its density is less than or greater than the density of the fluid. Of course, from this test, we won’t know the exact density of the 7 different cubes, however, we may be able to guess which density is greater or smaller based on how much they sink or float. The mathematical approach involves using the Archimedes’ principle and the three equations provided in the lab brief. We are able to calculate the density of the object based on the volume of the fluid, the density of the fluid, the mass of the object, and the buoyant force.

For our procedure, we need to calculate the density of water before we can calculate the density of the 7 cubes as it is a critical constant in our final equation. Using the metal cylinder provided and inserting it into a beaker filled with water, we can determine the density of the water by identifying the volume increased when the metal cylinder is placed in the beaker as we know the mass of the metal cylinder and the value of gravity. So we then rearrange equation 1 from the brief to help us solve for the density of the fluid (water).

Now that we know the density of the fluid, we will be placing the cubes in, finding the density of the cubes shouldn’t be an issue. We simply take equation 2 and 3 and subbing in the values known, and rearranging, we can then find out the density of each cube. Then, we can perform a physical test to visually prove that our densities are correct. If the cube sinks and the density we found is greater than that of the fluid, we know our calculations were on point.