Density and Buoyant Force Lab

Procedure

Make a chart with Quantity Measured/Symbol for Measurement/Instrument Used.
Briefly, but completely, describe the procedure for this lab – and include a labeled sketch.

Data

Arrange your data, neatly, in tables with correct headings and units.

Graphs & Diagrams

Using appropriate titles, scales, labels and units, create a graph that will allow you to find the spring constant, *k*, of you spring. See question #1 first before graphing.
Then graph weight versus spring force for the blocks submerged in water. See question #3 before graphing. Finally, draw the best fits lines for each of your graphs.

Questions

1) Draw a FBD for one of the metal blocks before it was placed in water. Write a net force equation for your FBD. Explain what quantities you should graph to find the spring constant of your spring. Use this info to create a data table next to your first graph.

2) Use your graph to find the spring constant of your spring. Show your work with units.

3) Draw a FBD for one of the metal blocks after it was placed in water. Write a net force equation for your FBD. Use your spring constant, spring displacement, the mass of each block and the gravitational constant to find the weight and spring force of each block. Show your work with units. Use this info to create a data table next to your second graph.

4) Use your graph to find the buoyant force on the blocks. (Hint: It's **not** the slope) Use the buoyant force you found, along with the volume of one of your blocks and the gravitational constant to find an experimental value for the density of water. Find the percent error between your experimental value and the actual value of 1000 kg/m^3.

5) Calculate the density of each block in kg/m^3 using your actual measurements. Show your work with units. Look up the densities you calculated, along with the physical properties of each block, to determine what types of metals were used in this lab. Explain your reasoning process.

Error Analysis

Thoroughly explain what the main sources of error are for this lab, and how you would correct them.