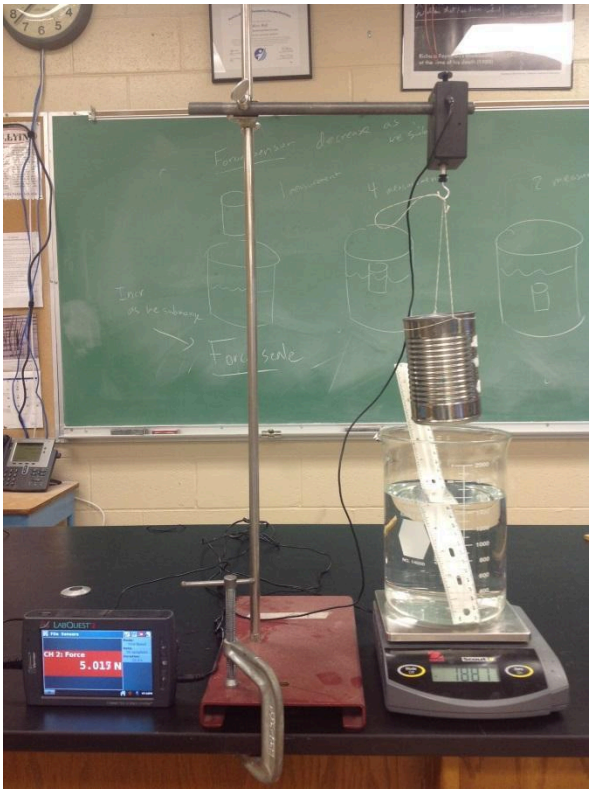
AP Physics 2 @ FHS – Fluid Statics Lab **Name:** **Date:**

Paradigm lab-Archimedes' Principle

The lab setup will look something like this:



Objectives:

- *Identify a relationship between pressure and depth for a fluid.*
- *Introduce the idea of buoyancy.*
- *Elucidate the forces on an object immersed partly or completely in a liquid.*

Pre-lab Questions

1. Draw a force diagram for the can when it is submerged below the surface of the water.

2. (a) The can begins suspended out of the fluid. What will happen to the support force as the can is lowered into the fluid? Why?

(b) What will happen to the mass registered by the balance?

2. Compare the force registered by the sensor when the object is lowered from a depth of 1X object height to a depth 2X the height of the object.

3. What factors determine if (and how much) force the fluid exerts on the object?

Lab Instructions

Measure the mass, height, and diameter of the can before beginning.

Collect force sensor readings, balance readings, and **depths** for the suspended. Be sure to get a reading before the object enters the water, at least four partially submerged readings, and two completely submerged readings. Be as accurate as possible in all of your measurements.

Make a table, and record your data below.

You will graph the data twice, once to show the relationship between support force and depth, and the second time to show the relationship between net upward force and depth.

2. Plot your data (DV vs IV) and **find a relationship between force and depth.** Manipulate data to make it linear, if necessary. Sketch the graph and best-fit below and write the equation for the best-fit. If the best-fit does not relate to the entire range of the data, indicate which parts of the data it does relate to.

3. Produce the calculated data you need to find the relationship between net upward force and depth. Produce the graph.

Post-Lab Questions

1. Be sure to interpret slope, intercept, and area of your plot. Do these have any physical meaning?

2. Go back to the pre-lab questions and review your answer to number two. Were you correct? Evaluate your response and provide a rationale for why you were right or wrong.