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Class: AP Physics II

Period: 1

Group #: 6

Lab # and Title: Lab 2: Hydrostatic Pressure

Laboratory Report

Purpose

This lab is an attempt to find the relationship between the pressure an object feels, and its depth in the fluid. We will be measuring the pressure of the water, and the depth at which that pressure was recorded. We are trying to answer, “what is the relationship between pressure and depth.”

Equipment Used

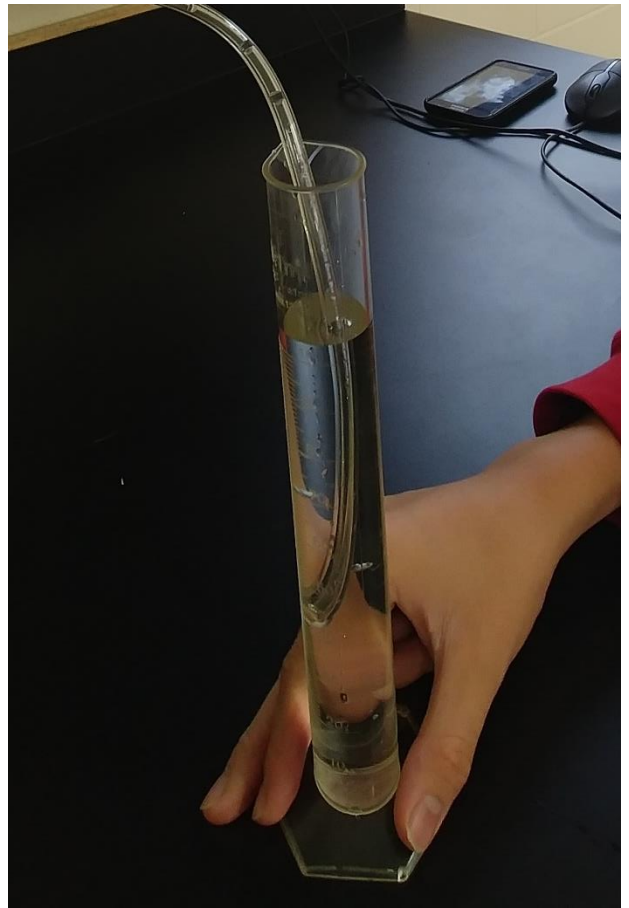
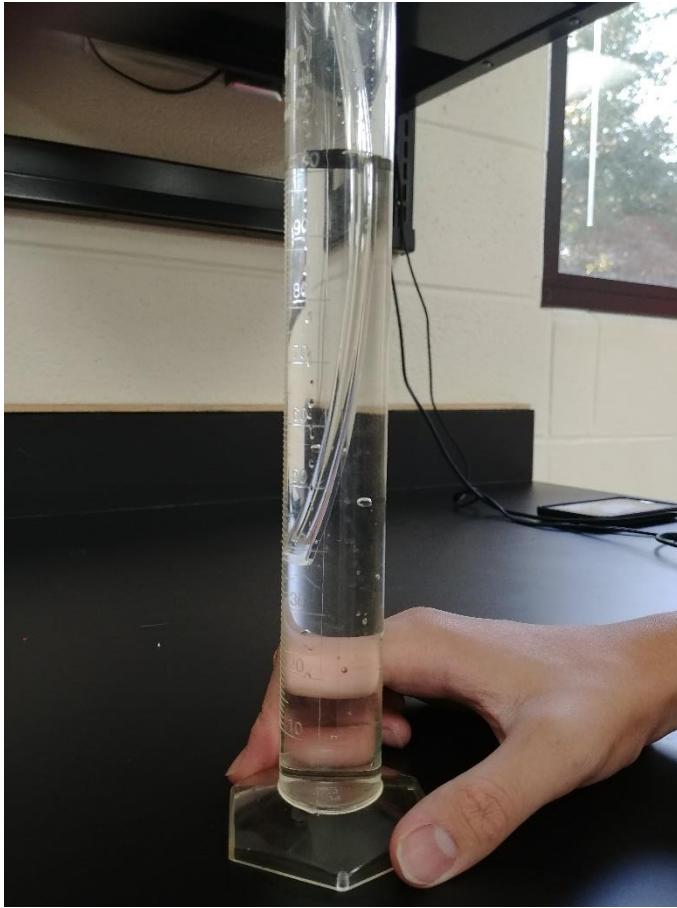
Our materials included a centimeter ruler, a pressure sensor, a pipe that fits on the pressure sensor, and a graduated cylinder.

Procedure

We started our approach by attaching a pipe to the end of our pressure sensor, making sure it was fixed securely. We then placed our pressure sensor on a surface significantly above the level of the table, for 2 reasons. First, it will help prevent the pressure sensor from getting water inside. It will also make holding the pipe at different depths easier.



We then placed our graduated cylinder on the table, and filled it with 100 mL of water. We then submerged the pipe in the graduated cylinder. We measured our depth values by using our ruler to measure the distance, in cm, between the water surface, and the opening of the pipe. We measured pressure by reading whatever the pressure sensor was displaying. We then moved the opening of the pipe to a different depth, shown below:



Then, we repeated, again using a ruler to measure the depth, and reading the pressure sensor for pressure.

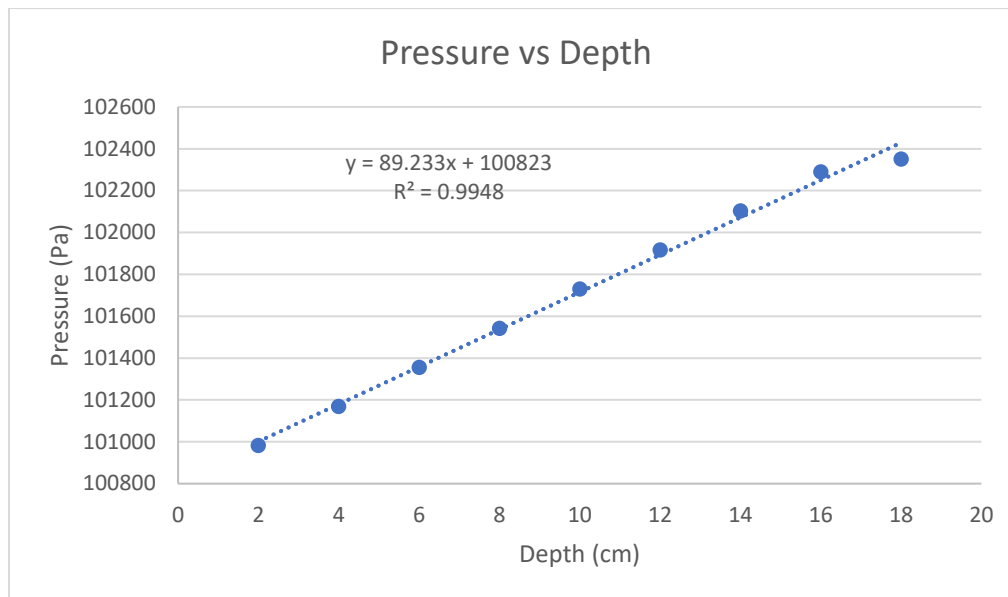
Data

Our raw data is as follows:

Pressure vs Depth

Depth (cm)	Pressure (Pa)
x	y
2	100982
4	101168
6	101355
8	101542
10	101729
12	101916
14	102103
16	102290
18	102350

We then plotted our data on a graph, and got this linear graph:



The graph is already linear, so no further linearization is needed.

Conclusion

Our data supports that the pressure of a fluid at any given point is dependent on the depth at which that point lies within the fluid, linearly. Our pressure sensor only reads to the nearest tenth, and our ruler to the nearest millimeter, which is accurate enough to prove a linear relationship, but not accurate enough to determine a scientific equation. Our main source of error would have been the pipe; it was coiled when we received it, and remained coiled throughout the lab. Because of this, different points along the opening of the pipe were at different depths. We tried to place the pipe in such a way to minimize the angle at which it rested, but no was near impossible. In addition, we read our depths using a ruler, which was placed parallel to the cylinder using our eyes, instead of using a cylinder with depths already labeled. We attempted to place the ruler as straight as possible, but keeping it that way was difficult.