

Purpose: To apply the Gas Laws to design an instrument to demonstrate Boyle's Law

Procedure: Make your own Cartesian Diver "System," including a way to measure the air volume within the dropper . (You can draw a face on your diver if you want to 😊)

Make a sketch:

System w/o Squeezing:

System w/ Squeezing:

Estimate:

V_1 = the volume of air in the dropper w/o squeezing the bottle

V_2 = the volume of air w/ squeezing

$V_1 = \underline{\hspace{2cm}}$ $V_2 = \underline{\hspace{2cm}}$

A few questions:

1) Explain how the diver works. What changes when you squeeze? Explain why.

2) What remains constant? 2 things?

3) Why does the cap have to stay on for this instrument to function?

4) Record what the Atmospheric Pressure in the classroom is. Be sure to include units.

$P_1 = P_{atm} = \underline{\hspace{2cm}}$

5) Apply Boyle's Law (p. 421) to solve for P₂. Use the values for volume that you estimated above

$$P_1V_1 = P_2V_2$$

6) Will went to Tahoe last weekend and made his diver there. When he came home it stopped working. The mountain air is thinner than in San Ramon. How did the changing pressure of the atmosphere affect her system? Why did the diver sink at home?

Worth 10 "Investigational Lab" Points

Category	Possible Points	Points Earned
Working well and staying on task during the entire lab time	2	
Sketch of bottles w/ and w/o squeezing	1	
Volume estimations	1	
Questions answered thoroughly	6	
Total Points	10	