

## Cartesian Diver Lab

Name: \_\_\_\_\_

After you complete the lab, answer the following questions:

1. Explain using text and diagrams precisely how the Cartesian diver works. Why does squeezing the bottle make the diver sink? Why does releasing the squeeze make the diver float back up? Your explanation should include something about gas laws & fluid dynamics.
2. Your explanation above of how a diver works probably depends on the diver being open on the bottom. Yet there exists closed-bottom divers. Describe how it behaves differently than a regular open-ended diver. Explain using diagrams why it still works.
3. Does the diver work better when there is a big air pocket in the top of the *bottle* or a small one? Explain...
4. If you wanted to make a series of divers, like in the video, that spelled out the word "H-E-L-L-O", how would you do it? Explain in enough detail to teach someone else how to make it...
5. In the video you saw a diver with glitter fountaining inside. Was it an open diver or a closed one?
6. In the video you saw a Jaws diver whose mouth opened up when it dived. Was it an open diver or a closed one?
7. In the video you saw a wadded-up piece of aluminum foil work as a diver. Explain how it worked.
8. A nail is pushed into a piece of Styrofoam packing material. Do you think that would work as a diver? Explain why or why not...

9. A candle (which floats) is tied to a paper clip. Do you think that would work as a diver? Explain...

10. What, if anything, would you have had to do differently in this lab if you had used...

a) ...oil in the pipet instead of water?

b) ...a heavier hex nut?

c) ...a smaller pipet?

d) ...a larger bottle?

e) ...helium instead of air?

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*we'll do these together:*

11. Sometimes, if a diver is set to be very sensitive, so it is just barely less dense than water, it will sink just fine, but then when the squeeze is released, it does not float back up, even though no air has been lost out of it. Explain why this happens:

12. A Cartesian diver is stuck on the bottom, with not quite enough air to get it to the top. List several different ways to get the sunken diver to the top of the bottle, and be prepared to explain each of them. (Hint: Think of the different factors you've learned about that affects a gas's volume)

1)

8)

2)

9)

3)

10)

4)

11)

5)

12)

6)

13)

7)