



Density Diver

Crew members of a submarine can control the submarine's density underwater by allowing water to flow into and out of special tanks. These changes in density affect the submarine's position in the water. In this lab, you'll control a "density diver" to learn for yourself how the density of an object affects its position in a fluid.

MATERIALS

- 2 L plastic bottle with screw-on cap
- water
- medicine dropper



SCIENTIFIC METHOD

Form a Hypothesis

1. How does the density of an object determine whether the object floats, sinks, or maintains its position in a fluid? Write your hypothesis below.

Test the Hypothesis

2. Completely fill the 2 L plastic bottle with water.
3. Fill the diver (medicine dropper) approximately halfway with water, and place it in the bottle. The diver should float with only part of the rubber bulb above the surface of the water. If the diver floats too high, carefully remove it from the bottle and add a small amount of water to the diver. Place the diver back in the bottle. If you add too much water and the diver sinks, empty out the bottle and diver and go back to step 2.
4. Screw the bottle cap on tightly so that no water leaks out.
5. Apply various pressures to the bottle. Carefully watch the water level inside the diver as you squeeze and release the bottle. Record your observations below.

6. Try to make the diver rise, sink, or stop at any level. Record your technique and your results.

Density Diver, continued

Analyze the Results

7. How do the changes inside the diver affect its position in the surrounding fluid?

8. What is the relationship between the water level inside the diver and the diver's density? Explain.

Draw Conclusions

9. What relationship did you observe between the diver's density and the diver's position in the fluid?

10. Explain how your density diver is like a submarine.



Density Diver, continued

- 11.** Explain how pressure on the bottle is related to the diver's density. Be sure to include Pascal's principle in your explanation.

- 12.** What was the variable in this experiment? What factors were controlled?
