

Fluids  
Station #4  
Cartesian Diver

**Task**

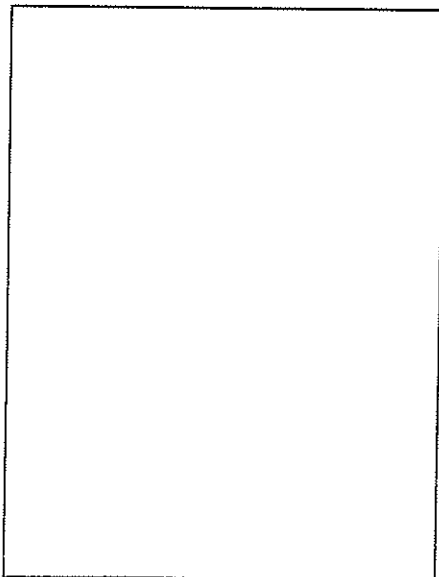
Construct an apparatus that will sink and float on command.

1. Fill the plastic soda bottle to the VERY top with water.
2. Fill the glass eyedropper 1/4 full with water.
3. Place the eyedropper into the soda bottle. The eyedropper should float and the water in the bottle should be overflowing. Seal the bottle with the cap.
4. Squeeze the sides of the bottle and notice how the eyedropper (called a diver) sinks. Release your squeeze and it float back up to the top. Squeeze again and observe the water level in the eyedropper (it goes up). Practice making the diver go up and down without making it look like you're squeezing the bottle. Amaze your friends with your ability to make the eyedropper obey your commands!

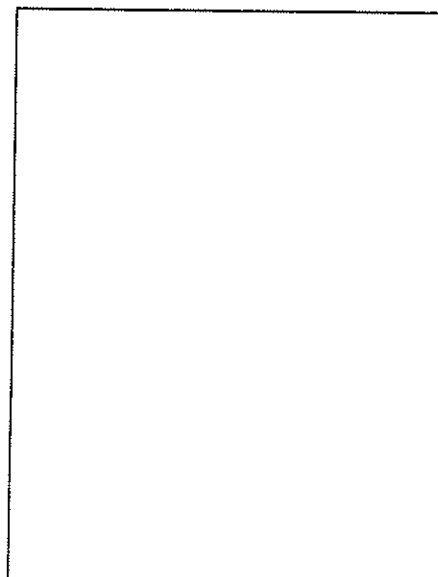
**How does it work?**

Squeezing the bottle caused the diver to sink because the increased pressure forced water up into the diver, compressing the air at the top of the eyedropper. This increased the mass of the diver causing it to sink. Releasing the squeeze decreased the pressure on the air at the top of the eyedropper, and the water was forced back out of the diver.

Draw a diagram of the eye dropper before you put pressure on the soda bottle.



Draw a diagram of the eye dropper after you put pressure on the soda bottle.



Did the volume of the air in the dropper change when you squeezed the soda bottle?

How did that affect the density of the air trapped in the eyedropper? Use the formula to help explain your answer.

When did water enter the eyedropper?

When did water exit the eyedropper?

Explain why the diver went up and down.