

A Cartesian Diver

Problem

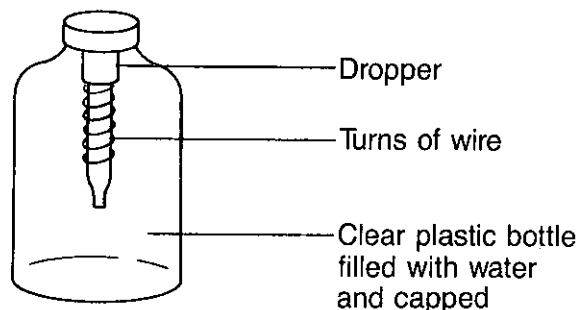
What is the relationship between the density of an object and its buoyancy in a fluid?

Materials (*per group*)

copper wire
medicine dropper
large clear plastic bottle with an airtight lid
glass
water

Procedure

1. Wrap several turns of wire around the middle of the medicine dropper.
2. Fill the glass with water and place the dropper in the glass. The dropper should barely float, with only the very top of it above the surface of the water.
3. If the dropper floats too high, add more turns of wire. If the dropper sinks, remove some turns of wire.
4. Completely fill the large plastic bottle with water.
5. Place the dropper in the bottle of water. The water should overflow.
6. Screw the cap tightly on the bottle. No water or air should leak out when the bottle is squeezed.
7. Squeeze the sides of the bottle. Record your observations. If the dropper does not move, take it out and add more turns of wire.
8. Release the sides of the bottle. Record your observations.



Observations

1. What happens to the dropper when the sides of the bottle are squeezed?

2. What happens to the dropper when the sides of the bottle are released?

Conclusions

1. What happens to the pressure of the water when you squeeze the sides of the bottle?

2. When you squeeze the bottle, some of the water is pushed up into the dropper. Why?

3. Why does the dropper sink when you squeeze the sides of the bottle?

4. Why does the dropper rise when you release the sides of the bottle?

5. How is the density of an object related to its buoyancy in a fluid?
