

A Cartesian diver

Introduction

Students make a Cartesian diver from a fizzy drink bottle and a plastic pipette. This experiment illustrates how gases are more compressible than liquids.

Topic

Particulate nature of matter, liquids, and gases.

Timing

Variable

Equipment

Apparatus

- Plastic disposable pipette, 5 cm³
- Hex nut, 11 mm across face to face
- Clear plastic soft drink bottle, 2 dm³, 1.5 dm³ or 1 dm³
- Plastic beaker, 250 cm³
- Scissors

Chemicals

- Water

Health, safety and technical notes

- Read our standard health and safety guidance here <https://rsc.li/3OHL4ob>
- Water may spill, clean any spillages.

Answers

1. Air is compressed and the volume of air is reduced.
2. When compared with those in liquids, the gas particles which make up air are a large distance apart. It is therefore easier to squash them closer together, thus reducing the volume.
3. When the bottle is squeezed, pressure in the water pushes on the pocket of air inside the diver. The volume of air is reduced, and this allows more water into the diver. This makes the diver denser, and it therefore sinks. When the pressure is released, the air expands, taking up a larger volume. Water is pushed out of the diver, which becomes less dense and therefore floats in the water.