

There's Air in There!

YOU WILL NEED:

2 identical empty clear plastic soda bottles (with screw-on caps)

push pin

water

clear deep container for water (aquarium, sink)

balloon

pencil

Although you can't see it and normally can't feel it, air pressure affects us every day, all day long, and in many different ways. The air is made up of zillions of atoms and molecules moving around in every direction and constantly bumping into everything around them. There are so many of these little particles bashing into things so often that they end up pressing on things pretty hard. That's air pressure. In the activities that follow, you will see some surprising things about air pressure!

Do this activity with a partner.

1 Remove the cap from one of the bottles and place the open bottle upside down in your large container of water. Push the bottle down about 8–10 cm. Don't let the water in the large container overflow.



2 Look closely at the mouth of the bottle. Did any water enter the bottle? What do you think is keeping more water from entering the bottle? Tilt the bottle to the side to allow some air to escape. What happened to the level of the water inside the bottle?

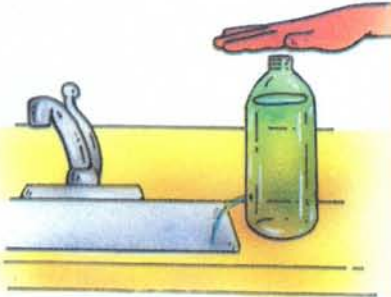


3 Use your push pin to carefully poke a hole in the side of the bottle near the bottom as shown. Place the bottle upside down in the water again. What do you observe about the level of water in the bottle now?



4 If you want to observe the process again, empty the bottle into the large container. Cover the hole with your finger and place the bottle upside down in the water again. Take your finger off the hole and observe the water level in the bottle.

5 Working on the counter at the edge of your sink, **fill** the bottle with water and **observe** the water coming out of the hole into the sink in a thin stream. After a few seconds, **cover** the mouth of the bottle with the palm of your hand. What happened to the water coming out of the hole?



6 Screw on the bottle cap. **Hold** the bottle sideways with the hole facing down. Does the water still stay in the bottle? Stand the bottle upright again. **Loosen** the cap a little. What do you observe? **Tighten** the cap again.



7 Remove the cap and **place** a balloon over the opening of the bottle. Does the water come out of the hole with the balloon on the bottle? Describe what happens to the balloon as the water comes out. What does the balloon look like when the water stops?



8 Pull up on the balloon and then let go. What do you notice? **Watch** the hole and **pull** up on the balloon again. What did you observe? Why do you think air comes in when you pull up on the balloon?

9 Use a pencil to **make** your pin hole the same diameter as your pencil. **Put** your finger over the hole and fill the bottle with water. Your partner should **fill** the other bottle with water. When you say "go," take your finger off the hole while you each turn your bottle upside-down. Which one empties first?



10 Try steps 5 and 6 again to see what happens now that your bottle has a larger hole!