

Section 4

Understanding Earth and Space Systems

EXPLORATION 2

Air Power

Discover the force of air at work.

Did you know that air presses on you all the time from all directions? Since the air and fluids inside your body push back against the force of air on the outside, you are not moved or compressed by air pressure.

We can see the force of air at work in many ways. For example, we can drink with a straw due to unequal air pressures.

Do the experiment on the following pages to see the force of air in action!



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In this experiment, you will learn about air pressure and see it in action.

Level of Difficulty:

moderate

Time Needed:

10 minutes

Hypothesis:

Circle the word to show your hypothesis.

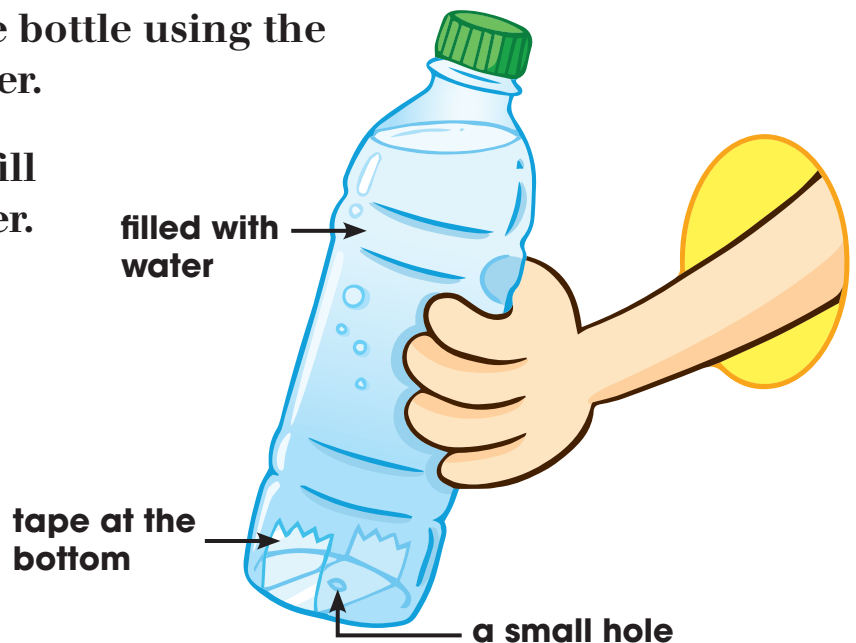
Air pressure **can / cannot** control the flow of water.

Materials:

- a nail
- a hammer
- a plastic water bottle
- tape
- water

Steps:

1. Ask an adult to help make a small hole in the bottom of the bottle using the nail and the hammer.
2. Tape the hole and fill the bottle with water.
3. Screw the cap onto the bottle and hold it over a sink.



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4. Gently pull the tape off the bottom of the bottle and observe. Did any water flow out?
5. Unscrew the cap and observe. Did any water flow out?

You can try screwing and unscrewing the cap a few times. What did you notice?



Conclusion:

Read the conclusion. Circle the correct word.

When the cap was on, water did not flow out from the bottom. When the cap was off and the air pressure changed inside the bottle, water flowed out immediately. The air pressure controlled the flow of water.

My hypothesis was **correct / incorrect** .

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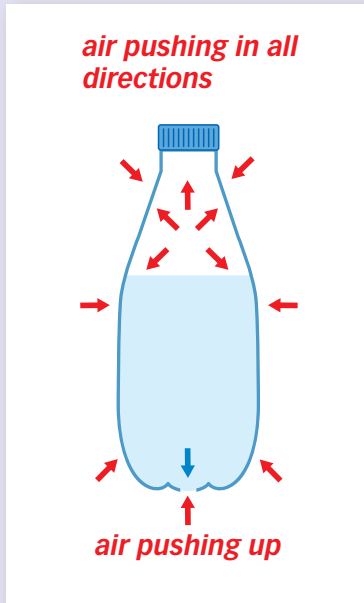
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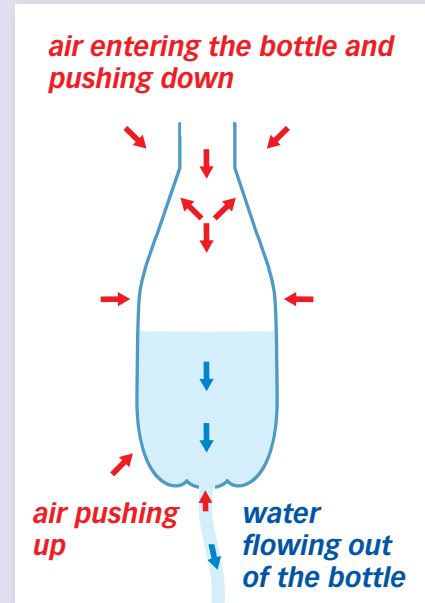
Explanation:

Were you surprised that no water came out of the bottle when the cap was on? This is because the force of air was at work.

The cap is on.



The cap is off.



When the cap was on, the water tried to flow out due to the pull of gravity. However, it was unable to do so because there was nothing to take up the space filled by the water if it flowed out. Also, the air below the hole pushed up against the pull of gravity on the water. Because these two forces were in balance, the water stayed in the bottle.

When the cap was off, air was able to enter the bottle and push down on the water. The pull of gravity along with the air pressure were enough to force the water out of the bottle.