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How to Crush a Can with Air Pressure

How Strong is Air Pressure?



Adult supervision required



15 minutes

You could probably crush an empty can with your bare hands... but is there a way to crush it with just water?

You can with pressure! **Pressure** refers to the force that gas particles exert on an object or the environment. Temperature and Pressure are directly proportional, meaning that as temperature increases, so does pressure.

A change or imbalance between the pressure inside the can and the atmospheric pressure is known as an **implosion**, which you will observe through this experiment

Materials

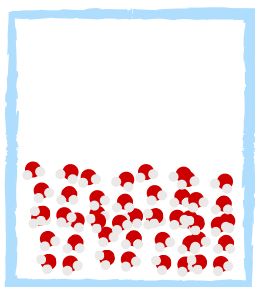
- ☐ Cold water
- ☐ Medium sized bowl
- ☐ Measuring Cup
- ☐ Empty aluminum soda can
- ☐ Tongs
- ☐ Heat Resistant Gloves
- ☐ Stovetop, burner, or microwave
- ☐ Safety Goggles
- ☐ Ice



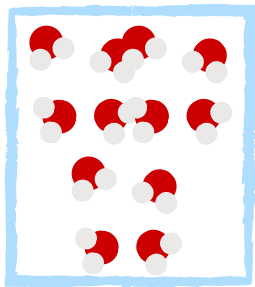
Understand the Science

- ★ Before heating the can, it consists of liquid water and gaseous air molecules. When you heat the can, **energy** is added to the liquid water, causing the molecules to move around more and change its state of matter from liquid water to gaseous water vapor. The inside of the can is now filled with water vapor, which pushes out all the other gases, and a small amount of water.
- ★ When you place the can of hot water upside down in the cold water, the water vapor condenses inside the can, changing states of matter from a gas to a liquid, turning into liquid water.
- ★ The pressure on the inside of the can is much less without the gaseous water vapor, causing the outside **atmospheric pressure** on the can to be much greater than the pressure inside of the can. Pressures always want to be balanced, or in **equilibrium**, so BAM! Your can is crushed immediately!

Liquid



Gas



Increase in **temperature** and **energy**

Procedure

Step 1:

Take cold water and fill up about half of the bowl. Then, pour 100 mL of water into the soda can.



Step 2:

Prepare a medium sized bowl with ice water and set aside.



Step 3:

THIS STEP REQUIRES PARENT SUPERVISIONS! Place the empty soda can on the stovetop or a hot plate to heat up. Ensure that this step is completed with gloves and goggles. Heat the can until you can see water vapor coming out of the top.



Step 4:

Take your tongs and pick up the can, turning it to dunk the can into the water. This step should be done quickly for the experiment to work. Observe how the can is crushed by the air pressure! Cool, right?

