EXCITING! At home can experiment

HAVE YOUR PARENTS HELP YOU WITH THIS EXPERIMENT!

**CAUTION: Do not heat the can over high heat or heat the can when it is empty. This may cause the ink on the can to burn or the aluminum to melt.**

For this experiment you will need:

* an empty aluminum soft-drink can
* a 2- or 3-liter (2- or 3-quart) saucepan
* a pair of kitchen tongs

1. Read the instructions for the experiment.

2. What do you think will happen when you invert the can into the pan with water?

3. Follow the procedure below:

a) Fill a saucepan with ice cold water.

b) Put 15 milliliters (1 tablespoon) of water into the empty soft-drink can.

c) Heat the can on the kitchen stove (low heat) or hot plate to boil the water. When the water boils, a cloud of condensed vapor will escape from the opening in the can. Allow the water to boil for about 30 seconds.

d) Using the tongs, grasp the can and quickly invert it and dip it into the water in the pan.

4. What did you observe?

5. What happened to the air inside the can when you boiled the water?

6. What happened to the water vapor inside the can when it was immediately cooled?

Here’s what happened:

What caused the can to collapse? When you heated the can you caused the water in it to boil. The vapor from the boiling water pushed air out of the can. When the can was filled with water vapor, you cooled it suddenly by inverting it in water. Cooling the can caused the water vapor in the can to condense, creating a partial vacuum. The extremely low pressure of the partial vacuum inside the can made it possible for the pressure of the air outside the can to crush it.

A can is crushed when the pressure outside is greater than the pressure inside, and the pressure difference is greater than the can is able to withstand. You can crush an open aluminum can with your hand. When you squeeze on the can, the pressure outside becomes greater than the pressure inside. If you squeeze hard enough the can collapses. Usually, the air pressure inside an open can is the same as the pressure outside. However, in this experiment, the air was driven out of the can and replaced by water vapor. When the water vapor condensed, the pressure inside the can became much less than the air pressure outside. Then the air outside crushed the can.

7) Draw a picture of what happened using arrows showing the air pressure at different stages.