

Collapsing Can

Purpose

To develop problem solving skills using the gas laws

Materials

Heating unit (ringstand, ring, bunsen burner/hotplate)

Aluminum soda can

Tongs

Bucket/tub of cold water

Procedure

1. Pour about 5-10 mL of tap water into an aluminum can.
2. Heat the can on a hot plate until the water is boiling and steam pours out of the opening.
3. Using tongs, remove the can from the heat source and quickly invert the can in the bucket of cold water, submerging the opening underwater.
4. The can will be crushed very quickly with a bang.

Additional Information

1. A variation involves using aluminum can with a lid. Pour about 50 mL of tap water into the can, heat to boiling, and seal the can with the cap or with a stopper and remove from the heat source. The can will crush within a minute.

Questions for the Students

1. What is the pressure inside the can before the water is heated? as the water is being heated? when steam is pouring out of the can? when the can is removed from the heat and sealed? (Have the students compare the pressure to atmospheric pressure.)
2. What differences, if any, would there have been if water had not been added to the can, but it was still heated? Why?

Disposal

The can should be thrown in the trash.

Reference

ICE Demonstration Workshop, University of Arizona, 1986.