

EXPERIMENTS YOU CAN DO AT HOME!!!

“The Collapsing Can”

adapted by Fusion Science Theater

Here is an experiment that is similar to the one we did at the end of our Science in a Box “The Boiling Point” show. We used a large metal paint, but this experiment uses an everyday soda can, so you can do it at home.

CAUTION: You must use the stove in this experiment, handle a very hot soda can, and avoid super hot steam. Before you do any of this, ask an adult to help you or at least be in the room. Also, don’t heat an empty can or heat a can over high heat or the aluminum can may melt and the ink on the label may burn. Again, do not try this experiment on your own!!

For this experiment you will need:

- an empty aluminum soft-drink can
- a 2- or 3-quart saucepan or a large basin
- kitchen tongs
- water

Fill the saucepan with cold water. Put 1 tablespoon of water into the empty soda can. Heat the can on the kitchen stove until the water boils—you’ll know it’s boiling because a cloud of water vapor will come out of the top. Wait about 30 seconds, then, grab the can with the tongs and turn it upside down into the cold water.

What happens?

Want to know why?

The reason the soda can collapsed is the same reason the big metal can in the Science in a Box show was crushed!

To understand this, you have to know a little bit about gas and something called gas pressure. Remember when the water in the teapot boiled? The water molecules that were in the liquid danced so fast that they left the liquid, spread out, and filled up the balloon. These molecules became a “gas” called steam. These molecules in the gas hit the inside of the balloon and pushed on it—this is called gas pressure. When more and more molecules turned into gas, the pressure inside the balloon got greater than the pressure made by air molecules outside the balloon (air pressure), so the balloon got bigger.

BUT, when the teapot was set in ice, the water molecules cooled down, slowed down and got back together to form liquid water again. (This is

called condensation). Because the number of water molecules hitting the inside of the balloon went down, the pressure did, too. When the pressure inside the balloon was less than the air pressure outside, the balloon got smaller and was finally sucked into the teapot.

The same thing happened with the large metal can—when we heated the water in the can to boiling at the end of the show, the water molecules left the liquid, became gas, filled up the can, and escaped out of the top in what looked like a cloud. These water molecules also pushed out the air that used to be in the can before the water boiled.

Then, when we plunged the can into cold water, the water molecules in the gas came back together to form liquid water again, and the pressure inside the can went down. But this time there was a cork in the opening of the can, not a balloon. The cork could not slip inside the can, so when the pressure inside the can became less than air pressure outside the can, the air pressure crushed the can.

You didn't have a cork in your soda can. What did you do so seal the can like the cork?