

### Super-heated Pop Can Experiment

**Safety:** Wear safety goggles, use tongs to move hot items, use caution around the heated surfaces.

**Question:** What will happen when a pop can filled with steam is submerged in ice water?

**Pre-lab theory:** Kinetic molecular theory states that particles of a substance move faster and farther apart with increased energy (temperature). When the particles are cooled they quickly move closer together. If this is in a sealed system it will create a vacuum pulling the walls of the can inward.

**Hypothesis:** If water in a can is heated to reach its boiling point and then dipped in a cold bowl of water, then it will fold in on itself.

**Materials:**

- Bowl/large container
- Ice cubes
- Cold water
- Tongs
- 150 mL beaker
- Empty aluminum can
- Hot plate

**Procedure:**

1. Fill bowl with water and add ice. Turn on the heating element to high. Fill the can with approximately 1cm of water and place on heating element.
2. When can has released steam for 3 min, use the tongs to pick up the can and pour any additional liquid into the beaker.
3. Quickly submerge the can upside down in the water.
4. Record observations.

**Observations:** Can began to make sounds when it was vigorously boiling. Steam began to come out of the can. When the can was submerged it quickly collapsed into itself making a crunch sound.

**Conclusion:** My hypothesis for this experiment was that a super-heated can would collapse in on itself when submerged in cold water. My hypothesis was correct as the can did fold in on itself. The water molecules changed from a liquid to gas and as it was heated further, the gas particles increased speed and moved further away from one another. When they cooled down they came closer together but since the system was sealed (and couldn't pull additional particles in) it created a vacuum. One source of error would be that if there was a hole in the can (or the opening not completely submerged), the vacuum would not be complete and the crunch wouldn't be as dramatic.