Here's the real scoop on the science of the imploding can. Before heating, the can is filled with water and air. By boiling the water, *the water changes states from a liquid to a gas.* This gas is called *water vapor*. The water vapor pushes the air that was originally inside the can out into the atmosphere.

When the can is turned upside down and placed in the water, *the mouth of the can forms an airtight seal against* the surface of the water in the bin. In just a split second, all of the water vapor that pushed the air out of the can and filled up the inside of the can turns into only a drop or two of liquid, which takes up much less space. This small amount of condensed water cannot exert much pressure on the inside walls of the can, and none of the outside air can get back into the can. The result is the pressure of the air pushing from the outside of the can is great enough to crush it.

The sudden collapsing of an object toward its center is called an implosion. Nature wants things to be in a state of equilibrium or balance. To make the internal pressure of the can balance with the external pressure on the can, the can implodes. That's right, air pressure is powerful!

One more thing . . . you probably noticed that the can was filled with water after it imploded. This is a great illustration of how air is pushing all around us. Specifically, the outside air pressure was pushing downward on the surface of the water. Since the air pressure inside the can was less than the pressure outside the can, water from the bowl was literally pushed up and into the can.

This action is similar to what happens when you drink from a straw. Though we say we are "sucking" liquid up through the straw, we really aren't. To put it simply, science doesn't suck . . . it just pushes and pulls. Outside air pressure is pushing down on the surface of the liquid. When you reduce the pressure in your mouth (that sucking action) the outside pressure is greater than the pressure inside your mouth and the soda shoots up through the straw and into your mouth. The same thing is true with the can. The outside air pressure pushing downward on the surface of the water is greater than the force inside the can and the water gets pushed up into the can.

Questions:

1. In a small circle, sketch what the particles of the water vapor look like after boiling for a minute.
2. In a small circle, sketch what the particles of water in the can look like after the implosion.
3. Draw arrows for the **can and water** to show where more pressure was when the can imploded.

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4. If a gas maintains a *constant temperature*, when pressure is increased, what does the *volume* do?
5. If a gas maintains a *constant volume*, when pressure is increased, what does the *temperature* do?
6. If a gas maintains a *constant pressure*, when the temperature is increased, what does the *volume* do?