

Gas Laws Take-Home Lab; SC6 a,b,c

For Credit: To receive credit, your parent or guardian must write a short note, in your lab notebook, confirming that you performed the experiment for them and explained the results to their satisfaction using the concept of **gas laws**. You will also be required to take a picture performing the experiment.

Subject/Concept: Chemistry - Gas Laws

Purpose: The purpose of this activity is to observe the gas laws in action.

Materials:

- 1/8 cup water
- small pan of ice water
- 1 empty aluminum soda can
- 1 pair barbeque tongs
- 1 stove

Procedure:

1. Place 1/8 cup of water in an empty aluminum soda can.
2. Heat the can of water on the stove on medium until visible steam escapes from the can for a period of about 5-10 seconds.
3. With the barbeque tongs, grab the can and invert it into the pan of ice water.

Cautions:

1. **Do not boil the can dry! It will melt onto the stove top!**
2. **Do not touch the aluminum cans with your hands while it is on the stove. It is very hot.**
3. **Be careful not to spill or splash any of the boiling water in the can as you invert it.**

Questions:

1. What gas replaces the air while the water is boiling?
2. What is the chemical formula for the gas in question #1?
3. Explain how each of the following contributes to the results:
 - a) the temperature of the gas cools when the can is removed from the heat
 - b) the gas inside the can condenses to form water droplets
4. What is the difference between an implosion and an explosion?
5. If cans are roughly 8" in circumference and 4.75" tall, how many pounds of pressure does the atmosphere place on the outside of the can? (1 atm = 14.7psi).
6. Convert your answer from #5 to torr and to kPa

Real-world application:

7. How does a pressure cooker speed up cooking?
8. How does external pressure influence the boiling point of water?

You might want to check out these internet videos which illustrates the same point on a larger scale!

<http://tinyurl.com/26xu7dx>

<http://tinyurl.com/5ed8wo>

Another fun & easy activity for at home illustrating some gas laws :

<http://tinyurl.com/2utdhuy>

(making one of these, bringing it to class, and explaining in your lab notebook how it works in terms of the gas laws MAY be worth your time – and grade!)