Ms. Randall
Regents Chemistry
Lab Activity: Solubility of a Gas

Background: Some solutions contain a gas dissolved in a liquid. One example of this is soda. Soda is solution where CO_2 is dissolved in water with lots of sugar. Different soda manufacturers use varying amount of carbon dioxide in their recipes in different ways, thus affecting the taste. In this investigation you will observe the effects of temperature and pressure on the solubility of a gas.

Objective: To observe the effects of pressure and temperature on solubility of a gas.

Pre-lab questions:

1. In terms of pressure and solubility of the gas, what do you predict will happen when you open the top of the can?

2. In terms of temperature and solubility of the gas, what do you predict will happen when you heat the soda?

Procedure:

1. Pop the top of the soda can and record all observations about what occurs. Include its sound, smell, temperature color, etc. DO NOT TASTE OR YOU WILL GET A ZERO!!!
2. Place the can of soda in the center of the tray. Take off the tab completely.
3. Hold a copper rod, with the crucible tongs, in the hottest part of the flame until you see it undergo a color change. This will take several minutes.
4. Place the hot metal in the can of soda and record your observations.

Data:

Observations when you popped the top of the can	**Observations about what occurred when you heated the soda.**

Analysis:

1. Carbonated beverages contain dissolved CO_2 gas. If you shake the bottle and then open it, the beverage may shoot into the air. Explain why this happens.

2. When a person scuba dives they have to be careful to ascend slowly from the dive otherwise the diver is in danger of getting the bends. The bends occurs when gases in the diver's bloodstream come out of solution. Based on what you learned in this lab explain why this will occur.

3. You have developed a new brand of soda which is very gassy. Your factory workers have asked you what environmental conditions you would like in the system which delivers the CO_2 to the soda. What will you tell them and why?

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Lab conclusion: Solubility of a Gas

1. **Write a paragraph summarizing what you have learned about the scientific concept of the lab from doing the lab. Back up your statement with details from your lab experience**.

2. Under which conditions of temperature and pressure is a gas most soluble in water?

A) High temperature and low pressure
B) High temperature and high pressure
C) Low temperature and low pressure
D) Low temperature and high pressure

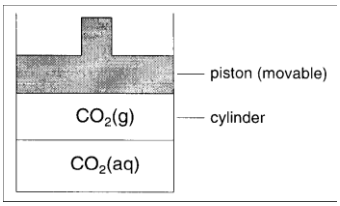
3. A sample of gas is held at constant pressure. Increasing the Kelvin temperature of this gas sample causes the average kinetic energy of its molecules to

A) Decrease and the volume of the gas sample to decrease
B) Decrease and the volume of the gas sample to increase
C) Increase and the volume of the gas sample to decrease
D) Increase and the volume of the gas sample to increase

4. At the same temperature and pressure, 1.0 liter of CO(g) and 1.0 liter of CO2(g) have

A) Equal masses and the same number of molecules
B) Different masses and a different number of molecules
C) Equal volumes and the same number of molecules
D) Different volumes and a different number of molecules

5. Given the diagram below that shows carbon dioxide in an equilibrium system at a temperature of 298 K and a pressure of 1 atm:



Which changes *must* increase the solubility of the carbon dioxide?
A) Increase pressure and decrease temperature
B) Increase pressure and increase temperature
C) Decrease pressure and decrease temperature
D) Decrease pressure and increase temperature