ScienceCube

Solubility of Gases According to Temperature

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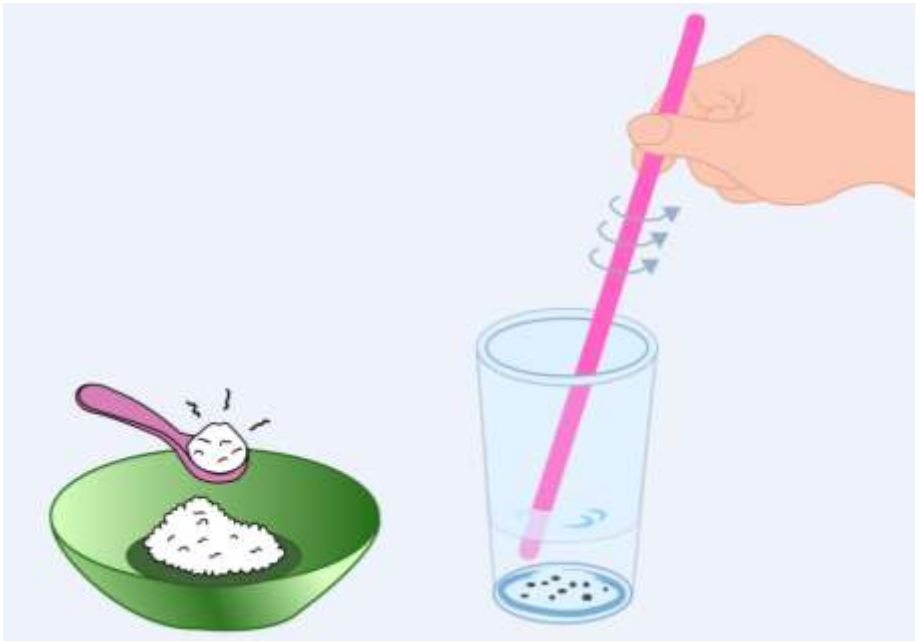
1. **Understanding and explaining the concept of gas solubility.**
2. **Observing the solubility of carbon dioxide according to temperature and explaining why cold cola tastes better.**

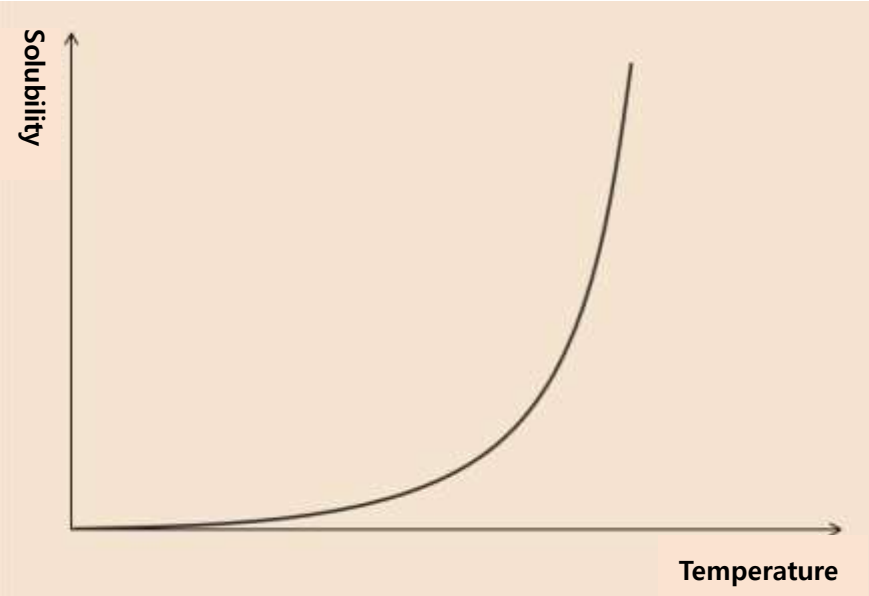
Fundamental Concept

1. Solubility

The amount of solute in grams that can dissolve in 100g of solvent at a specific temperature.



2. Solubility of Gases in Water According to Temperature



<Solubility According to Temperature>

A. Ice Water

B. Room Temperature Water

C. Hot Water

Temperature Comparison	**A < B < C**
Gas Solubility	**C < B < A**

Experiment

Materials Needed

Interface, Science# program, Gas pressure sensor B (2), Cola, Rubber tube, Rubber stopper (3), 500 mL beaker (2), Ice, 200 mL three-necked flask (2)

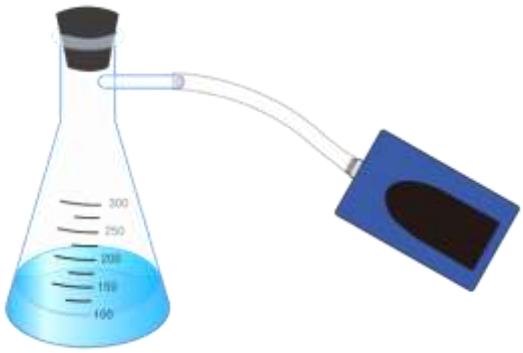
Experimental Setup

1. Cut two 10 cm pieces of silicone tubing.
2. Attach the silicone tubing to the branches of the three-necked flasks.
3. Attach a socket  to the other end of the silicone tubing and connect the gas pressure sensors.
4. Pour 200 mL of cold water and hot water into two separate beakers..

<Cold Water>

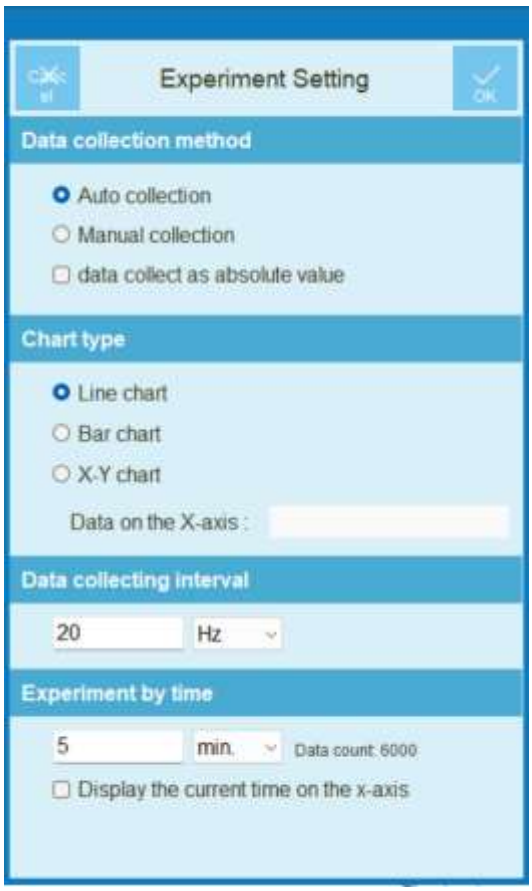
<Hot Water>

5. Pour 100 mL of cola into each of the 250 mL three-necked flasks and seal with a rubber stopper.



Interface Setup

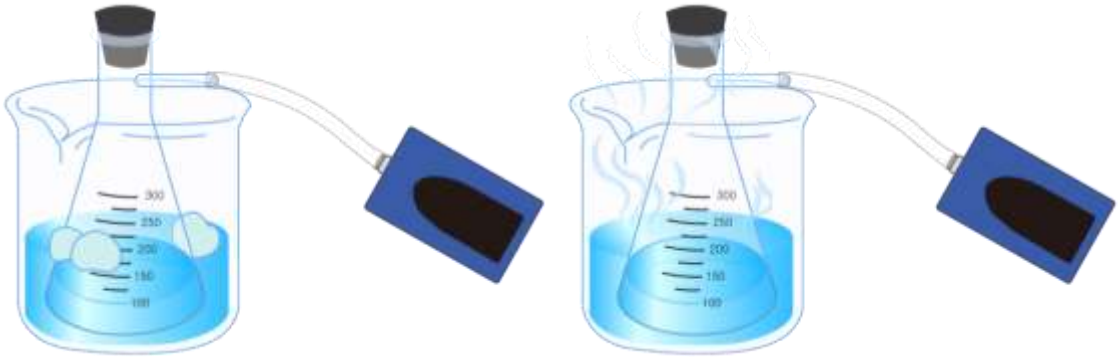
1. Run Science#.
2. Connect the two gas pressure sensors (B) to the interface.
3. Press the button to zero the gas pressure at 0 hPa.
4. Press the button to set up the experimental environment as shown below or press the button for automatic setup.



Automatic setup

Data Collection

1. Press the button to start data collection and measure the gas pressure at room temperature for a moment.
2. Simultaneously place the two three-necked flasks into the beakers containing cold and hot water and observe the changing gas pressure.



Data Analysis

Recording Data

1. Display the changes in gas pressure measured in cold and hot water in a graph.

2. Record the gas pressure values measured over a certain period in the two three-necked flasks in the table below.

Category	Cold Water	Hot Water
Initial Gas Pressure (hPa)		
Final Gas Pressure (hPa)		

Data Application and Extended Activities

1. Explain the relationship between temperature and gas pressure.

2. Explain the reason for the observed results in relation to the solubility of gases.

3. Based on the experimental results, explain why cold cola tastes better.

4. Think of and describe a creative method to compare the solubility of gases without using sensors..


Report
(For Students)
Report
(For Teachers)