



UNIT 5: CHEMISTRY OF CLIMATE CHANGE

Workbook 5.1: Gas Laws

Lesson 1: Hot Enough?

GUIDING QUESTION: DESCRIBE HOW TO CONVERT BETWEEN DIFFERENT TEMPERATURE SCALES.

- Do Now:

The weather forecast in Moscow, Russia, calls for a 60% chance of precipitation with highs reaching 30 °C, while in Washington, D.C., the weather forecast calls for a 70% chance of precipitation with highs reaching 50 °F.

1. Which city will be warmer? Explain your thinking.
2. Do you think it will rain or snow in either of the two cities? Explain your reasoning.

NOTES

- There are multiple different temperature scales that you will encounter in this class. In the U.S. we use the Fahrenheit scale whereas most of the rest of the world uses Celsius.
- Comparing Fahrenheit and Celsius:
 - Fahrenheit – mp of water is 32 °F and bp of water is 212 °F
 - Celsius – mp of water is 0 °C and bp of water is 100 °C

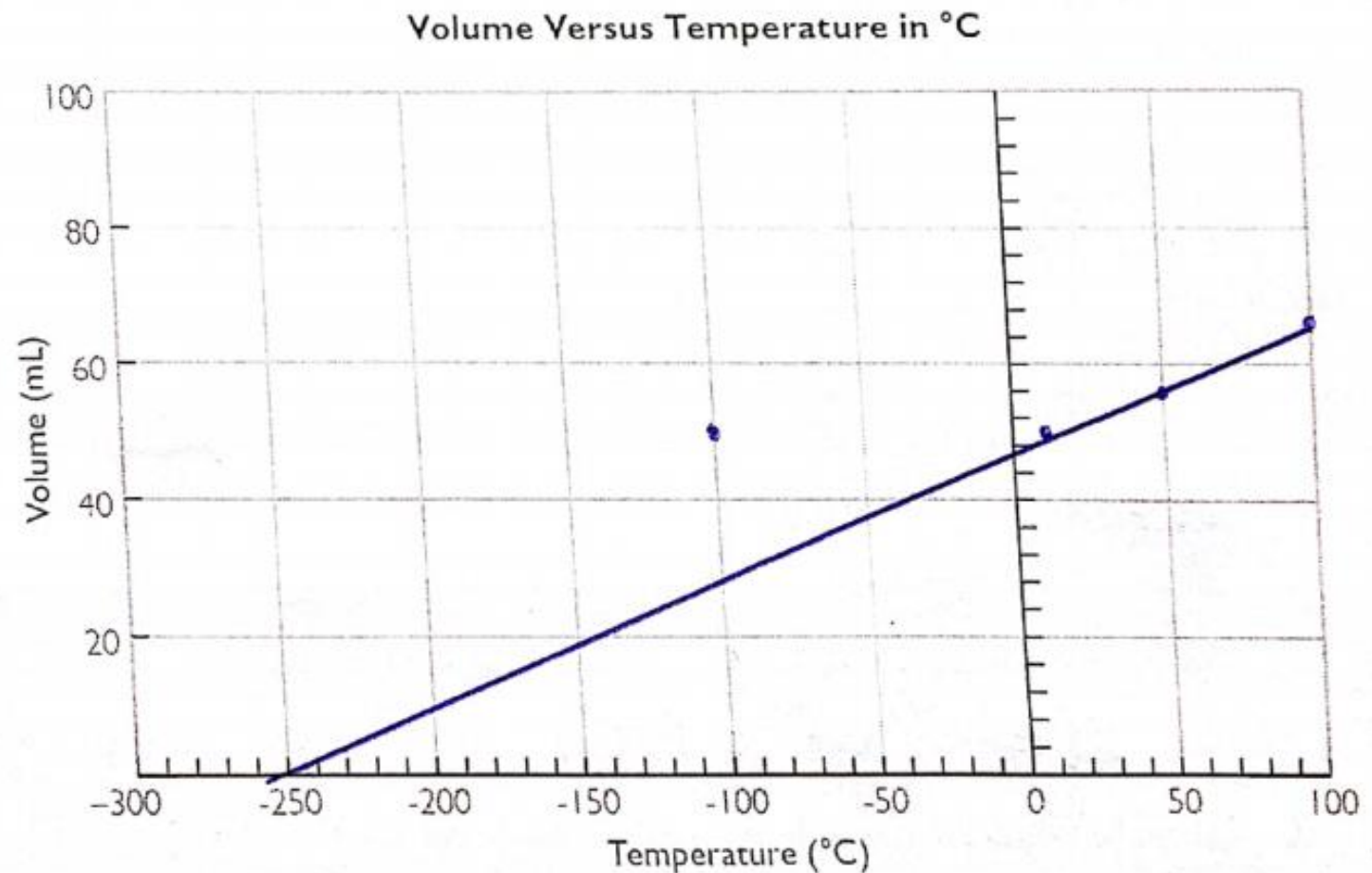
NOTES

- Degree: The increment of temperature that corresponds to one unit on a thermometer. The size of a degree depends on the temperature scale used.
- There are 180 Fahrenheit degrees between 0 °C and 100 °C. This means that a Fahrenheit degree unit is a smaller change in temperature than a Celsius degree unit.
- This is why the formula to convert between the two values contains a fraction:

$$F = \frac{9}{5}(C) + 32 \quad \text{or} \quad F = 1.8(C) + 32$$

1. The volume of a sample of gas was measured at several temperatures. The data are given in the table below. Plot the data points on the graph.

Temperature	Volume
10.0 °C	50 mL
50.0 °C	57 mL
100.0 °C	66 mL



NOTES

- On the Celsius scale, the temperature at which the volume of a gas is theoretically equal to 0 is $-273\text{ }^{\circ}\text{C}$. This value is equal to 0 K. 0 K is referred to as absolute zero. It is the lowest possible temperature as volume can never be negative.
- The scientific community will typically record temperature in Kelvins because the scale contains no negative numbers and can thus be used in proportional relationships (we'll discuss this later)
- Comparing Celsius and Kelvin:
$$K = C + 273$$
- If you need to convert from F to K, you will need to convert to F to C first.

BACK TO THE DO NOW

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CLOSURE

- Answer Guiding Question on page 2:
 - Describe how to convert between different temperature scales.
- Homework #8 due Friday, 4/13.
- Achieve 3000: “No Idle Law” due Friday, 4/20.

- Check your grade! If you have a “0” for the Chromatography Lab Report, come see me!