

In this experiment, we are going to demonstrate the relationship between temperature and volume of a fixed mass of gas at a fixed pressure.

For this experiment you will need:

a Bunsen burner, a tripod stand, a clamp stand, a beaker, filled with water, a capillary tube, a ruler, and a thermometer. Set up the experiment as shown.

You will take a number of readings so draw up a table to record your results.

This should have columns with headings for length of air column in centimetres (this is proportional to the volume), temperature in degrees Celsius, and temperature in Kelvin.

Let's begin the experiment. Turn on the gas and ignite the Bunsen burner. Place it under the beaker of water and carefully heat the water to boiling.

Record the temperature and corresponding length of the trapped air column at intervals. You should take at least three readings.

Draw a graph to show the relationship between the length of the air column and the temperature in Kelvin.

You should be able to draw a line of best fit through the results that shows a direct relationship between the temperature and the length of the air column, and therefore the volume.

Charles's Law states that for a fixed amount of gas at constant pressure the temperature in Kelvin is directly proportional to the volume. So, for a fixed mass of gas at a constant pressure, volume divided by temperature in Kelvin will remain the same.

This can be written as the equation $\frac{V_1}{T_1} = \frac{V_2}{T_2}$.