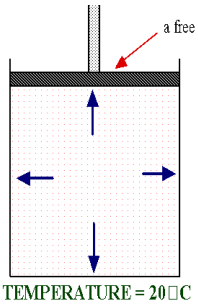
4:1 SCH 3U1 Unit 4: The Gas Laws -1

Expections

A1: demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating)

F2. investigate gas laws that explain the behaviour of gases, and solve related problems;

F3. demonstrate an understanding of the laws that explain the behaviour of gases.

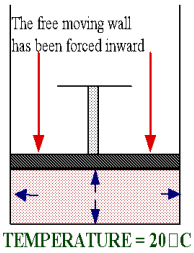


GAS MOLECULES ARE NOT TOUCHING EACH OTHER BUT ARE MOVING RAPIDLY (ACCORDING TO THE TEMPERATURE) AND RANDOMLY SO OCCUPY A GIVEN SPACE - A VOLUME!

THE VOLUME IS MEASURED IN .....

GAS MOLECULES ARE COLLIDING WITH THE WALL *WITH PERFECTLY ELASTIC COLLISIONS* THUS EXERTING A FORCE ON EACH WALL - A PRESSURE!

THE PRESSURE IS MEASURED IN .....



WHAT HAS HAPPENED TO THE SPEED THESE GAS MOLECULES ARE MOVING AT ?

WHAT HAS HAPPENED TO THE VOLUMEOCCUPIED BY THESE GAS MOLECULES ?

WHAT HAS HAPPENED TO THE FREQUENCY WITH WHICH THESE GAS MOLECULES ARE COLLIDING WITH THE WALLS

HYPOTHESIS 1:

WHEN THE VOLUME OF A GAS DECREASES(AT CONSTANT TEMP) WHAT SHOULD HAPPEN TO THE PRESSURE THAT THIS GAS EXERTS ON THE WALLS ?

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The gas molecules are NOT touching each other but ARE moving rapidly (according to the temperature) and randomly so they occupy a given space called the **VOLUME**.

The volume is measured in …….. or ……

The gas molecules are also colliding with the walls (perfectly elastic collisions) thus exerting a force on each wall –**PRESSURE**

The Pressure is measured in …….. or …… or ……

Diagram 2: What has happened to the **speed** these gas molecules are moving at ……..

What has happened to the **volume** occupied by these gas molecules?

……

What has happened to the "frequency" with which these molecules are colliding with the walls …….. and therefore the **PRESSURE**.

HYPOTHESIS: When the VOLUME of a gas decreases (at const Temp) what should happen to the PRESSURE that this gas exerts on the walls of the container

……..

Gas Law Exp 1: BOYLES LAW.

One of the unique properties of gases is that they are compressible. Unlike solids & liquids, a given volume of gas can be squeezed into a smaller volume or compressed by the application of pressure. As the volume of the gas decreases, the pressure or force that the gas exerts on its container increases. In this experiment, you will explore the relationship between the pressure of a trapped gas and its volume with the temperature of the gas held constant.(*Boyles Law*)

BOYLES LAW APPARATUS: Connect the pressure sensor to the ipad. Open up the sensor and go to the pressure reading page. Be sure the cable from the syringe to the pressure sensor is disconnected, then withdraw the plunger to the 28 cc mark and reconnect the cable. Withdraw the plunger slowly taking 3-4 readings of volume and pressure as you go. Push the plunger in taking 6-7 readings as you push (keep the plunger steady to read and be sure readings are well spaced out). Record in the data table below.

Use your calculator to determine the values of 1/volume and pressure in kPa → multiply by 6.85 kPa / PSI

volume of gas (cm^3)	$(volume)^{-1}$ (cc^{-1})	Pressure of gas (kPa)	P * V

*** Scroll back on your ipad to the graph and sketch the Pressure (kPa) vs volume(cc)**
use any program of your choice to graph Pressure (kPa) vs 1/ volume (1/cc)