Exp#3 : Gases intro

24/25

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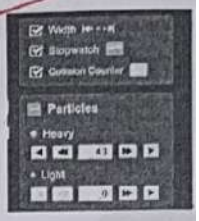
Get Started: Click on this link to open the gAs simulAtion

Part I

Go to intro. **Choose only one type of particle.**



Record the pressure, temperature and volume.

Pressure = 5.8 atm Volume = 10nm

temperature = 300k

Give one pump of gas and observe the behavior. How would you describe this?

Random movemut

Record the pressure, temperature and volume.

Pressure = 11.7atm / temperature = 300K / Volume = 10nm.

Hold volume and temperature constant and give one more pump.

Record the number of particles and the pressure in the data table below. Describe what you s

Repeat this a few times, either increasing or decreasing the number of the same type of particles.

Number of particles	Pressure (atm)
9	1.1 atm
66	7.7 atm
100	11.7 atm
121	14.1 atm
374	43.7 atm

V = 10 nm

T = 300 k

Is there a relationship between the number of particles and the pressure? Briefly describe this.

when the number of particles increases the pressure increases.

What is the pressure in the container due to?

Because the gas molecules collide with each other and the bowl

1:

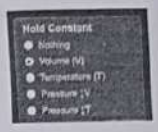
are 3 parameters that need to be specified when describing a specific quantity of a gas. They are: Pressure, ume and Temperature. We will keep the number of particles constant in each "experiment" and explore the fect (if any) a change in any of these parameters may have on the behavior of the gas.

Choose the Laws option on the right. See picture

Experiment 1- Volume

Give one pump of gas into the chamber.

Choose to hold the volume constant by selecting that option in the upper right-hand corner. See the picture.



What is the initial temperature (in K) and pressure (in atm) in the chamber?

temprature = 300k / pressure = 5.8 atm

Use the slider at the bottom of the simulator to add heat and double the temperature.

11.7 atm

Did the pressure go up or go down? What is the new pressure in the chamber?

pressure = 11.7 atm → go up

Keeping the volume constant (and the number of particles constant), change the temperature and record the pressure. Repeat 4 times and record your data. Sketch a graph to the right of the table. Be sure to give a title to your graph and label the axis completely.

Independent variable is : temprature

Dependent Variable: Pressure

Constants: number of particles / Volume

n = (50)

Temperature (K)	Pressure (atm)
116	2.3 atm
148	2.9 atm
211	4.1 atm
309	6. atm
400	7.8 atm

Describe the graph and relationship:

when temperature increses the pressure increseses

riment 2 - Temperature

t the simulator by selecting the reset button in the bottom right corner of the simulation.
ve one pump of gas into the chamber.
hoose to hold the temperature constant by selecting that option in the upper right-hand corner. See the picture.
What is the initial pressure (in atm) in the chamber?

Pressure 5.8 atm

Locate the handle on the left of the chamber and slide it to the right as far as it will go. What units are used to measure the width of the chamber? nanometer

Does the volume go up or go down when you slide it to the right?

go down

Did the pressure go up or go down?

go up

Slide the handle all the way to the left as far as it will go. Did the pressure go up or go down?

go down

Keeping the temperature constant (and the number of particles constant), change the volume and record the pressure. Rep
4 times and record your data. Sketch a graph to the right of the table. Be sure to give a title to your graph and label the ax
completely.
Independent variable is: Volum
Dependent Variable: Pressure
Constants: temperature / number of particles

Volume (nm)	Pressure (atm)
5	11.7 atm
7	8.3 atm
9.5	6.2 atm
11	5.3 atm
15	3.9 atm

T = 300 K

n = 50

Describe the graph and relationship:

when the volume increases the pressure decreases

riment 3 - Pressure

et the simulator by selecting the reset button in the bottom right corner of the simulation.
ve one pump of gas into the chamber.
hoose to hold the pressure constant by selecting that option in the upper right- hand corner. See the picture.
What is the initial temperature (in K) in the chamber?

300K

Use the slider at the bottom of the simulator to add heat and increase the temperature.
Did the volume go up or go down?

go up

Keeping the pressure constant (and the number of particles constant), change the temperature and record the volume. Repeat 4 times and record your data. Sketch a graph to the right of Be sure to give a title to your graph and label the axis completely

Independent variable is : temperature
Dependent Variable: volume
Constants: pressure/numberofparticles

Temperature (K)	Volume (nm)
150	5 nm
300	10 nm
360	12 nm
390	13 nm
420	14 nm

P= 5.8atm

n = 50

Describe the graph and relationship:

when temperature increases the volume increases.

In each of the experiments, you hold one parameter constant while changing the other 2. Summarize the four experiments by using arrows (# or $) to represent what happened.

1- Experiment 1: When temperature went increases the pressure went increases.

Real world example?

coffee heater

2- Experiment 2: When volume went increases the pressure went decreases

Real world example?

Cola bottle

3- Experiment 3: When temperature went increases the volume went increases.

Real world example?

the airship