

Exploring the behavior of Gases

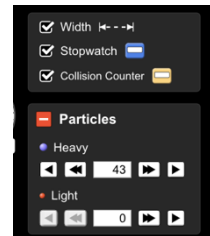
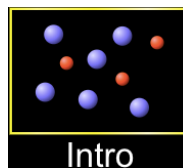
Name: _____

Date: _____

Get Started: Click on this [link](#) to open the gas simulation

Part I

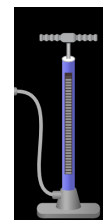
1. Go to intro. **Choose only one type of particle.**
2. Record the pressure, temperature and volume.



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

Record the pressure, temperature and volume.

4. 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 saw.



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

Number of particles	Pressure (atm)

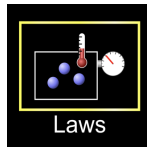
5. Is there a relationship between the number of particles and the pressure? Briefly describe this.

What is the pressure in the container due to? (what assumption are we making?)

Part II:

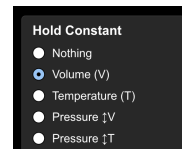
There are 3 parameters that need to be specified when describing a specific quantity of a gas. They are: Pressure, Volume and Temperature. **We will keep the number of particles constant** in each "experiment" and explore the effect (if any) a change in any of these parameters may have on the behavior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

Choose the Laws option on the right. See picture



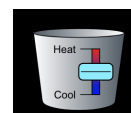
Experiment 1- Volume

1. Give one pump of gas into the chamber.
2. 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?

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



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

4. 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 : _____

Dependent Variable: _____

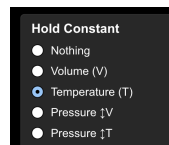
Constants: _____

Temperature (K)	Pressure (atm)

Describe the graph and relationship:

Experiment 2 - Temperature

1. Reset the simulator by selecting the reset button in the bottom right corner of the simulation.
2. Give one pump of gas into the chamber.
3. **Choose 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?

4. 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? _____

Does the volume go up or go down when you slide it to the right? _____, Did the pressure go up or go down? _____; Why?

5. Slide the handle all the way to the left as far as it will go.

Did the pressure go up or go down? _____; Why?

6. Keeping the temperature constant (and the number of particles constant), change the volume 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 : _____

Dependent Variable: _____

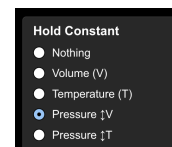
Constants: _____

Volume (nm ³)	Pressure (atm)

Describe the graph and relationship:

Experiment 3 - Pressure

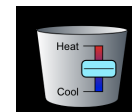
1. Reset the simulator by selecting the reset button in the bottom right corner of the simulation.
2. Give one pump of gas into the chamber.
3. **Choose to hold the pressure constant** by selecting that option in the upper right-hand corner. See the picture.



What is the initial temperature (in K) in the chamber? _____

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

Did the volume go up or go down? _____



5. 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 the table. Be sure to give a title to your graph and label the axis completely

Independent variable is : _____

Dependent Variable: _____

Constants: _____

Temperature (K)	Volume (nm ³)

Describe the graph and relationship:

Analysis

In each of the experiments, you hold one parameter constant while changing the other 2. Summarize the findings of your experiments by using arrows (\uparrow or \downarrow) to represent what happened.

Experiment 1: When temperature went _____, the pressure went _____.

Possible reason?

Real world example?

Experiment 2: When volume went _____, the pressure went _____.

Possible reason?

Real world example?

Experiment 3: When temperature went _____, the volume went _____.

Possible reason?

Real world example?