

Physics 102
Lab 3: Gas Law
Myat Thit Ko Ko
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Purpose

The purpose of this third lab is to obtain practical skills in graphing the nature of basic gas laws.

Members

This lab group consisted of two members.

1. Myat Thit Ko Ko (author)
2. Pablo Orantes Rodriguez

Procedure

This virtual lab was conducted on PhET interactive simulation of [Gas Properties](#). The idea is to graph the three gas laws: Boyle's law, Charles' law, and Gay-Lussac's law. However, in order to cover all four fundamental gas laws, I have also demonstrated Avogadro's law for a chance of extra credit. The lab consisted of the following steps and procedures.

Boyle's law

- Temperature and number of particles are kept as constants.
- Width of the container (proportional to volume) is adjusted to record change in pressure.

Charles' law

- Pressure and number of particles are kept as constants.
- Temperature is adjusted to record change in the width of the volume.

Gay Lussac's law

- Volume and number of particles are kept as constants.
- Temperature is adjusted to record change in pressure.

Extra Credit

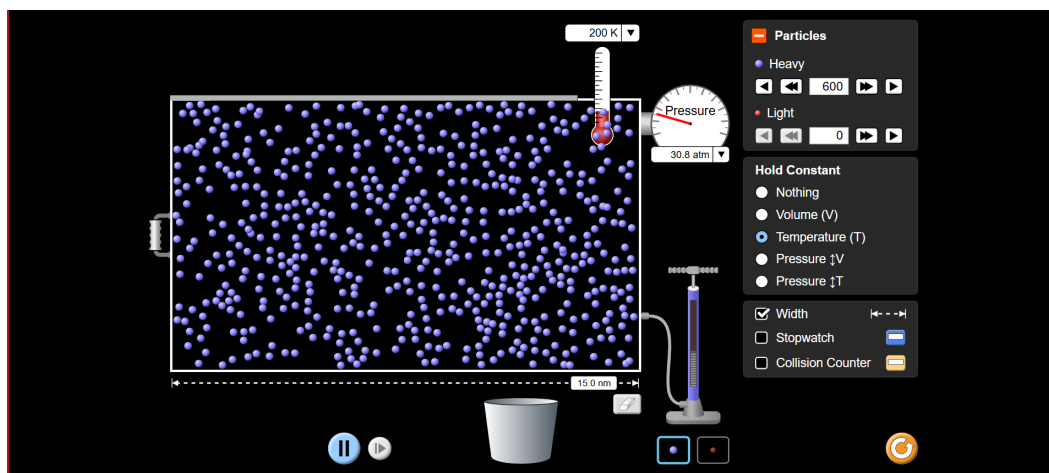
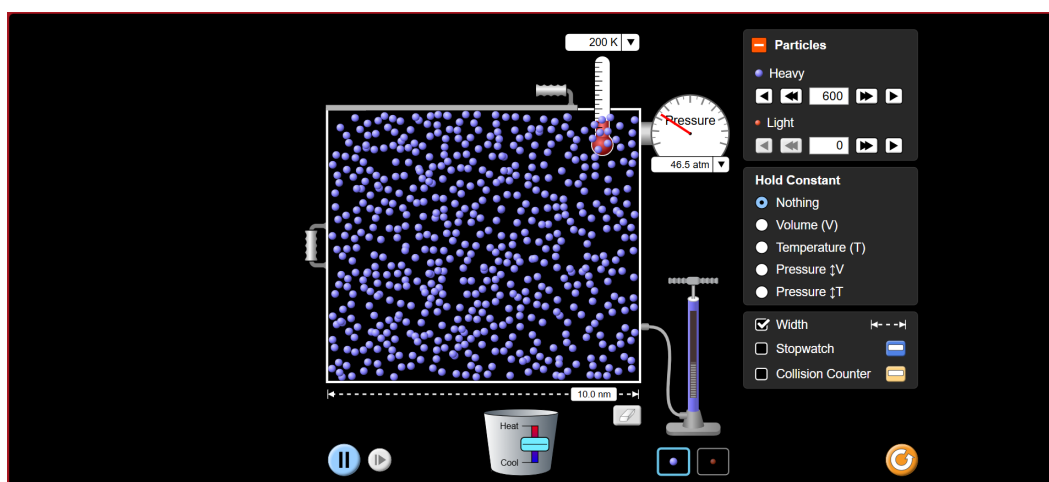
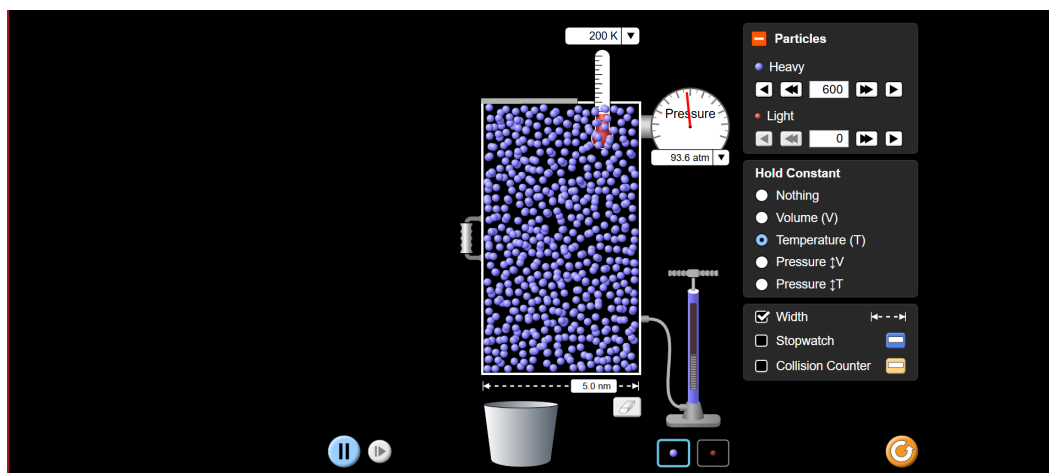
Avogadro's Law

- Temperature and pressure are kept as constants.
- The number of particles are adjusted to record change in the width of the volume.

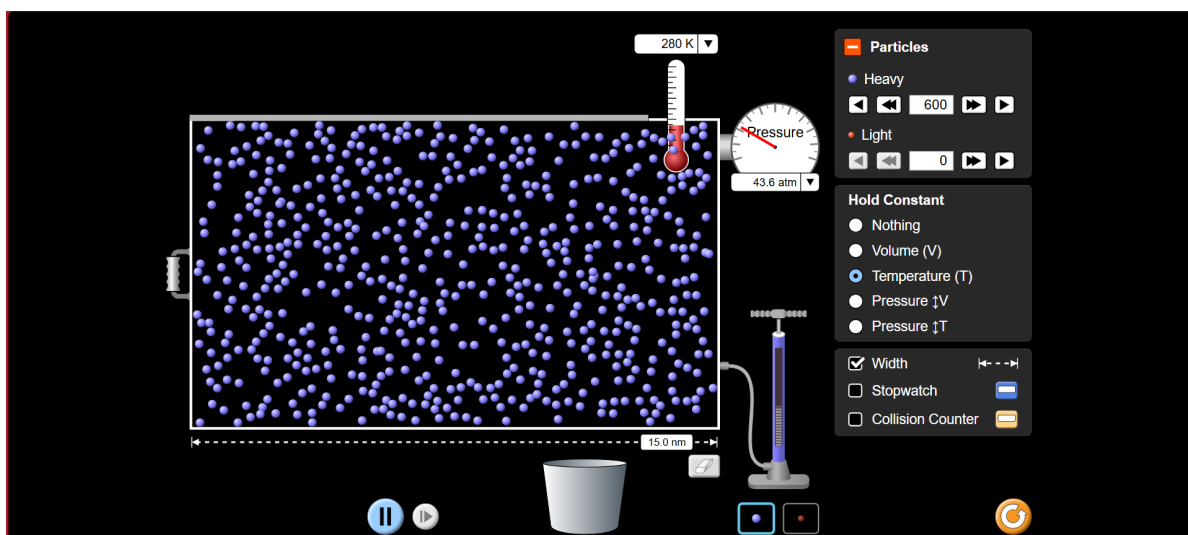
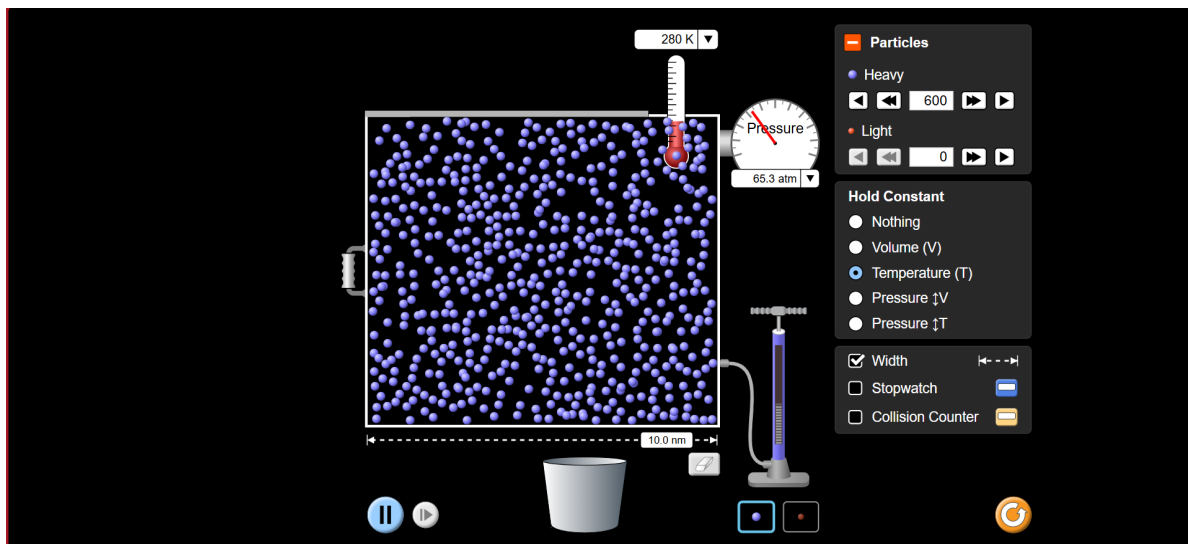
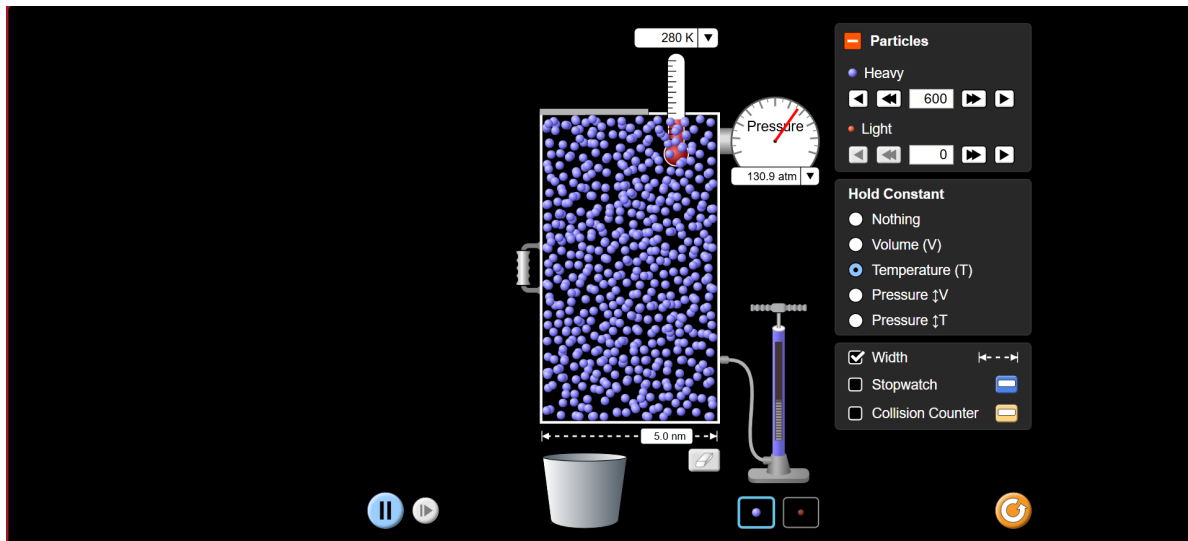
Data & Analysis

Boyle's law

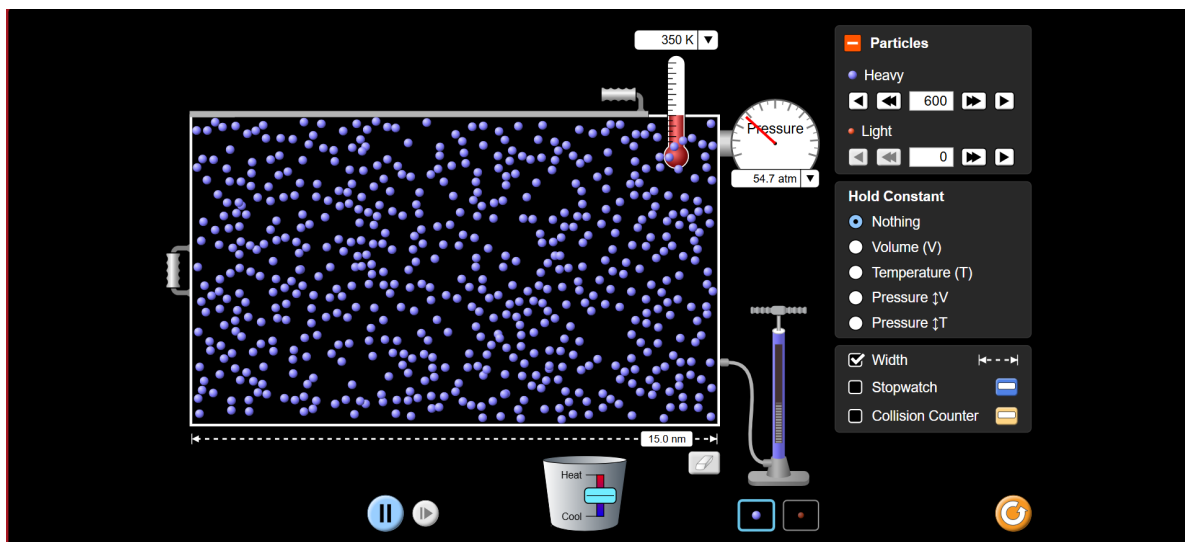
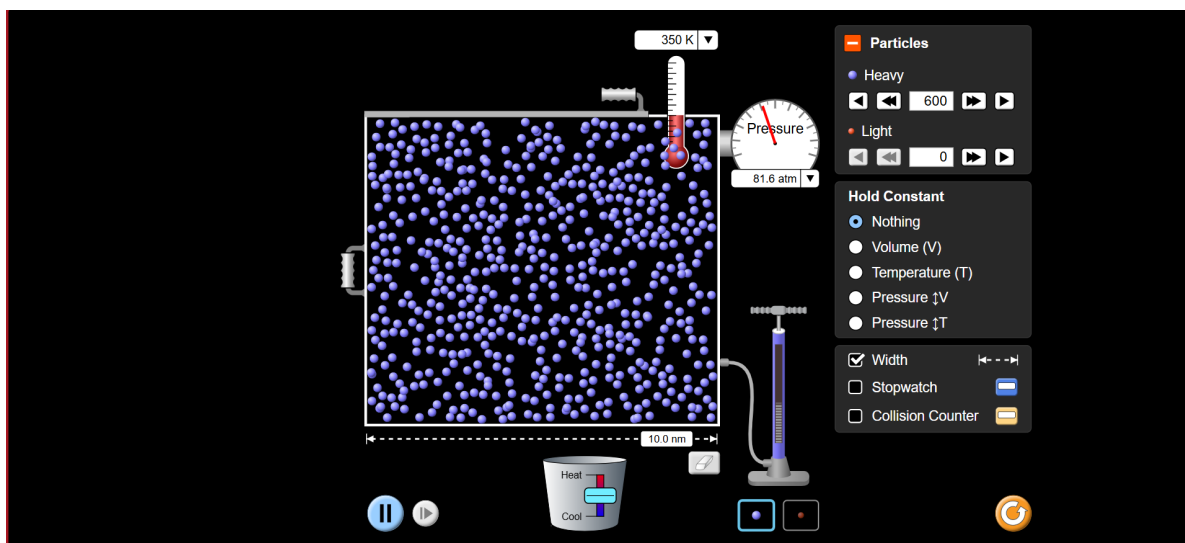
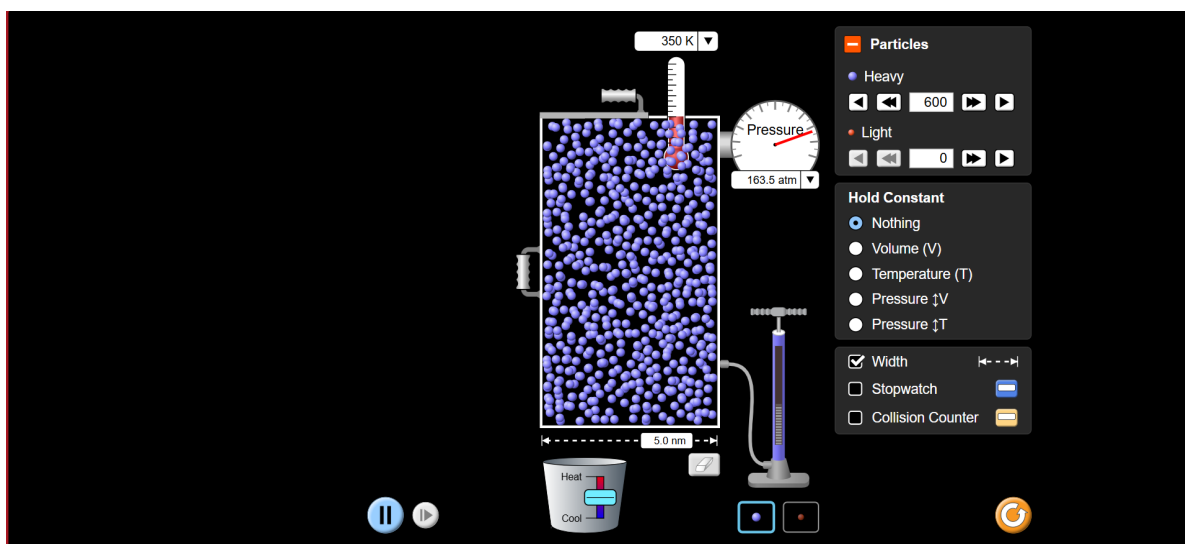
Constants: Temperature = 200K, Number of particles = 600 particles



Constants: Temperature = 280K, Number of particles = 600 particles

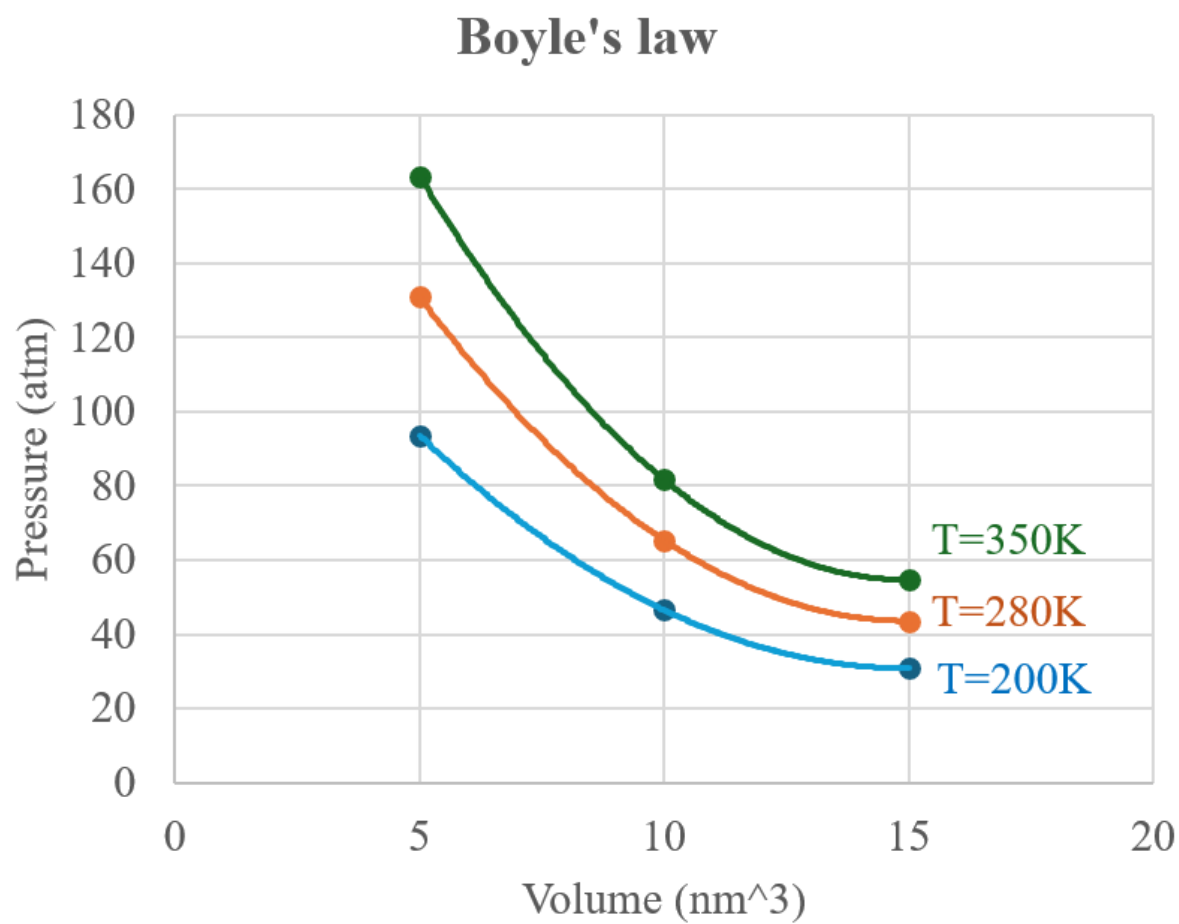


Constants: Temperature = 350K, Number of particles = 600 particles



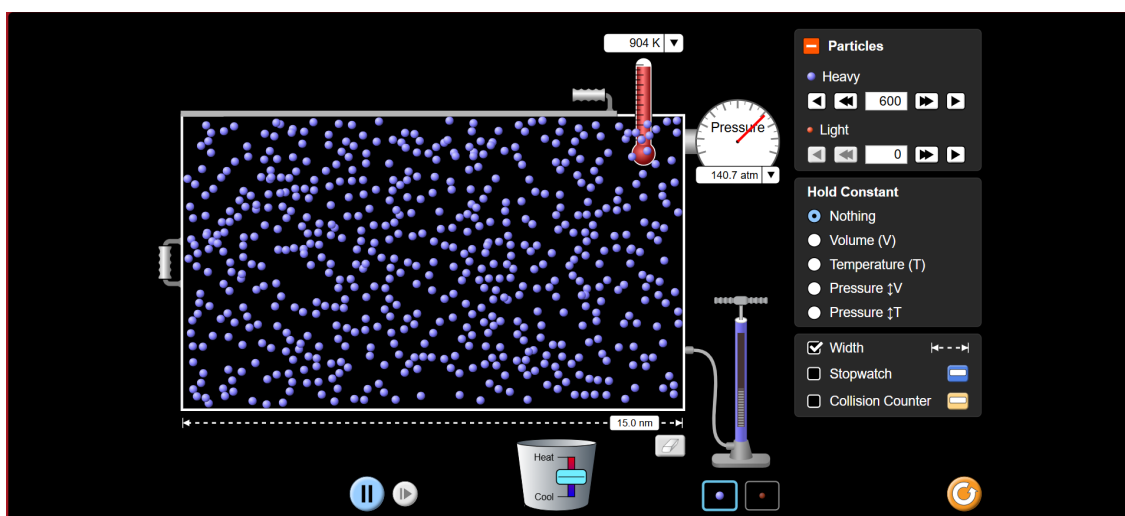
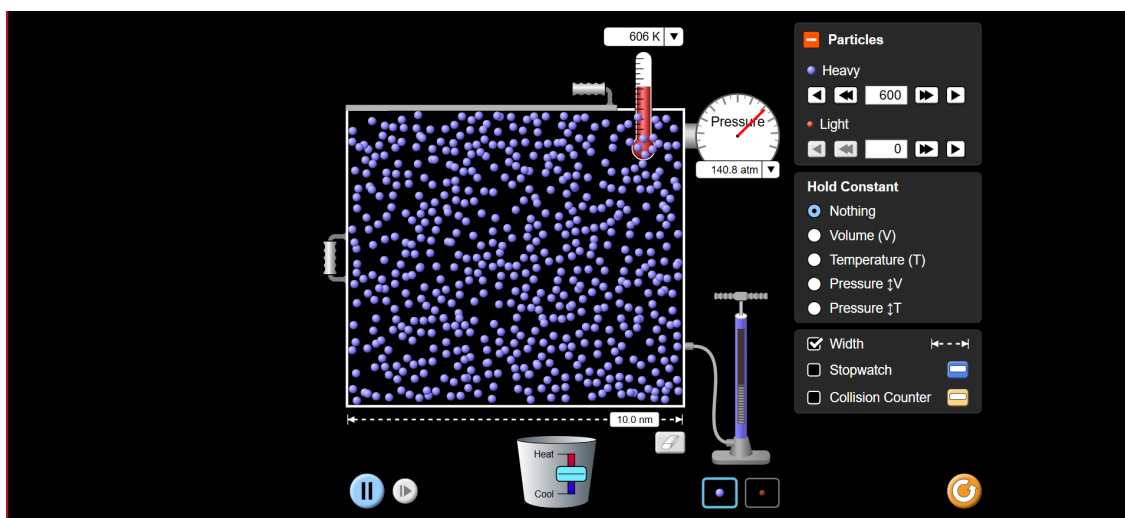
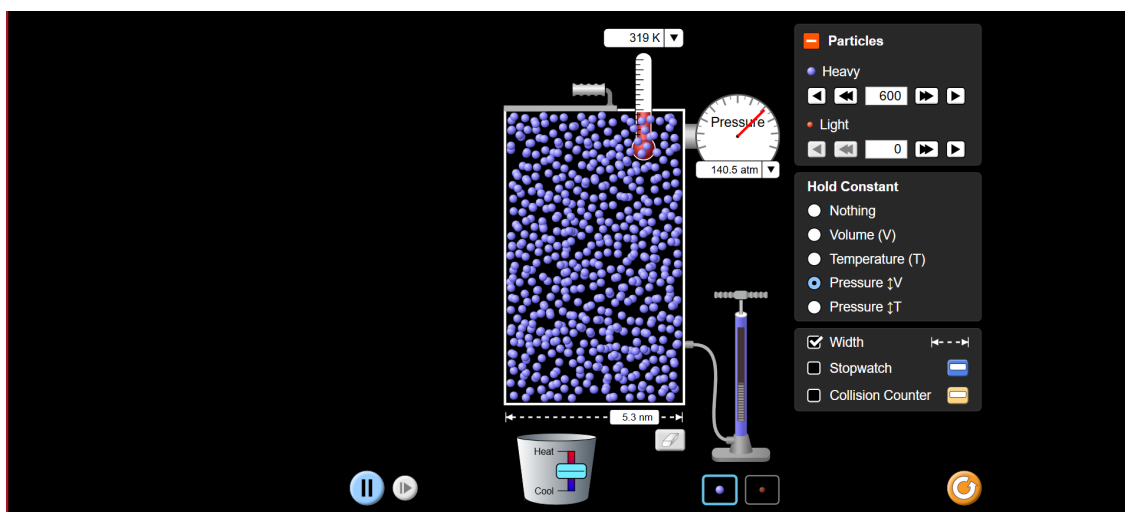
Boyle's law

V (nm ³)	P1 (atm) at T=200K	P2 (atm) at T=280K	P3 (atm) at T=350K
5	93.6	130.9	163.5
10	46.5	65.3	81.6
15	30.8	43.6	54.7

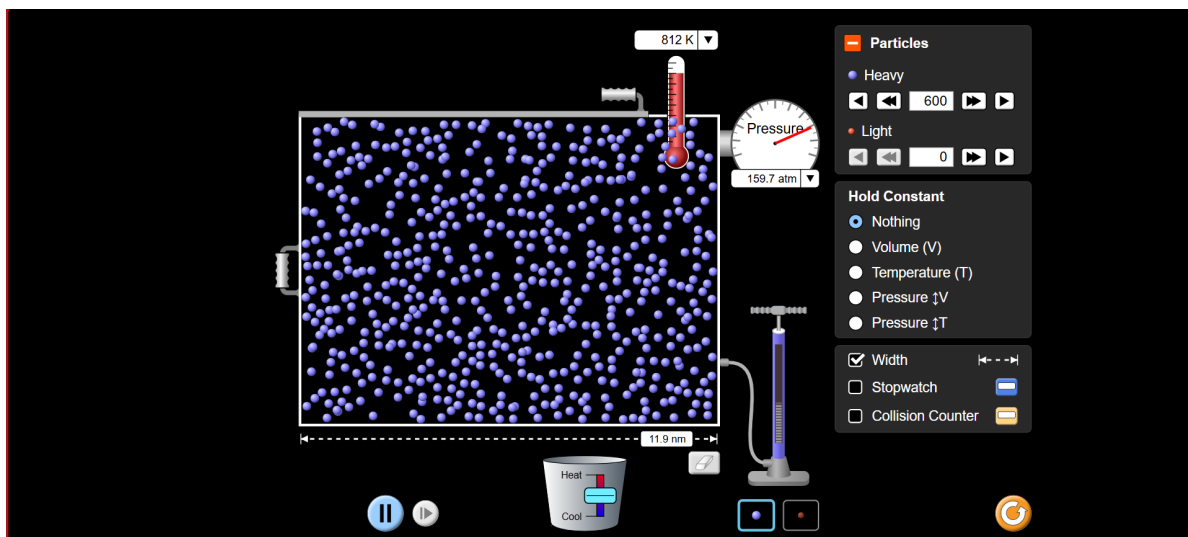
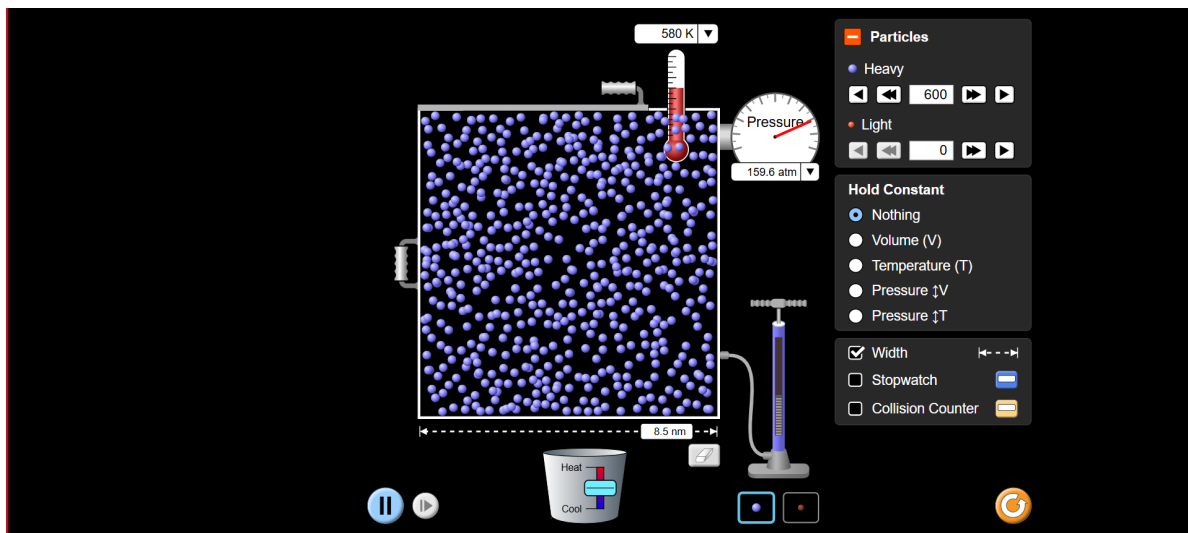
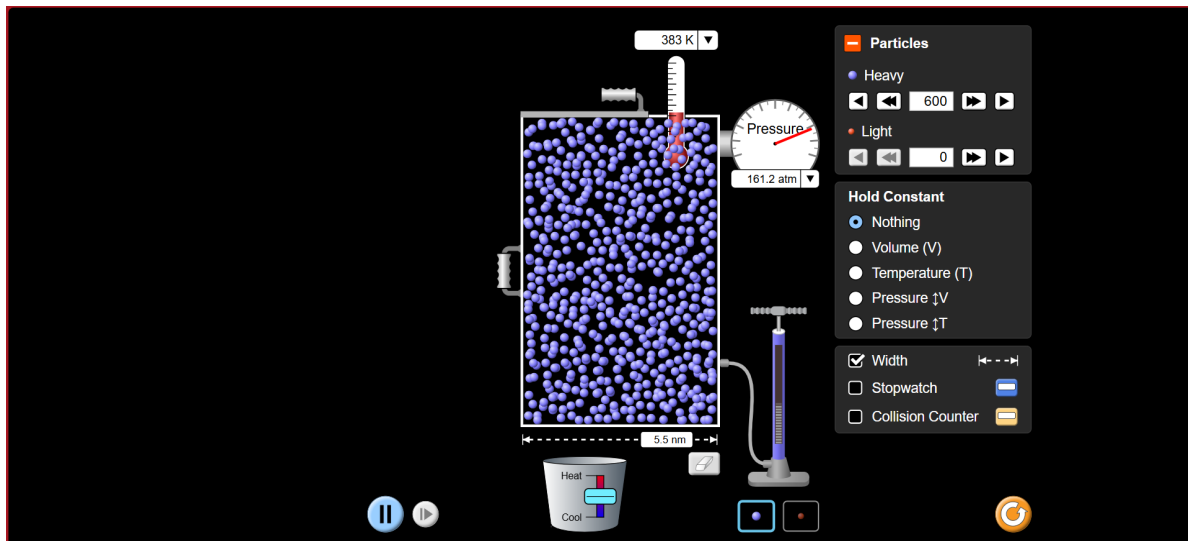


Charles' law

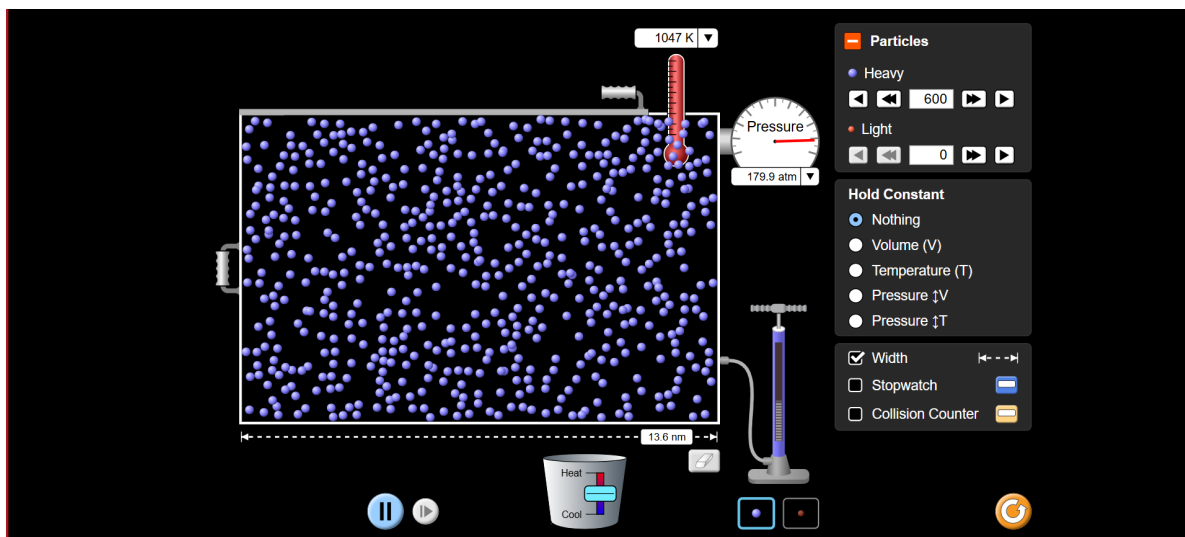
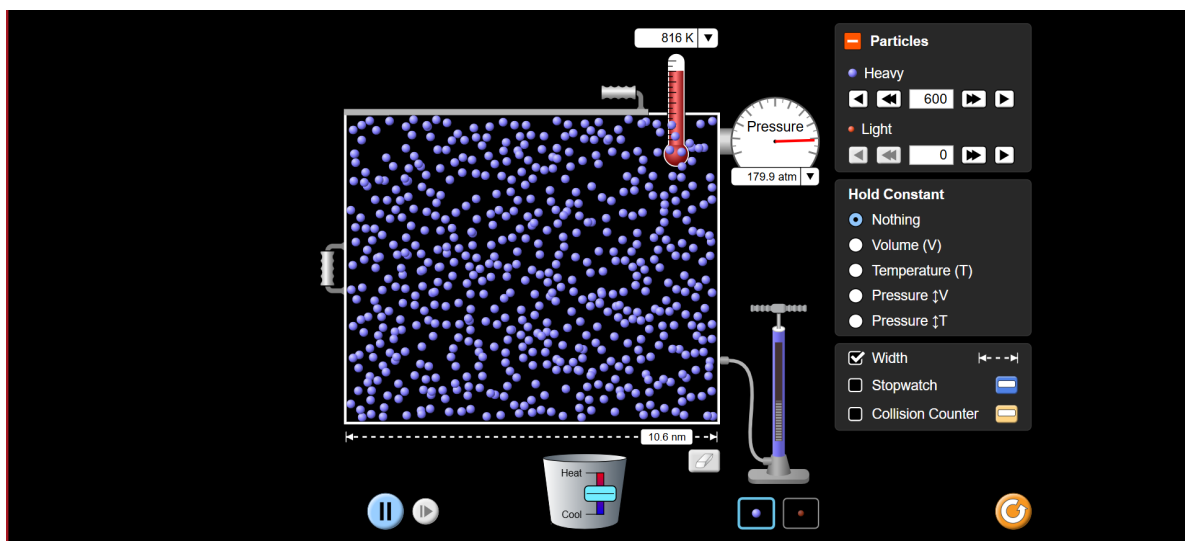
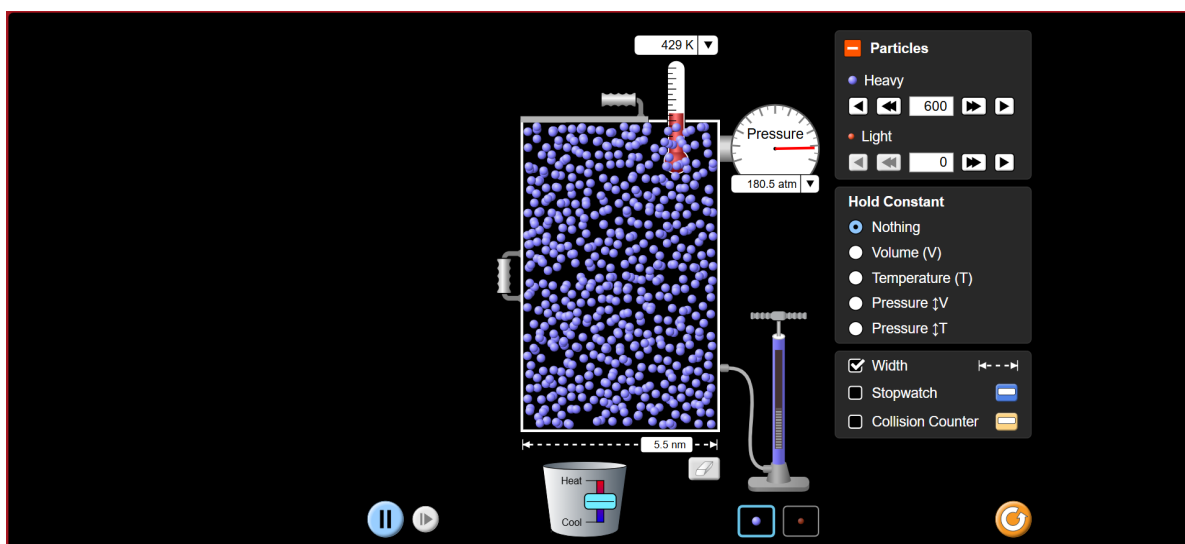
Constants: Pressure = 140atm, Number of particles = 600 particles



Constants: Pressure = 160atm, Number of particles = 600 particles

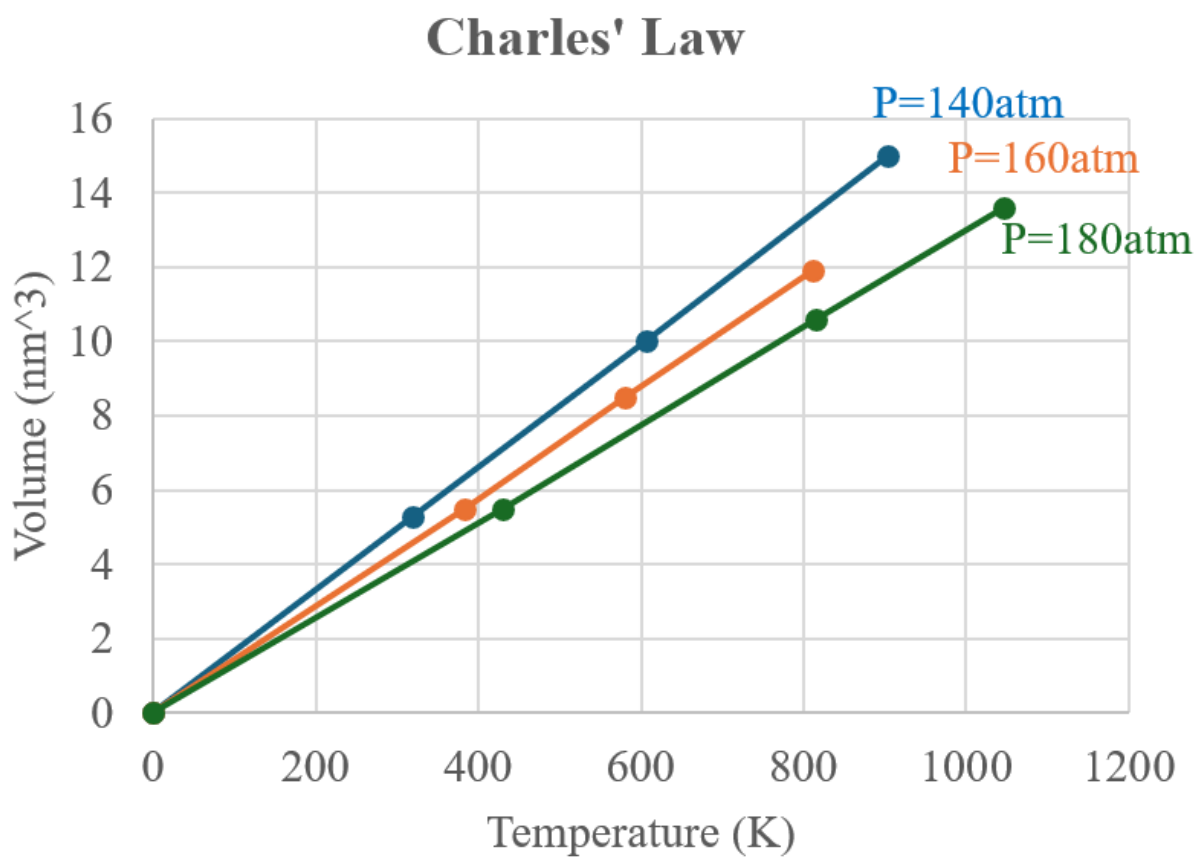


Constants: Pressure = 180atm, Number of particles = 600 particles



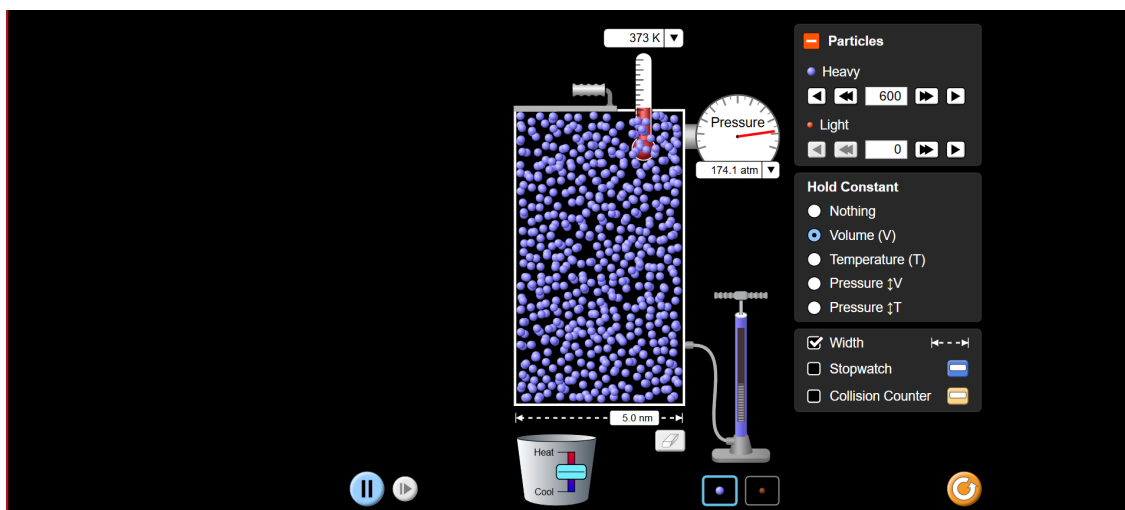
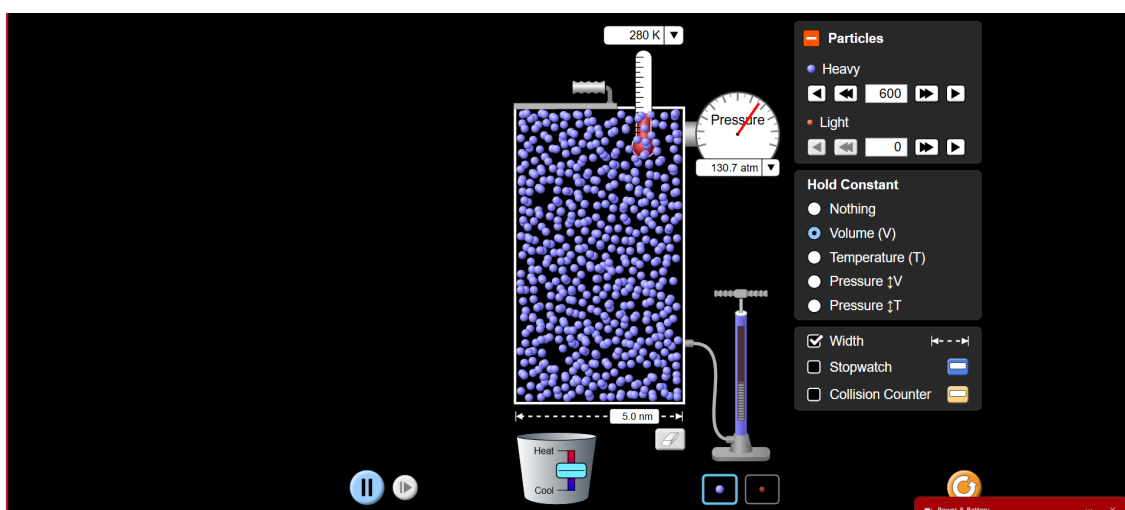
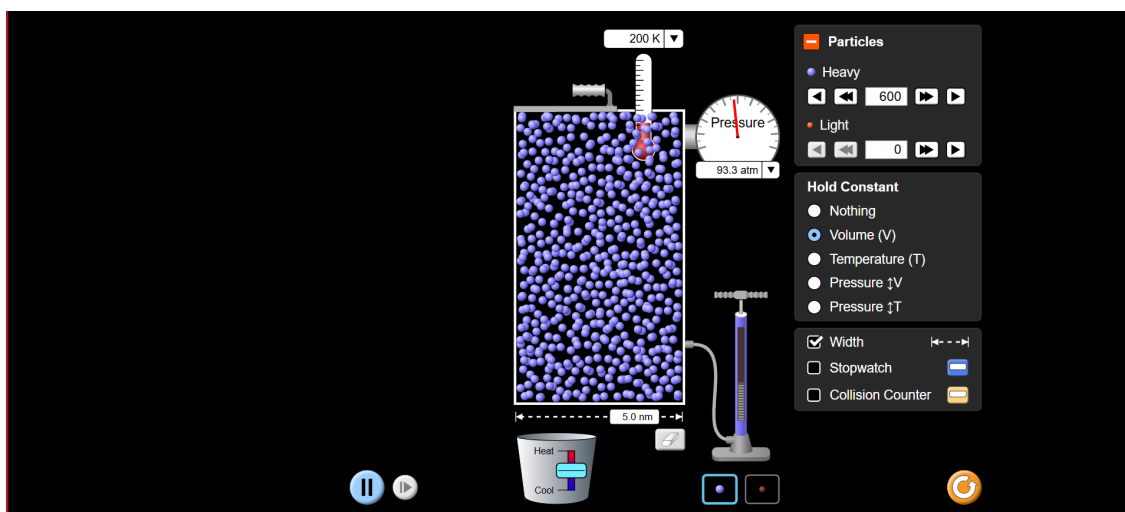
Charles' law

P = 140 atm		P = 160 atm		P = 180 atm	
T (K)	V (nm ³)	T (K)	V (nm ³)	T (K)	V (nm ³)
0	0	0	0	0	0
319	5.3	383	5.5	429	5.5
606	10	580	8.5	816	10.6
904	15	812	11.9	1047	13.6

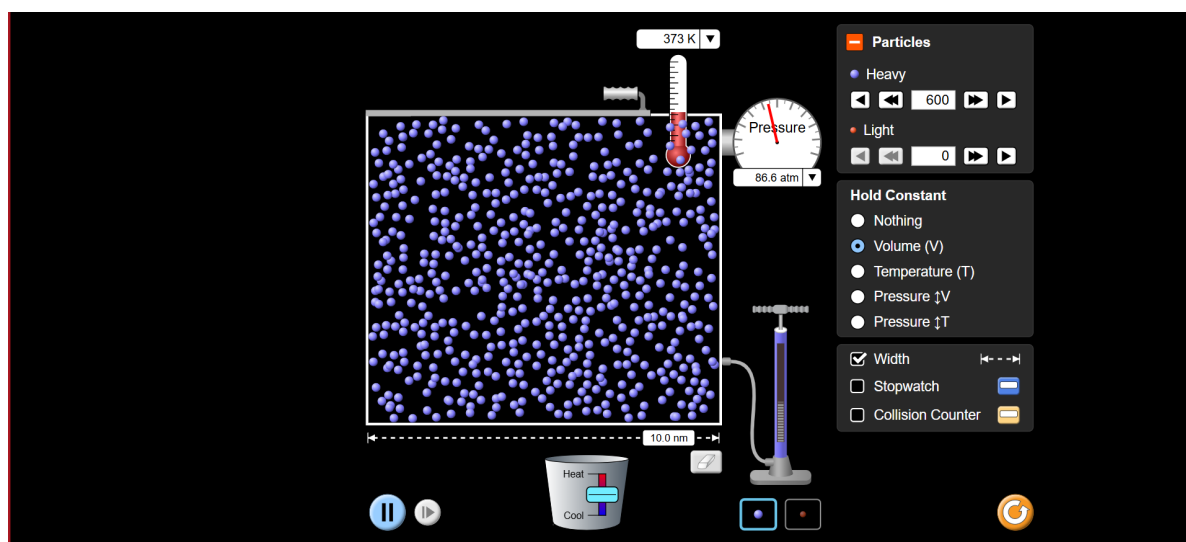
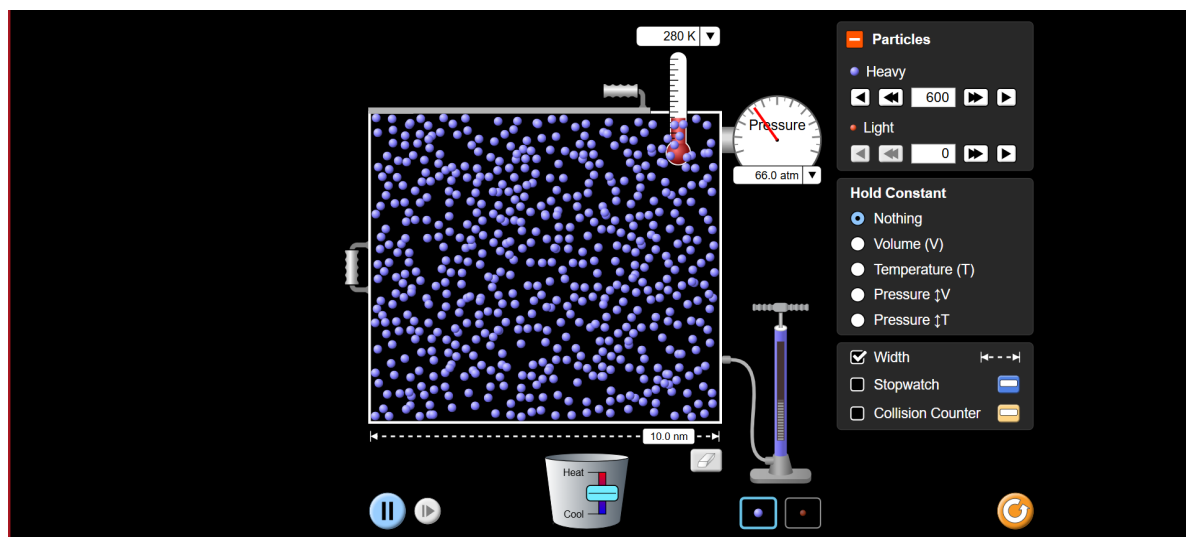
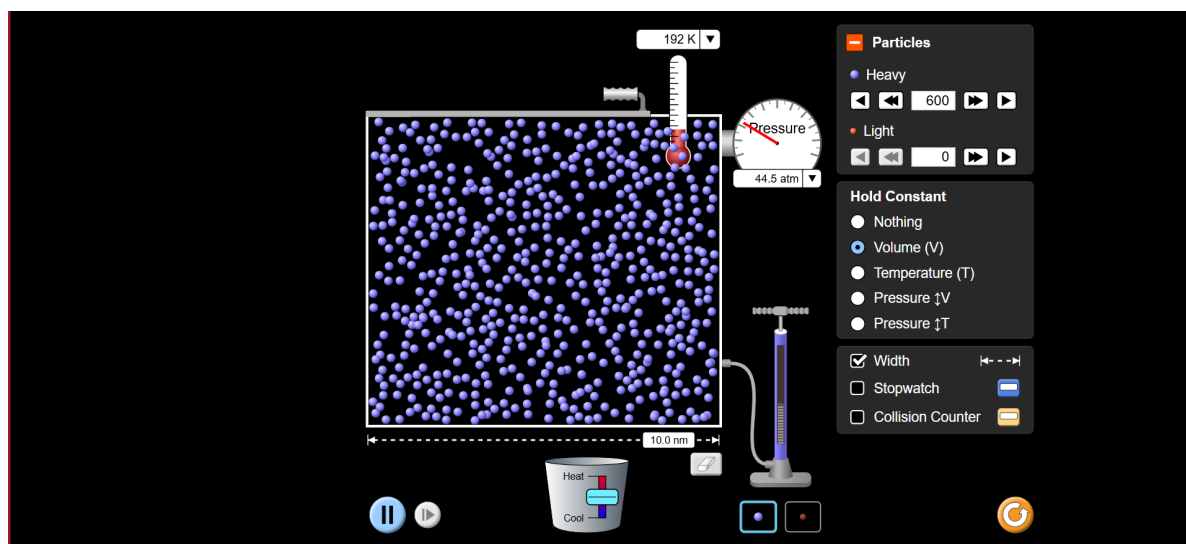


Gay-Lussac's law

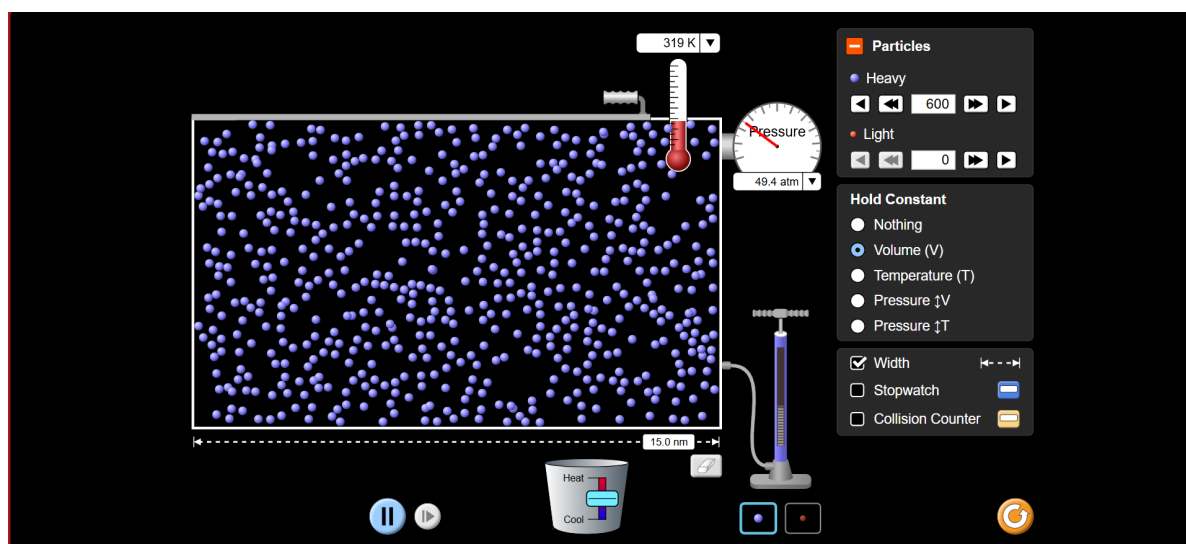
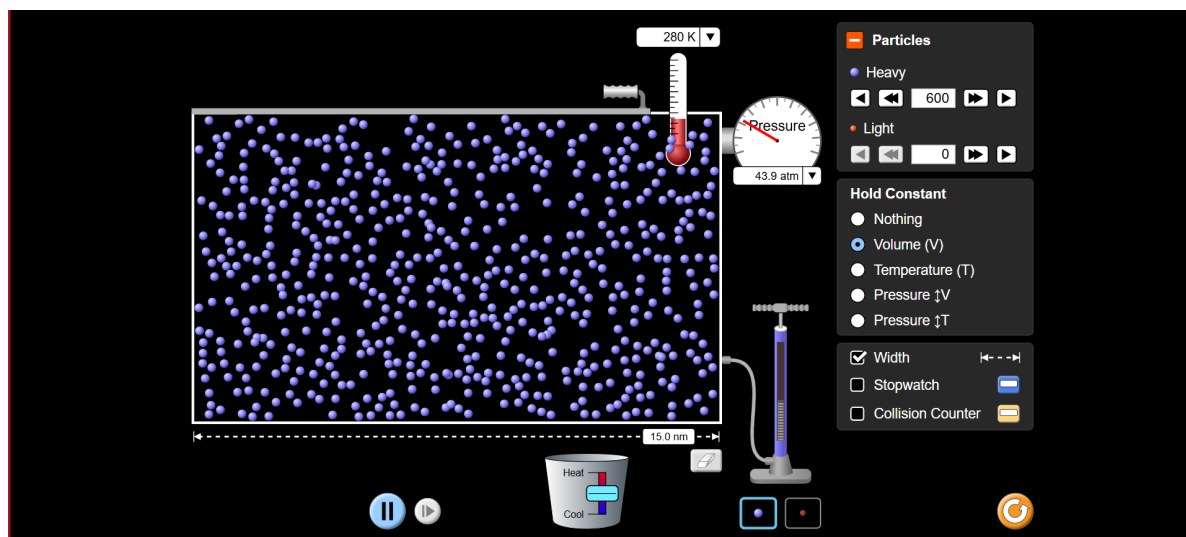
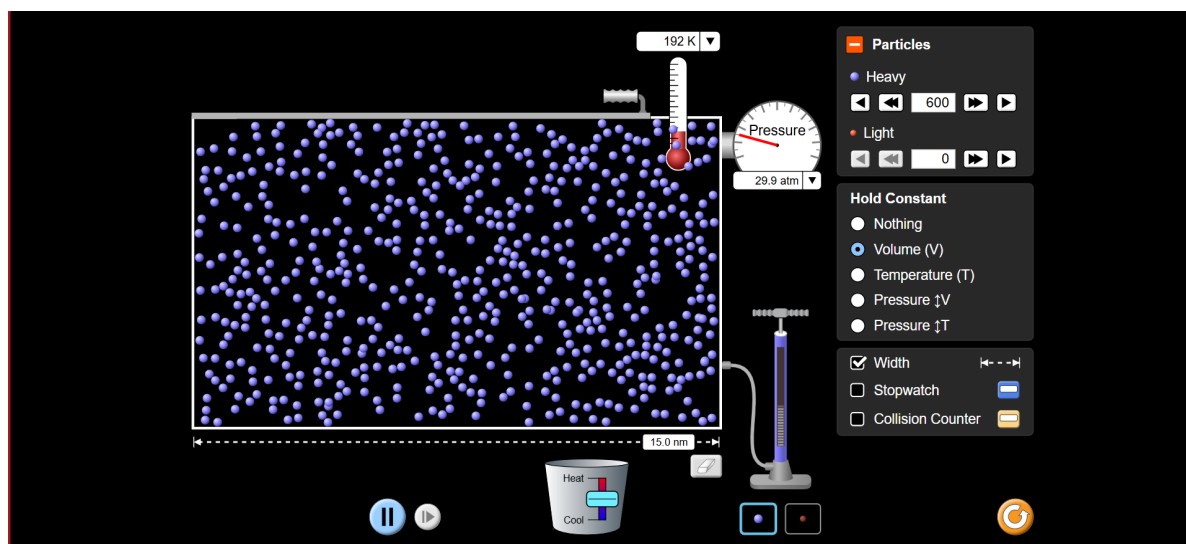
Constants: Volume $\propto 5 \text{ nm}^3$, Number of particles = 600 particles



Constants: Volume $\propto 10 \text{ nm}^3$, Number of particles = 600 particles



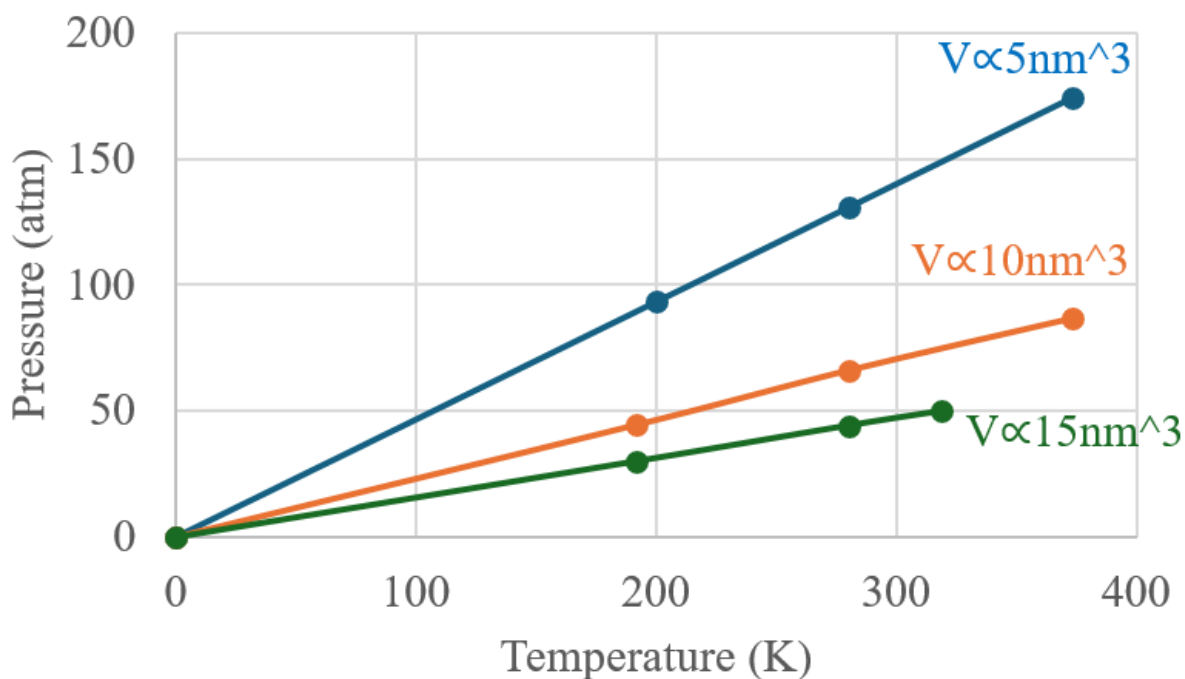
Constants: Volume $\propto 15 \text{ nm}^3$, Number of particles = 600 particles



Gay-Lussac's law

$V \propto 5\text{nm}^3$		$V \propto 10\text{nm}^3$		$V \propto 15\text{nm}^3$	
T (K)	P (atm)	T (K)	P (atm)	T (K)	P (atm)
0	0	0	0	0	0
200	93.3	192	44.5	192	29.9
280	130.7	280	66	280	43.9
373	174.1	373	86.6	319	49.7

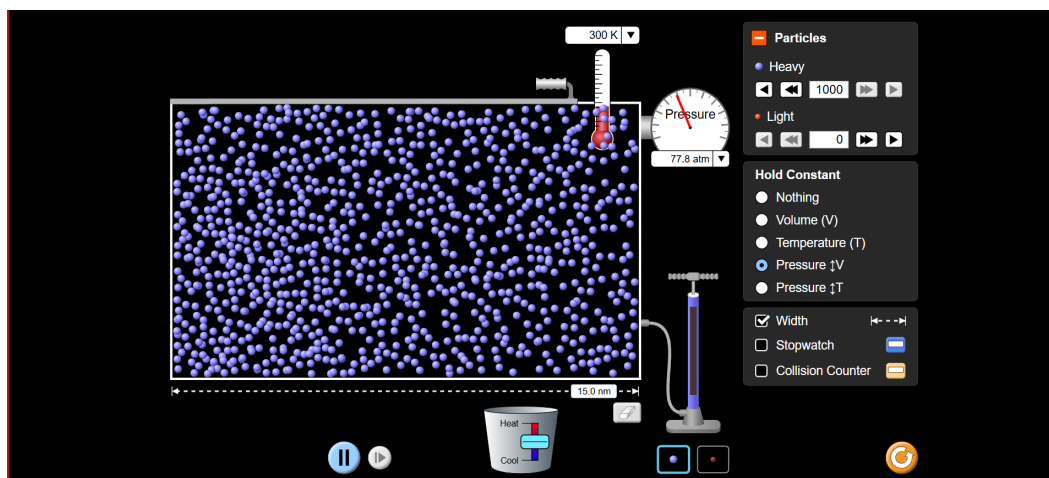
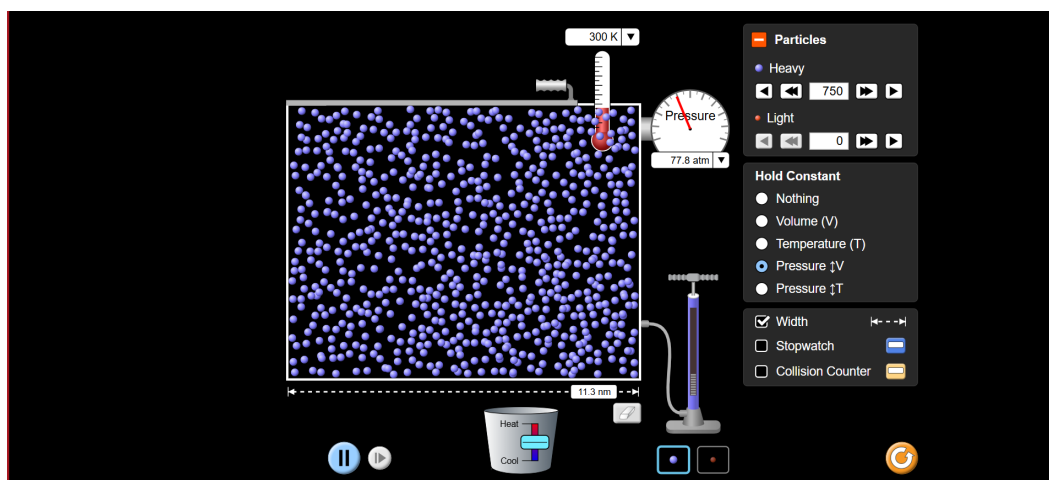
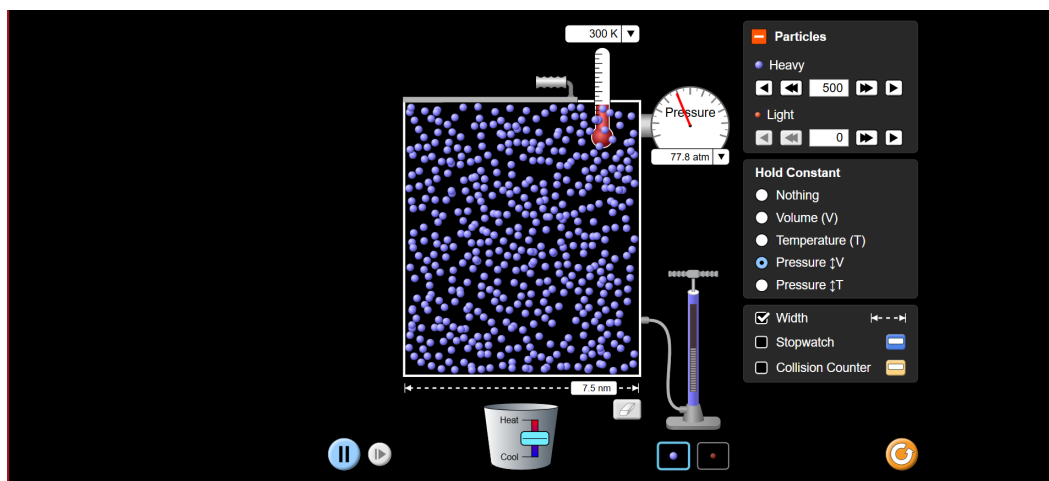
Gay-Lussac's Law



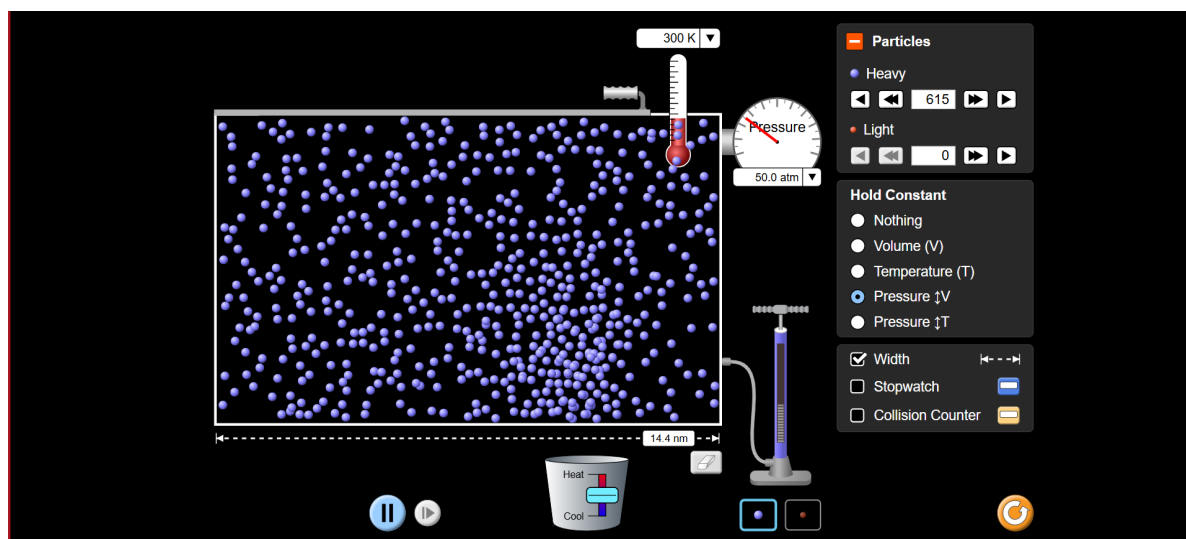
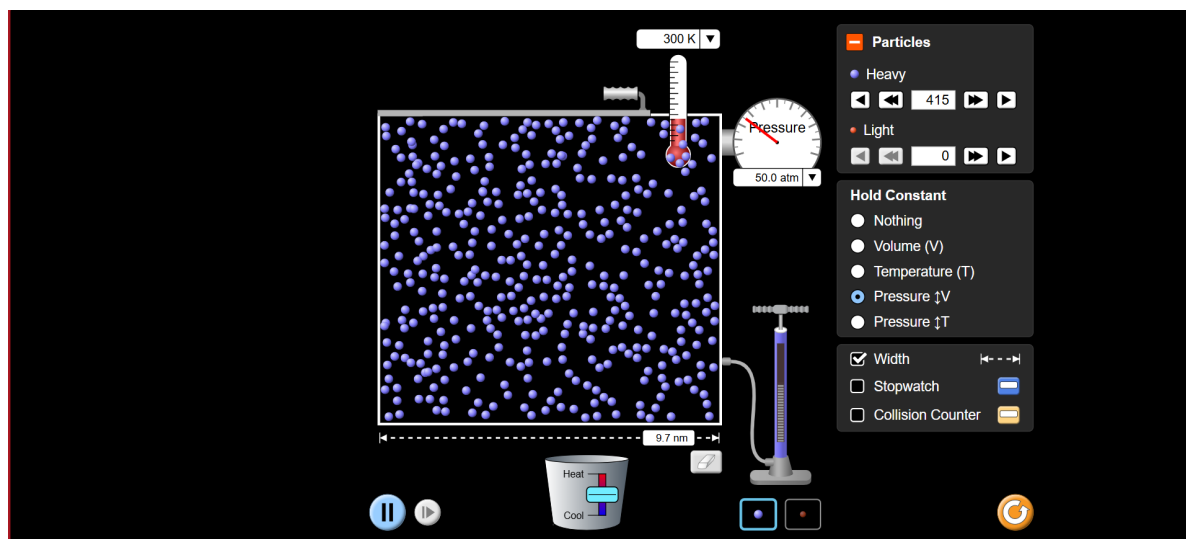
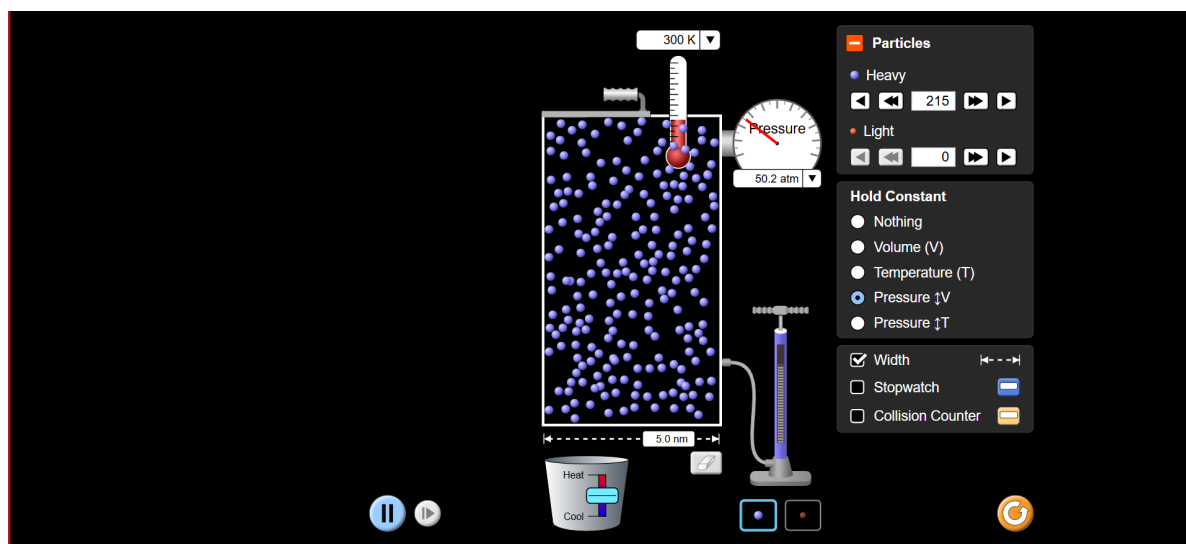
Extra Credit (Potential)

Avogadro's law

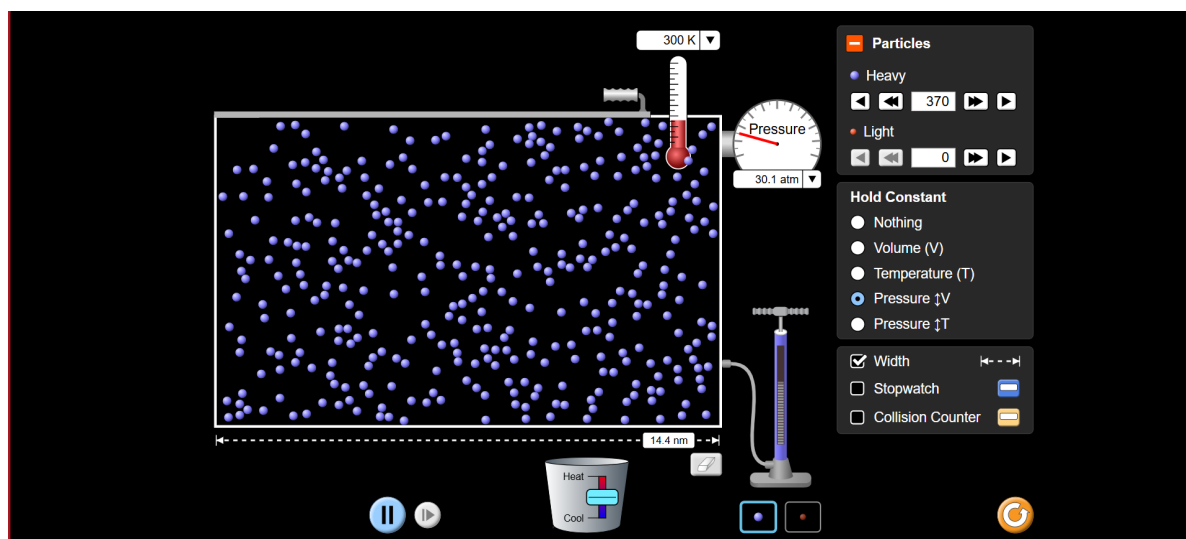
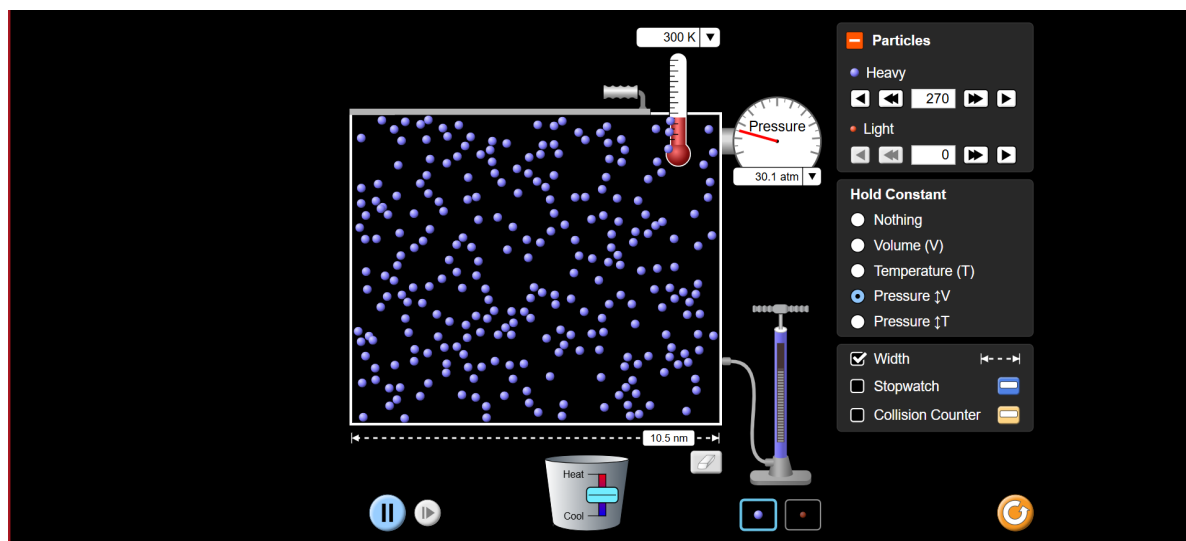
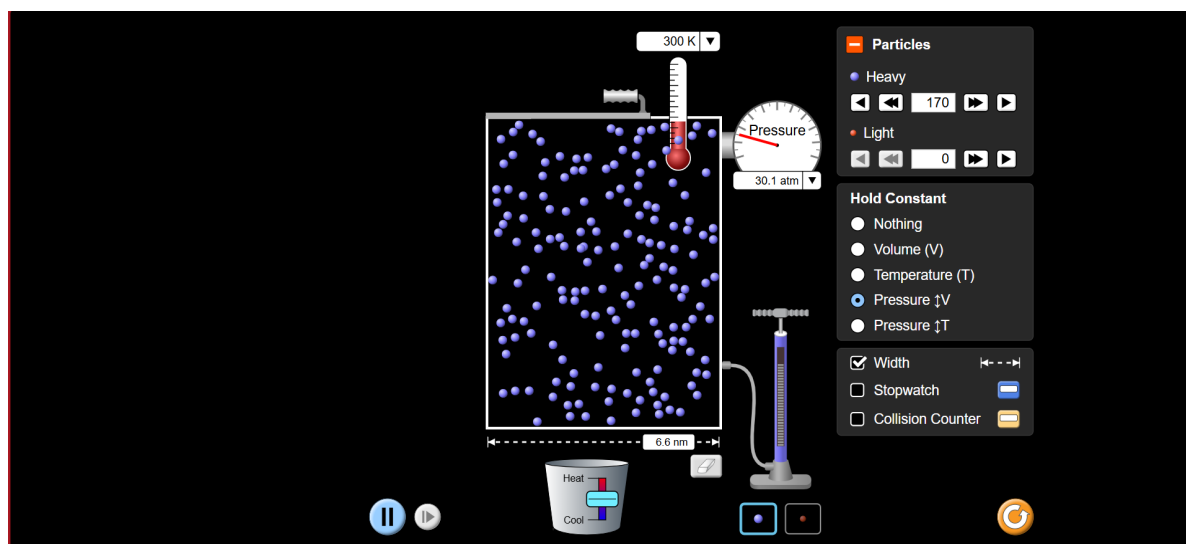
Constants: Temperature = 300K, Pressure = 77.8 atm



Constants: Temperature = 300K, Pressure = 50 atm

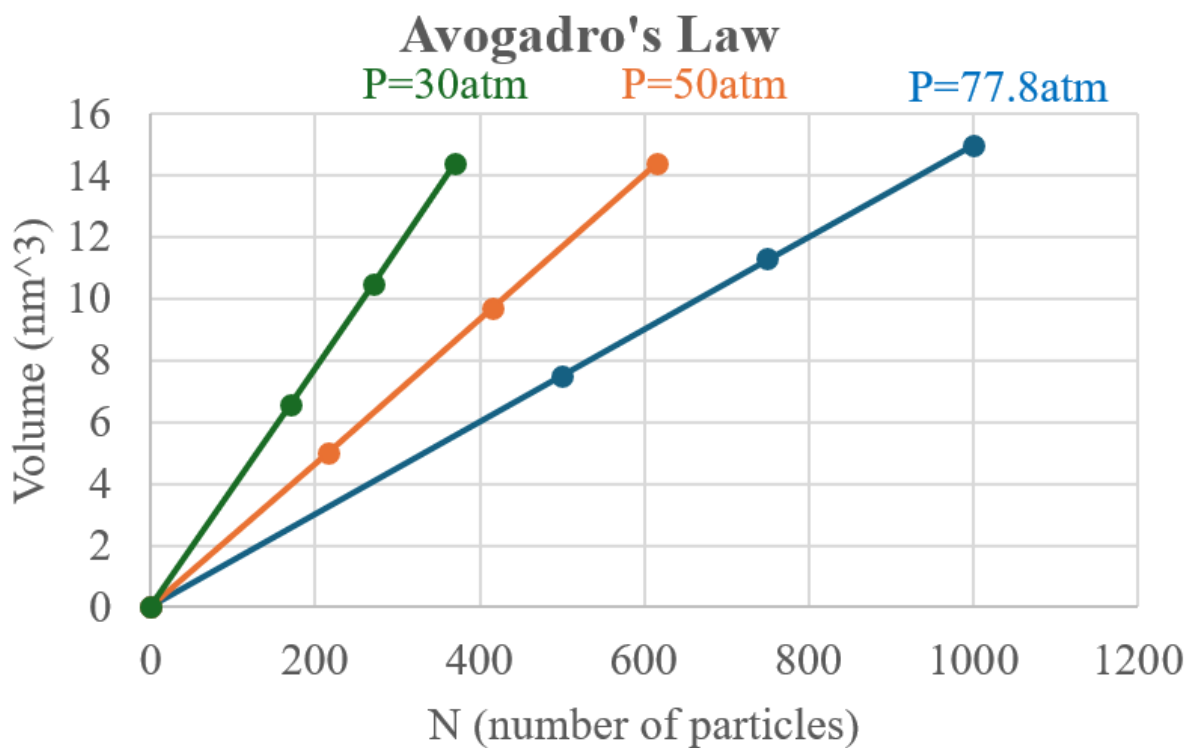


Constants: Temperature = 300K, Pressure = 30 atm



Avogadro's law

P = 77.8 atm		P = 50 atm		P = 30 atm	
N	V (nm ³)	N	V (nm ³)	N	V (nm ³)
0	0	0	0	0	0
500	7.5	215	5	170	6.6
750	11.3	415	9.7	270	10.5
1000	15	615	14.4	370	14.4



Analysis

No calculations had been made to find the error percentage. The graphs describe the nature of each gas law.

Conclusion

This virtual lab was simple and predictable. However, it was quite tedious to repeat all the trials.

Summary

Experiment Title: Gas Law

Student's name: Myat Thit Ko Ko

Date: 09/17/2026

Purpose: To graph the nature of basic gas laws

Procedure: Adjusting one value to observe the change of another while keeping some constant

Data: $4 \times 3 \times 3 = 36$ sets total

Analysis: No error percentages.

Conclusion: Satisfactory