

ChemThink: Behavior of Gases

Name _____ Per _____

1. What does the speed of atoms depend on? Describe the relationship between speed and each of these factors.

temperature: \uparrow temp = \uparrow speed
type of atom: smaller/lighter = faster

2. In a sample of one type of atom, do all the atoms move at the same speed? Why?

No, speed is related to each individual atom's energy

3. What is the equation for Pressure and what are the units for pressure?

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}} \quad \text{PSI}$$

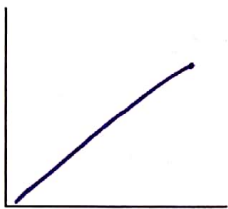
4. When atoms are moving in a closed container what is creating the force on the sides of the container?

impacts (collisions) of atoms w/ sides of container

5. **Explain** how a change in temperature causes pressure to change and include an equation.

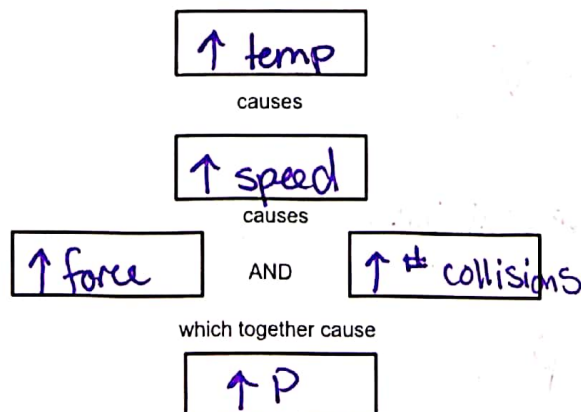
more collisions results in higher pressure
 \downarrow
b/c molecules moving faster $\frac{P}{T} = \text{constant}$

6. Draw the graph you observed of pressure vs. temperature. Is this a direct relationship or an inverse relationship?



direct

7. Fill the cause/effect relationship in the diagram of boxes you observed.

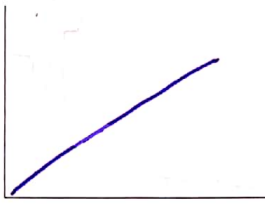


8. **Explain** how the number of atoms present causes pressure to change and include an equation?

more atoms = more collisions, which increases pressure

$$\frac{P}{n} = \text{constant}$$

9. Draw the graph you observed for pressure vs. number of atoms and describe if the relationship is direct or inverse.



direct

10. Fill in the cause/effect relationship in the diagram of boxes you observed.

↑ atoms

causes

↑ collisions

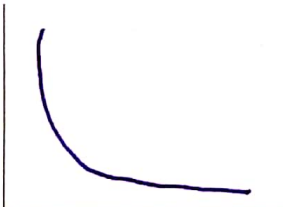
which causes

↑ P

11. **Explain** how a change in volume causes pressure to change and include an equation?

decreasing volume reduces the space the particles move around in. less space means more collisions and more pressure

12. Draw the graph for the relationship you observed for pressure vs. volume and describe if the relationship is direct or inverse.



inverse

13. Fill in the cause/effect relationship in the diagram of boxes you observed.

↓ V

causes

↑ # collisions

which causes

↑ P

14. What are the four variables that are used to describe a gas?

P- pressure
 V- volume
 n- # of atoms (moles)
 T- temperature