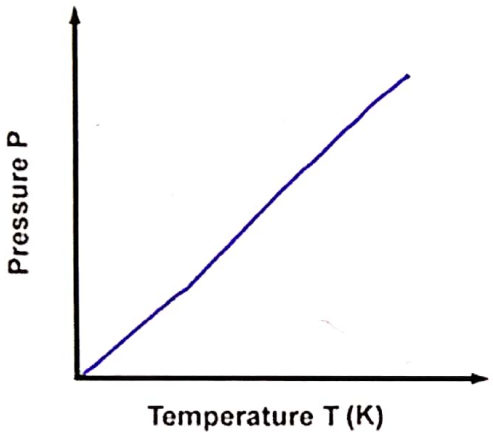
Name: KEY Date: Per.

Gay-Lussac's Law Worksheet

When volume is constant, $\frac{P_1}{T_1} = \frac{P_2}{T_2}$ or $P_1T_2 = P_2T_1$. This gives you the Gay-Lussac's Law equation, where pressure and temperature have a direct relationship.

1. What temperature units must all calculations for gas laws use: Kelvin!.

2. Draw quick graph showing the direct relationship between temperature and pressure:



direct

(think divide = direct)

3. You have a basketball at a temperature of 298K, and a pressure of 2.3 atm. You leave it outside on a cold day, and the temperature of the gas drops to 273K. What happens to the pressure in the basketball?

if temp ↓, particles move slower so there are less collisions and less pressure, the ball would become flat

4. You're out ice fishing with your dad. The propane tank attached to the heater had a pressure of 562.2 kPa when you bought it, and was at a temperature of about 280K. As the fuel in the tank gets used, the pressure in the tank drops to about 210.0 kPa. Describe what happens to the temperature (and thus the heat coming out of the heater).

if pressure ↓, that results from particles moving slower

slower particles correlate to a drop in temp, the heat from the heater would be colder

5. The label on the aerosol can says "Do not leave on stove or expose to heat." Explain why.

the can is under extremely high pressure to begin with, adding heat makes the particles move faster and increases the pressure even more, the can could explode

6. You buy a balloon for your cousin, who is in the hospital. You fill it up outside on a frigid day, when it is -25°C out, to a pressure of 1.7 atm. You bring it to him/her in the hospital where it is 28°C. The maximum pressure that the balloon can take is 2.0 atm. Does it pop?

$P_1 = 1.7$ atm

$T_1 = -25°C + 273.15 = 248.15$ K

$P_2 = ?$

$T_2 = 28°C + 273.15 = 301.15$ K

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$

$\frac{1.7}{248.15} = \frac{P_2}{301.15}$

$1.7(301.15) = P_2(248.15)$

$511.955 = P_2(248.15)$

$P_2 = 2.06$ atm

Pressure is greater than 2.0 atm, so the balloon would pop