

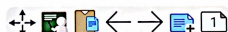
Combined Gas Law

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

P = Pressure (atm)

V = Volume (L)

T = Temp (K)



Gas Law Relationships

P ind. rel. to V $\uparrow \downarrow$ OR $\downarrow \uparrow$

P and V dir. rel. to T $\uparrow \uparrow$ OR $\downarrow \downarrow$

Ideal gas : gas that behaves based on combined/ideal gas law

Standard Temp and Pressure (STP)

$$T = 0^\circ\text{C} / 273\text{K}$$

$$P = 1\text{atm}$$

$$V/\text{mol} = 22.4\text{L/mol}$$



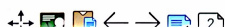
Ideal Gas Law

Law that adds "n" (#mol) to the combined gas law

Combined gas law

$$k = \frac{PV}{T}$$

constant $\left(\frac{\text{atm} \cdot \text{L}}{\text{K}}\right)$



Ideal gas law

$$R = \frac{PV}{nT}$$

constant $\left(\frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}}\right)$ # mol ideal gas



R : "Ideal" gas constant

$$R = 0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$$

* Universal

Ideal gas law "forms"

Base: $PV = nRT$

$P(\text{atm}), V(\text{L})$

$n(\text{mol}), T(\text{K})$

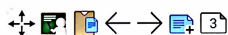
$R = 0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$

$$n = \frac{PV}{RT} \quad (\text{mol})$$

$$V = \frac{nRT}{P} \quad (\text{L})$$

$$P = \frac{nRT}{V} \quad (\text{atm})$$

$$T = \frac{PV}{nR} \quad (\text{K})$$



$\text{CO}_2(\text{g})$: $V = 1.20 \text{ L}$ $P = 1.50 \text{ atm}$ (50% greater than room P)
 $T = 310.0 \text{ K}$ $n_{\text{CO}_2(\text{g})} = \text{--- mol}$
 $R = 0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$

$$n = \frac{PV}{RT} = \frac{1.50 \cancel{\text{atm}} \cdot 1.20 \cancel{\text{L}}}{0.0821 \cancel{\frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}} \cdot 310.0 \cancel{\text{K}}} = 0.071 \text{ mol CO}_2(\text{g})$$

