Volume Conversions (V)

Conv. Factors : 1 L = 1000 mL

Pressure Conversions (P)

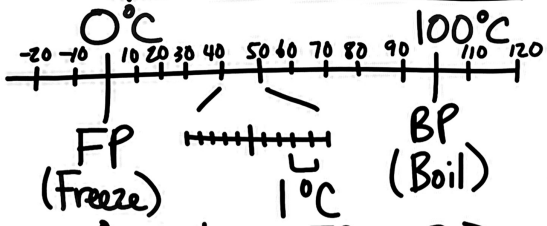
Conv. Factors : 1 atm = 760 mmHg = 29.1 inHg = 101.3 kPa = 14.7 psi = 760 torr

Ex: Convert 4.28 atm to kPa

1 atm = 101.3 kPa

$$4.28 \text{ atm} \left| \frac{101.3 \text{ kPa}}{1 \text{ atm}} \right. = 433.56 \text{ kPa}$$

Temperature Conversions



100°C between FP and BP

1°C has the same temp change as 1K

K = kelvin (absolute temp)

[0K = -273.15°C]

$K = {}^\circ C + 273.15$

${}^\circ C = K - 273.15$

Ex: $-10.34\,^\circ C \longrightarrow K$

$K = -10.34\,^\circ C + 273.15 = 262.81 K$

Ex2: $263.48\,K \longrightarrow {}^\circ C$

${}^\circ C = 263.48K - 273.15 = -9.68\,^\circ C$

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Boyle's Law

Volume (V) of a gas is indirectly (opposite) related to Pressure (P) of that gas

Equation $P \cdot V = k$ (k is a constant)

$k = P \cdot V$

Boyle's Law

$P_1 V_1 = P_2 V_2$

"1" is state 1 "2" is state 2

$P \uparrow \; V \downarrow$ keep k constant

$P \downarrow \; V \uparrow$ Indirect Relationship

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Graphing Boyle's Law

$P_1 V_1 = P_2 V_2$

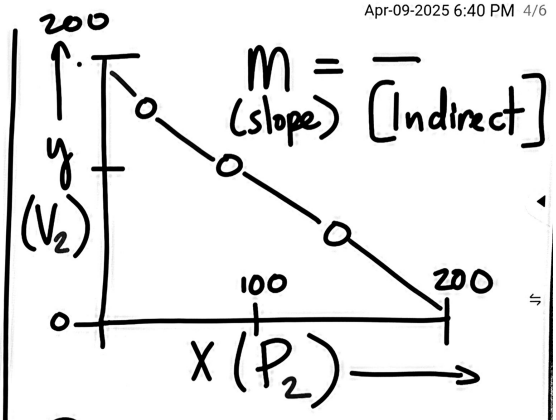
Change P_2, see change V_2

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

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

$P_2 \uparrow \; V_2 \downarrow$

$P_2 \downarrow \; V_2 \uparrow$



$m =$ — (slope) [Indirect]

P_2 (x):	20	80	160
V_2 (y):	150	100	50

Solve w/ Boyle's Law

"1": Starting
"2": Final

Base: $P_1 V_1 = P_2 V_2$

Solved Forms

$$P_1 = \frac{P_2 V_2}{V_1} \qquad P_2 = \frac{P_1 V_1}{V_2}$$

$$V_1 = \frac{P_2 V_2}{P_1} \qquad V_2 = \frac{P_1 V_1}{P_2}$$

Pick equation based on given variables

Boyle's Law Example

$P_1 = 3.49\,atm$ $V_1 = 2.58\,L$ $P_2 = 5.28\,atm$ $V_2 = \_\_ L$

$$\frac{P_1 V_1}{P_2} = \frac{\cancel{P_2} V_2}{\cancel{P_2}} \qquad V_2 = \frac{3.49\,\cancel{atm} \cdot 2.58\,L}{5.28\,\cancel{atm}}$$

$$V_2 = \frac{P_1 V_1}{P_2} \qquad V_2 = 1.71\,L$$