

TOPICS COVERED

REACTION TYPES

1. Combination
2. Decomposition
3. Single Replacement
4. Double Replacement
5. Combustion

REACTIONS IN SOLUTION

Molecular Equations

Ionic Equations

Spectator Ions

Net Ionic Equations

Predicting Precipitate
Formation

Acid/Base Neutralization

DIRECT PROPORTIONALITY

X	Y
1	1.20
2	2.40
3	3.60
4	4.80
5	6.00

$$Y \propto X$$

$$Y = k \cdot X$$

↓

$$k = \frac{Y}{X} = \frac{1.20}{1} = 1.20$$

$$Y = 1.20 X$$

$$Y = 1.20(5) = 6.00$$

INVERSE PROPORTIONALITY

X	Y
1	120
2	60
3	40
4	30
5	24

$$Y \propto \frac{1}{X}$$

$$Y = k \cdot \frac{1}{X}$$

$$Y = \frac{k}{X}$$

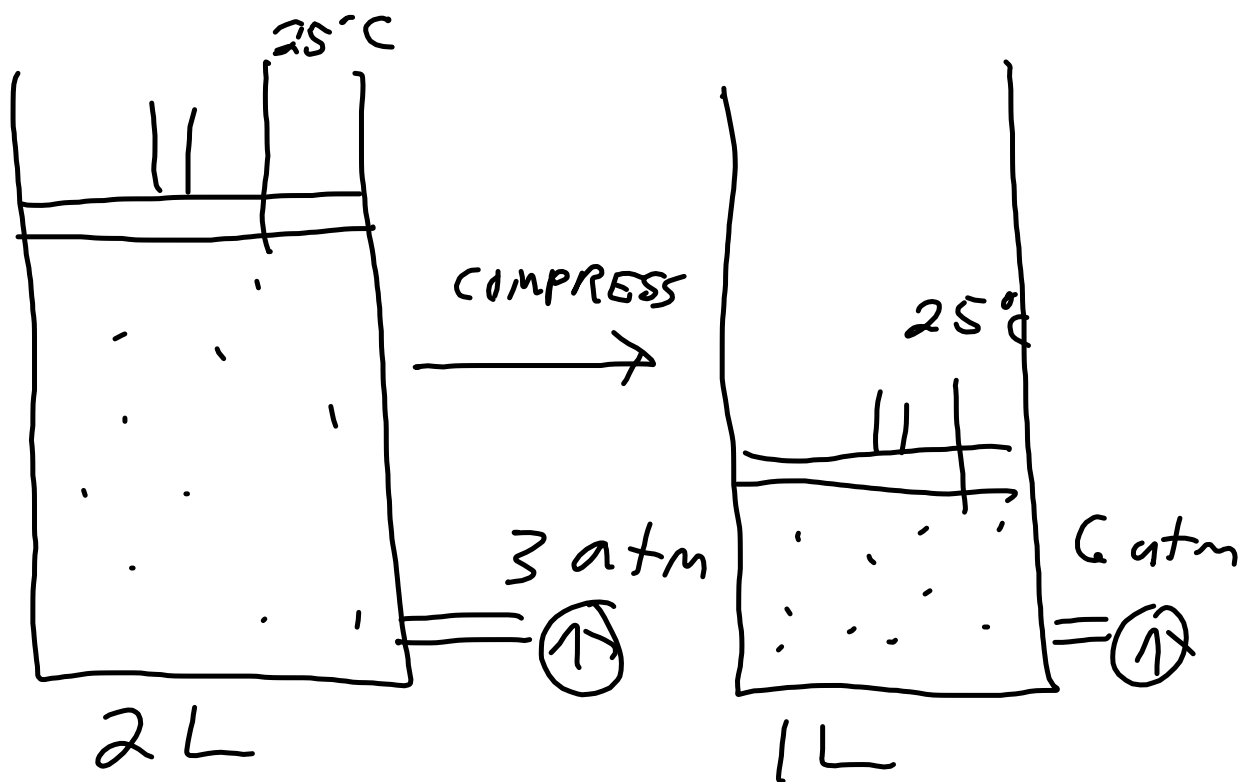
$$k = X \cdot Y$$

$$= (1)(120)$$

$$= 120$$

$$Y = \frac{120}{X}$$

$$= \frac{120}{5} = 24$$



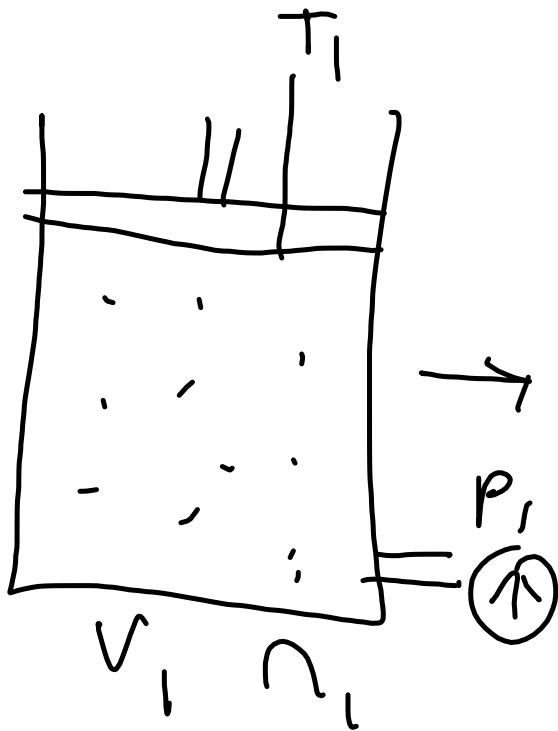
$$P \propto \frac{1}{V} \quad \text{Boyle's Law}$$

At a constant temperature, for a fixed amount of gas, pressure and volume are inversely related.

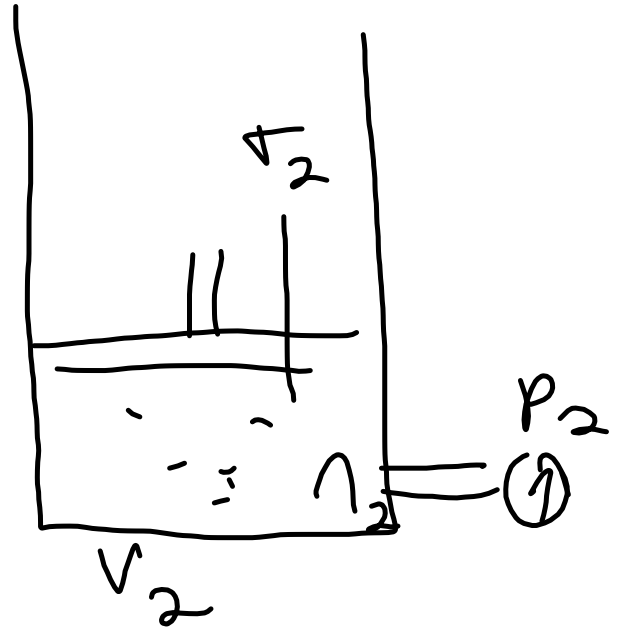
$$P = k \cdot \frac{1}{V} = \frac{k}{V}$$

$$PV = k \quad k = f(T, n)$$

STATE 1



STATE 2



$$T_1 = T_2 \text{ (isothermal)}$$

$$n_1 = n_2$$

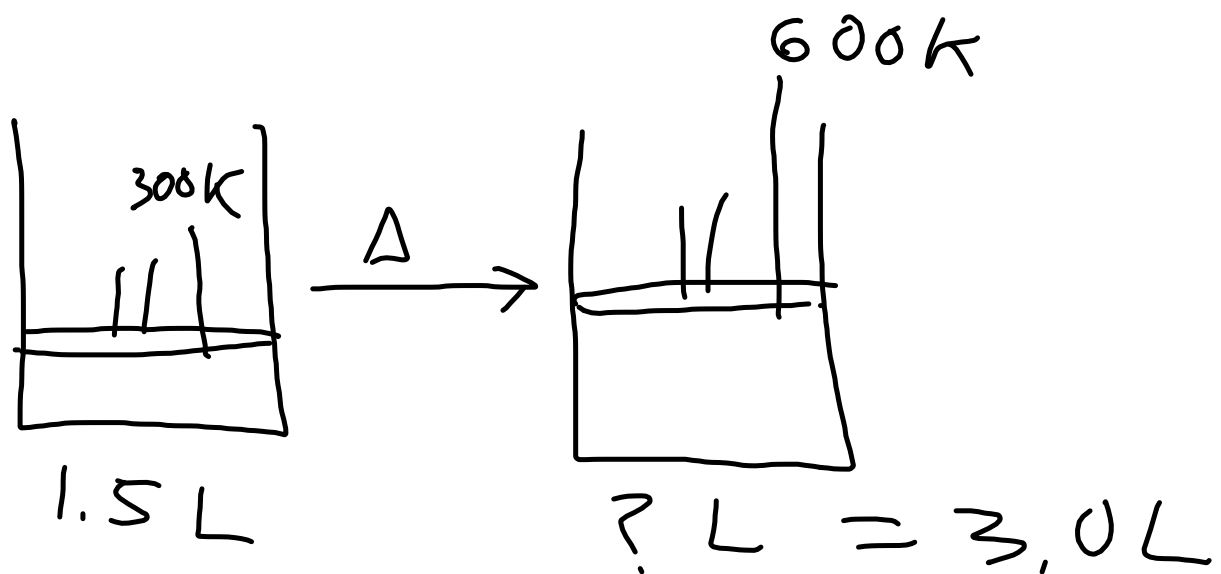
$$P_1 V_1 = K$$

$$P_2 V_2 = K$$

$$P_1 V_1 = P_2 V_2$$

2-point form
of Boyle's Law

Applies to an
isothermal
process involving
a fixed
amount of
gas



$V \propto T$ Charles' Law

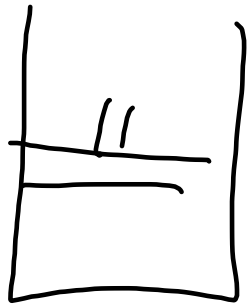
For a fixed amount of gas at a constant pressure, the volume is directly proportional to the Kelvin temperature.

$$V = kT$$

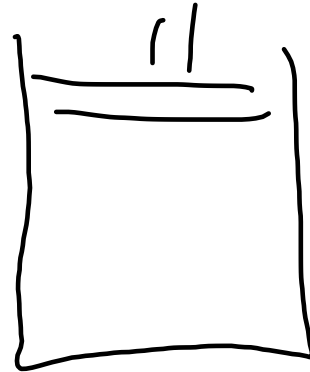
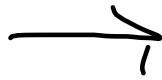
$$\frac{V}{T} = k \quad k = f(P, n)$$

STATE 1

STATE 2



$$V_1, n_1, T_1, P_1$$



$$V_2, n_2, T_2, P_2$$

$$\frac{V_1}{T_1} = k$$

$$\frac{V_2}{T_2} = k$$

$$P_1 = P_2 \text{ (isobaric)}$$

$$n_1 = n_2$$

$$\boxed{\frac{V_1}{T_1} = \frac{V_2}{T_2}}$$

Applies to an isobaric process involving a fixed amount of gas.

2-point form of Charles' Law