STOICHIOMETRY

= Mole ratio

E.G. Calculate the mass of aluminum needed to react with 150g of Chlorine.

$2Al + 3Cl_2 \rightarrow 2AlCl_3$

n Cl_2 = m/Mr - 150/71 = 2.11268 moles

Cl_2 : Al

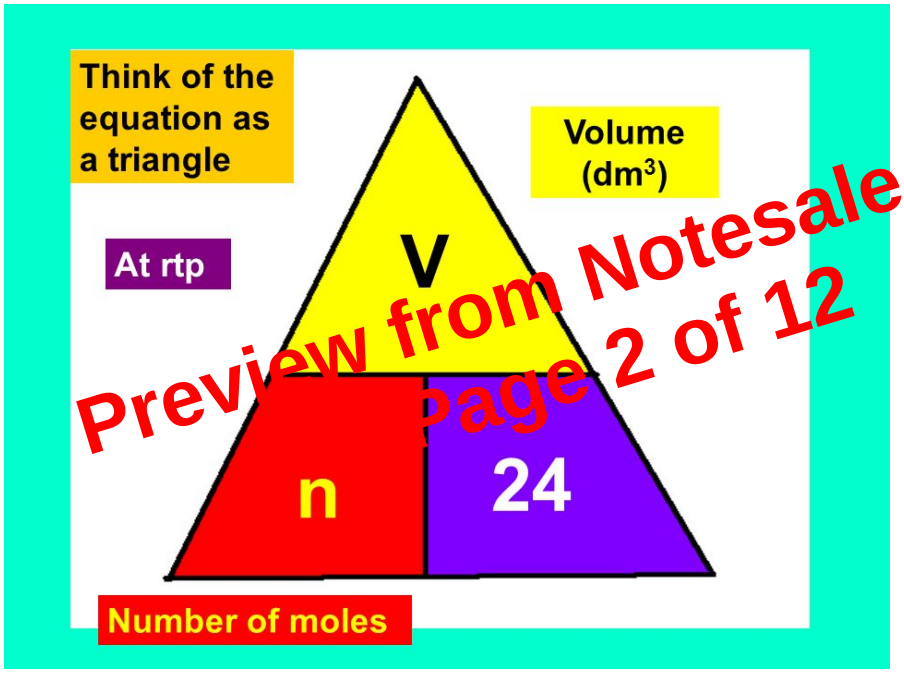
3 : 2

n Al = n x Mr = 1.40845 x 27 = 38.0g

MOLES & GASES

Gases take up a specific volume of space at RTP (room temperature & pressure, 25 degrees & 100KPa).

One mole of gas at RTP has a volume of 24dm3.



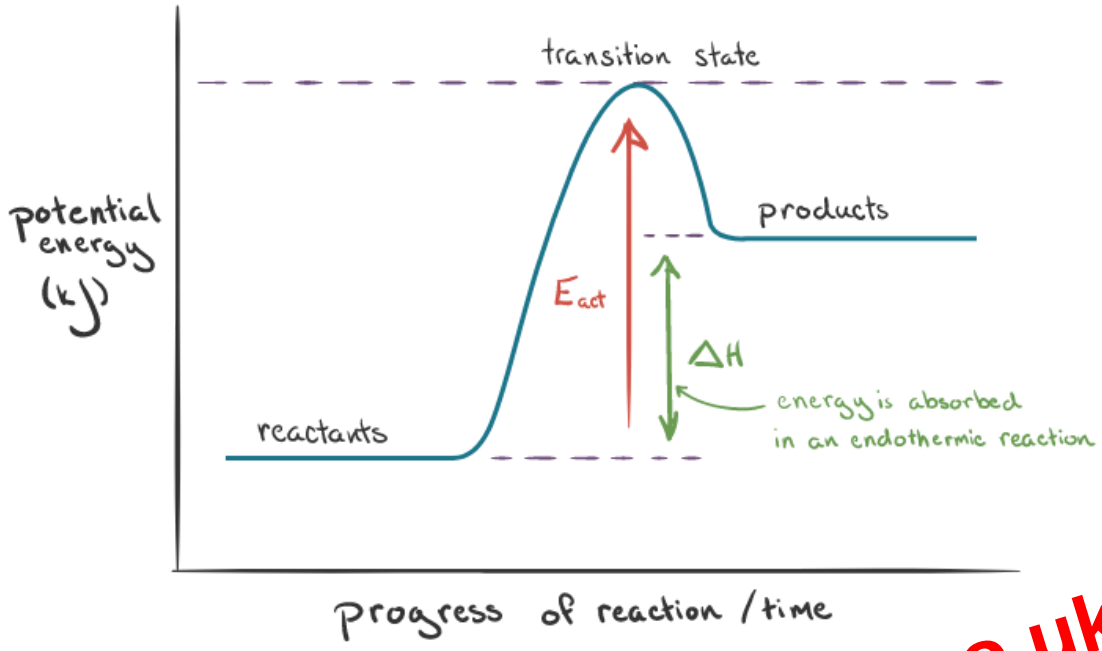
/ 1000 / 1000

cm^3 -> dm^3 -> m^3

<- <-

x 1000 x 1000

ENDOTHERMIC



Bond enthalpies

BONDS BROKEN BONDS MADE

Average bond enthalpy
= The energy required to break one mole of a specified type of bond in a gaseous molecule

- Bond breaking is **ENDOTHERMIC** as energy is required
- Bond making is **EXOTHERMIC** as energy is released

LIMITATIONS

- All molecules need to be gaseous
- As you're using average bond enthalpies, the actual energy would be slightly different.
- Difference in bond enthalpy and true value because bond enthalpies are in the gaseous state, however in true value they're in different

ENTHALPY CHANGES FROM EXPERIMENTAL DATA

$$Q = mc\Delta T$$

Q = Energy of reaction