Aim: How do we solve mole-mole problems?

hydrogen oxygen water

$2\ H_2 + 1\ O_2 \Longrightarrow 2\ H_2O$

How many moles of O_2 are needed to react with 5 moles of H_2?

The coefficients represent moles.

$\underset{\text{mole}}{2\ H_2} + \underset{\text{mole}}{1\ O_2} \Longrightarrow \underset{\text{mole}}{2\ H_2O}$

To set up the proportion, just write the # of moles given in the problem under the coefficients of each substance .

$\underline{2}\ H_2 + \underline{1}\ O_2$ $\quad \frac{2}{5} = \frac{1}{x} \quad 2x=5$
$5 \quad x \quad x=2.5$ moles

How many moles of water are produced when 3 moles of hydrogen react completely?

$\underline{2}\ H_2 \Longrightarrow \underline{2}\ H_2O \quad \frac{2}{3} = \frac{2}{x} \quad x = 3$ moles
$3 \quad x$

GO TO HANDOUT: mole-mole problems

STOICHIOMETRY: MOLE-MOLE PROBLEMS

nitrogen hydrogen ammonia

1. $\boxed{1}N_2 + \boxed{3}H_2 \rightarrow \boxed{2}NH_3$

How many moles of hydrogen are needed to completely react with two moles of nitrogen?

$\frac{3}{x} = \frac{1}{2} \quad x = 6\ mole\ H_2$

potassium chlorate potassium chloride oxygen

2. $\boxed{2}KClO_3 \rightarrow \boxed{2}KCl + \boxed{3}O_2$

How many moles of oxygen are produced by the decomposition of six moles of potassium chlorate?

$\frac{3}{x} = \frac{2}{6} \quad 2x = 18 \quad x = 9\ mole\ O_2$