

TEACHERS' GUIDE

Chemistry 1
Note Taking Guide Stoichiometry

Name KEY
Period 1,5,7 Date 4/7/16

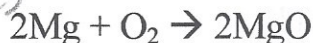
<http://www.gpb.org/chemistry-physics/chemistry/801>

→ Watch 0:00 - 4:42

Stoichiometry:

The study of the quantity relationships in a chemical reaction

Based on balanced equations



2 ^{mole of} magnesium atoms react with 1 molecule of oxygen gas to produce two formula units of magnesium oxide.

The Coefficients in a correctly balanced chemical equation give the MOLE RATIO for the substances involved in the reaction.

Ex. Problem: solid aluminum reacts with elemental iodine to form aluminum iodide.
The balanced chemical reaction is:



	R	P
Al	+2	+2
I	+6	+6

PAUSE some here.

When elemental aluminum reacts with elemental iodine, aluminum iodide is produced.

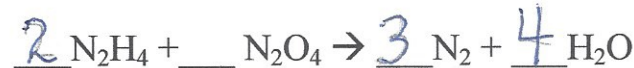
Mole ratios: $\frac{2}{3}$ Al: $\frac{3}{2}$ I₂
 $\frac{2}{2}$ Al: $\frac{2}{2}$ AlI₃
 $\frac{3}{2}$ I₂: $\frac{2}{2}$ AlI₃

Follow the Method

10:43 If you start with 4 moles of Al, how many moles of AlI₃ will be produced?

$$? \text{ moles AlI}_3 = 4 \text{ moles Al} \times \left(\frac{2 \text{ mol AlI}_3}{2 \text{ mol Al}} \right) = 4 \text{ moles AlI}_3$$

Problem Set 1: BE SURE TO BALANCE THE EQUATION FIRST!!



	R	P
N	46	26
H	48	28
O	4	+4

MAY PAUSE MORE
Try 5-8min

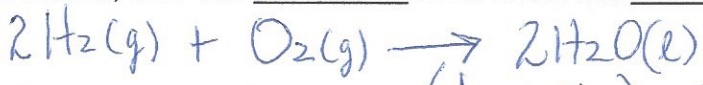
? moles N₂O₄ = 2.72 moles N₂H₄

$$? \text{ N}_2\text{O}_4 = 2.72 \text{ mol N}_2\text{H}_4 \times \left(\frac{1 \text{ mol N}_2\text{O}_4}{2 \text{ mol N}_2\text{H}_4} \right) = 2.72 \div 2 = 1.36 \text{ mol N}_2\text{O}_4$$

$$? \text{ moles N}_2 = 2.72 \text{ moles N}_2\text{H}_4 \times \left(\frac{3 \text{ mol N}_2}{2 \text{ mol N}_2\text{H}_4} \right) = \frac{2.72 \times 3}{2} = 4.08 \text{ mol N}_2$$

14:19

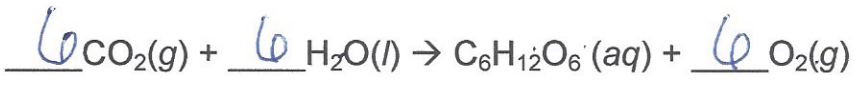
How many moles of water will be produced when 8.0 grams of hydrogen gas react with the oxygen in the air? (Hint: To "make the switch" between different substances in a reaction, use the mole ratio from the balanced equation.)



$$? \text{ mol H}_2\text{O} = 8 \text{ g H}_2 \times \left(\frac{1 \text{ mol H}_2}{2.0 \text{ g H}_2} \right) \times \left(\frac{2 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2} \right) = 4.0 \text{ mol H}_2\text{O}$$

17:48

Problem Set 2: BE SURE TO BALANCE THE EQUATION FIRST!!



	R	P
C	+6	6
O	3+318	18
H	212	12

$$\text{M.M. of CO}_2 = ? \quad 12.01 + 2(16) = 44.01 \text{ g/mol}$$

PAUSE
to check
answer.

$$? \text{ moles of C}_6\text{H}_{12}\text{O}_6 = 15.6 \text{ g CO}_2 \times \left(\frac{1 \text{ mol CO}_2}{44.01 \text{ g CO}_2} \right) \times \left(\frac{1 \text{ mol C}_6\text{H}_{12}\text{O}_6}{6 \text{ mol CO}_2} \right) = 0.059 \text{ mol C}_6\text{H}_{12}\text{O}_6$$

$$? \text{ grams CO}_2 = 0.25 \text{ moles C}_6\text{H}_{12}\text{O}_6 \times \left(\frac{6 \text{ mol CO}_2}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} \right) \times \left(\frac{44.01 \text{ g CO}_2}{1 \text{ mol CO}_2} \right) = 66 \text{ g CO}_2$$

- CR1. B Molar Mass CR2. C. Coefficients 1. B 2. B 2 mol H₂
3. B mole Ratio 4. B 16.6 mol 5. A 298.8 g H₂O

$$\#4. ? \text{ mole H}_2\text{O} = 8.3 \text{ mol O}_2 \times \left(\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol O}_2} \right) = 16.6 \text{ mol H}_2\text{O}$$

$$\#5. ? \text{ g H}_2\text{O} = (8.3 \text{ mol O}_2) \times \left(\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol O}_2} \right) \times \left(\frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right) = 298.8 \text{ g H}_2\text{O}$$