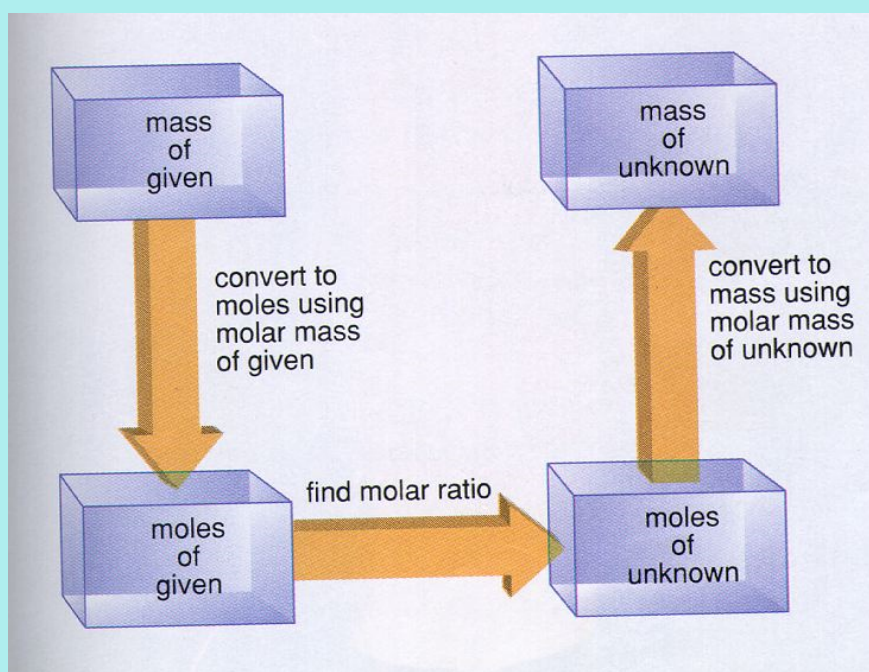


Mass (to Mole) to Mass Stoich Problems



What does an equation represent?



Draw a representation of particles:

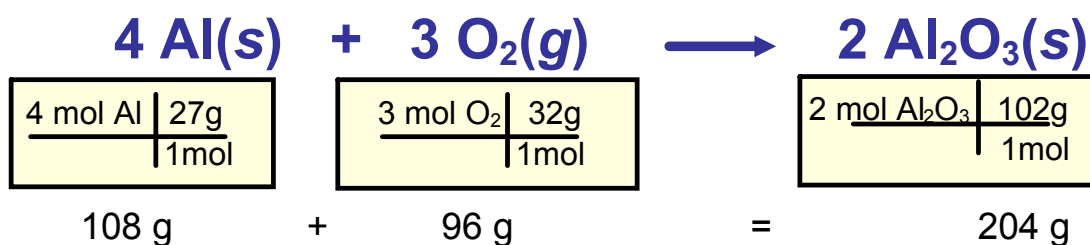


4 Al atoms + 3 O₂ molecules yield 2 molecules of Al₂O₃
 or
 4 Al moles + 3 O₂ moles yield 2 moles of Al₂O₃

coefficients do not mean mass



Use moles to determine mass



Law of Conservation of Mass

Mass is never created or destroyed

Gram to Gram Problem

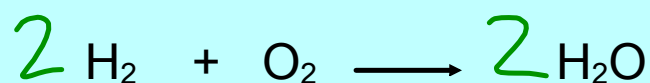
Step 1: Gram X to Mole X:

Reactants are weighed in grams -- convert grams to moles
(use periodic table- molar mass)

Step 2: Mole X to Mole Y -- compare 2 substances in reaction
(use coefficients from reaction)

Step 3: Mole Y to Gram Y -- convert moles to grams
(use periodic table- molar mass)

If I have 75 grams of H₂, how many grams of O₂ will react with it?



Mass to Mass Stoich problems

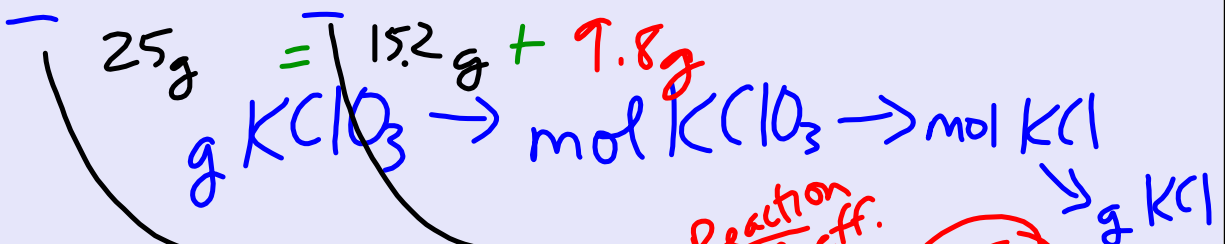
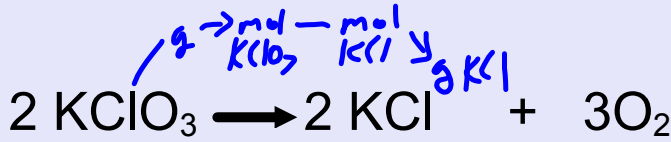
How many grams of potassium chloride are produced if 25 g of potassium chlorate decompose?



How many grams of oxygen will be produced with same starting amount?

Mass to Mass Stoich problems

How many grams of potassium chloride are produced if 25 g of potassium chlorate decompose?

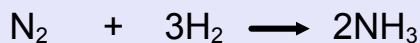


25 g KClO₃	1 mol KClO₃ (P.T.)	2 mol KCl (Reaction Coeff.)	74.5 g KCl (P.T.)
	122.5 g KClO ₃	2 mol KClO ₃	1 mol KCl

<p>(P.T.)</p> <p>KClO₃</p> <p>K 39</p> <p>Cl 35.5</p> <p>O 3 × 16 = 48</p> <p><u>122.5 g/mol</u></p>	<p>(P.T.)</p> <p>KCl</p> <p>K 39</p> <p>Cl 35.5</p> <p><u>74.5 g/mol</u></p> <p>coeff. Reaction</p>	<p>O₂ 16 × 2</p> <p><u>32 g/mol</u></p>
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How many grams of oxygen will be produced with same starting amount?

25 g KClO ₃	1 mol KClO ₃ (PT)	3 mol O ₂	32 g O ₂ (PT)
	122.5 g KClO ₃	2 mol KClO ₃	1 mol O ₂
			9.8 g O ₂

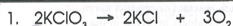


How many grams of ammonia are formed if I start with 50.0g of nitrogen

How many grams of hydrogen are consumed if I start with 50.0g of nitrogen

**STOICHIOMETRY:
MASS-MASS PROBLEMS**

Name MCO 7

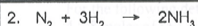


How many grams of potassium chloride are produced if 25 g of potassium chlorate decompose?

$$\begin{array}{l} \text{K} \ 39.1(1) = 39.5 \\ \text{Cl} \ 35.5(1) = 35.5 \\ \text{O} \ 16(3) = 48 \\ \hline 123\text{g/mol} \end{array}$$

$$\begin{array}{l} \text{K} \ 39.1 \\ \text{Cl} \ 35.5 \\ \hline 74.6\text{g/mol} \end{array}$$

$$25\text{g KClO}_3 \left(\frac{1\text{mol KClO}_3}{123\text{g KClO}_3} \right) \left(\frac{2\text{mol KCl}}{2\text{mol KClO}_3} \right) \left(\frac{74.6\text{g KCl}}{1\text{mol KCl}} \right) = 15.2\text{g KCl}$$



How many grams of hydrogen are necessary to react completely with 50.0 g of nitrogen in the above reaction?

$$\text{H}_2 = 2\text{g/mol}$$

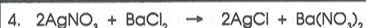
$$\text{N}_2 = 28\text{g/mol}$$

$$50\text{g N}_2 \left(\frac{1\text{mol N}_2}{28\text{g N}_2} \right) \left(\frac{3\text{mol H}_2}{1\text{mol N}_2} \right) \left(\frac{2\text{g H}_2}{1\text{mol H}_2} \right) = 10.71\text{g H}_2$$

3. How many grams of ammonia are produced in the reaction in Problem 2?

$$\begin{array}{l} \text{N} \ (1) \ 14 = 14 \\ \text{H} \ (3) \ 1 = 3 \\ \hline 17\text{g/mol} \end{array}$$

$$50\text{g N}_2 \left(\frac{1\text{mol N}_2}{28\text{g N}_2} \right) \left(\frac{2\text{mol NH}_3}{1\text{mol N}_2} \right) \left(\frac{17\text{g NH}_3}{1\text{mol NH}_3} \right) = 60.7\text{g NH}_3$$



How many grams of silver chloride are produced from 5.0 g of silver nitrate reacting with an excess of barium chloride?

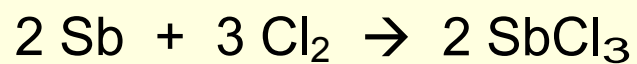
$$\begin{array}{l} \text{Ag} \ (1) \ 107.9 = 107.9 \\ \text{N} \ (1) \ 14 = 14 \\ \text{O} \ (3) \ 16 = 48 \\ \hline 169.9\text{g/mol} \end{array}$$

$$5.0\text{g AgNO}_3 \left(\frac{1\text{mol AgNO}_3}{169.9\text{g AgNO}_3} \right) \left(\frac{1\text{mol AgCl}}{2\text{mol AgNO}_3} \right) \left(\frac{143.3\text{g AgCl}}{1\text{mol AgCl}} \right) = 2.1\text{g AgCl}$$

5. How much barium chloride is necessary to react with the silver nitrate in Problem 4?

$$\begin{array}{l} \text{Ba} \ (1) \ 137.3 = 137.3 \\ \text{Cl} \ (2) \ 35.5 = 71 \\ \hline 208.8\text{g/mol} \end{array}$$

$$5.0\text{g AgNO}_3 \left(\frac{1\text{mol AgNO}_3}{169.9\text{g AgNO}_3} \right) \left(\frac{1\text{mol BaCl}_2}{2\text{mol AgNO}_3} \right) \left(\frac{208.8\text{g BaCl}_2}{1\text{mol BaCl}_2} \right) = 1.18\text{g BaCl}_2$$



How many grams of chlorine gas are required to react with 8 grams of antimony?

How many grams of SbCl_3 are produced from 109 grams of Cl_2 and excess Sb ?

For quiz tomorrow

every part of the equation that has a number
needs units
needs an element or compound name

moles are abbreviated mol
not m -that is meters