| SCH3U | # Stoichiometry: Mass to Mass |
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| Quantitative Chemistry | |

*Review: balancing equation, how to convert mass to moles and moles to moles(mole ratio)*

**Definitions:**

*Stoichiometry:*

*Stochiometric amounts:*

| ***3 types of stoichiometry problems***<br>*A + B → C + D* | | |
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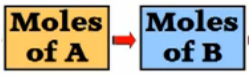
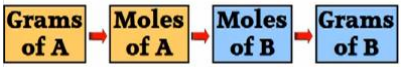
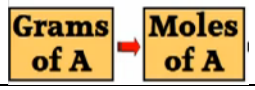
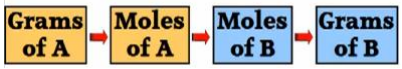
| ***Moles to Mass***<br>(moles of A to grams of A)<br>  | ***Moles to Moles***<br>(moles of A to moles of B)<br>  | ***Mass to Mass***<br>(mass of A to mass of B)<br>  |
| *Eg. Calculate the **mass** of 0.900 mol of NH3?* | $2N_2O_5(g) \rightarrow 4NO_2(g) + O_2(g)$<br><br>*Eg. How many **moles** of $NO_2$ can be produced from 4.3 **moles** of $N_2O_5$?* | $CO_{2(g)} + 2\ LiOH_{(s)} \rightarrow Li_2CO_{3(aq)} + 2H_2O_{(l)}$<br><br>*Eg. Calculate the **mass** of lithium hydroxide required to react with **mass** of $8.80 \times 10^2$ g of carbon dioxide?* |
| ***Mass to Moles***<br>(grams of A to moles of A)<br>  | | |
| *Eg. How many **moles** of oxygen are in 5g of O?* | | |




**EXAMPLE 1:** *Determine the **mass** of lithium hydroxide required to react with 8.8 x $10^2$ g of $CO_2$*

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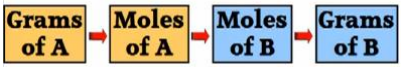
| ***STEP 1*** | *Write the balanced equation for the reaction, listing the given value(s), required value(s), and molar masses below the substance being considered in the problem.* |
| ***STEP 2*** | *Convert mass of given substance(s) to moles of given substance.* mass of A to moles of A |
| ***STEP 3*** | *Convert moles of substance A to moles of substance B: multiply the moles of the given substance by the suitable conversion factor derived from the mole ratio in the balanced equation.* moles of A to moles of B |
| ***STEP 4*** | *Convert moles of required substance to mass of required substance.* moles of B to mass of B |




***EXAMPLE 2:*** *An airbag is inflated with nitrogen produced from the decomposition of sodium azide, $NaN_3$. The mass of $N_2$ in a fully inflated airbag is 87.5g. What mass of $NaN_3$ is required to produce this mass of $N_2$?*

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| ***STEP 1*** | *Write the balanced equation for the reaction, listing the given value(s), required value(s), and the corresponding molar masses.* |
| ***STEP 2*** | *Convert mass of given substance(s) to moles of given substance.* mass of A to moles of A |
| ***STEP 3*** | *Convert moles of substance A to moles of substance B: multiply the moles of the given substance by the suitable conversion factor derived from the mole ratio in the balanced equation.* moles of A to moles of B |
| ***STEP 4*** | *Convert moles of required substance to mass of required substance.* moles of B to mass of B |