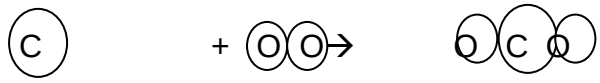
Wordsworth High School
Grade 9 NS
Chemistry

Chemical Reactions.

Chemical Reactions are represented by chemical equations

- Chemical reactions can be represented with models.



$C + O_2 \rightarrow CO_2$

$2H_2 + O_2 \rightarrow 2H_2$

Chemical reactions can also be represented by symbols if it occurs in a balanced equation, eg.

$C+O_2 \rightarrow CO_2$

$2H_2 + O_2 \rightarrow 2H_2O$

The small two (undercase) indicates to us the amount of atoms in thecompound.
The big two infront of hydrogen, shows the relationship of the chemical reaction. Eg. 2 molecules Hydrogen reacts whith 1 molecule Oxygen to form water.Therefor the equation will be 2:1 (H:O).
Matter can not be made or destroyed.
Atoms can only rearrange.
All the atoms infront of the arrow are called reactants.
The atoms behind the arrow are called products.

Balancing of chemical equations

All chemical reactions must be balanced.
The total amount of atoms on the right hand side (reactants) of the equation must be the same as the total amount of atoms on the left hand side (products) of the equation.
$4Fe + 3O_2 \rightarrow 2Fe_2O_3$ (brown rust layer on iron).
$2Mg + O_2 \rightarrow MgO$ (white powder)
Another reaction is Copper that reacts with Oxygen to form Copper oxide. (a very slow reaction)
Word equation: Copper + Oxygen → Copper oxside
Chemical equation: $2Cu + O_2 \rightarrow 2CuO$

Example:
Magnesium oxide are heated to form Magnesium and Oxygen.
Step 1
Write in the formula: $Mg + O_2 \rightarrow MgO$
Left of the arrow is 1 Mg-atom
2 O - atoms
Right of the arrow is 1 Mg-atom
1 O- atom
$Mg + O_2 \rightarrow \mathbf{2}MgO$

Step 2 $Mg + O_2 \rightarrow 2MgO$ (put a 2 in front of MgO to balance the O)
Left of thre arrow is 1 Mg-atom
2 O - atoms
Rifht of the arrow is 2 Mg-atoms (the 2 in front of MgO, makes Mg two as well)
2 O- atoms
Step 3 $\mathbf{2}Mg + O_2 \rightarrow \mathbf{2}MgO$
Left of the arrow is 1 Mg-atom (the 2 in front of Mg, makes the equation balanced.)
2 O - atoms
Right of the arrow is 2 Mg-atoms
2 O- atoms

Now the reaction is balanced.

Worksheet
Question 1
Determine the amount of atoms in each equation:
Example

$2CaCO_3$
2x1 Ca-atom=2**Ca**-atoms
2x1 C -atom=2**C**-atoms
2x3 O -atoms =6**O**-atoms

1.1 $3NaHCO_3$
_____
_____
_____
_____

1.2 $2Cu\ (NO_3)2$
_____
_____
_____

1.3 3NaCl
_____
_____
_____

Question 2

Study the following balanced equations and answer the questions that follow:

$2Li + 2H_2O \rightarrow 2LiOH + H_2$

2.1 What do we call the chemicals on the left hand side of the arrow in the equation?

_____

2.2 What do we call the chemicals on the right hand side of the arrow in the equation?

_____

2.3 Write down the formula for a di-atomic molecule in the chemical equation.

_____

Question 3

Balance each of the following chemical equations:

3.1 $Na + O_2 \rightarrow Na_2O$ _____

3.2 $Al + 0_2 \rightarrow Al2O_3$ _____

3.3 $KBr + Cl_2 \rightarrow KCl + Br_2$ _____

3.4 $Mg + HCl \rightarrow MgCl_2 + H_2$ _____

Question 4

Make a model of the reactants and show how the atoms rearranged themselves in the product. (Use sweets, playdow,beads)

$C + O_2 \rightarrow CO_2$

$2H_2 + O_2 \rightarrow 2H_2O$