Chapter 16: Chemical Reactions

Aim: Identify reactants and products in a chemical reaction.

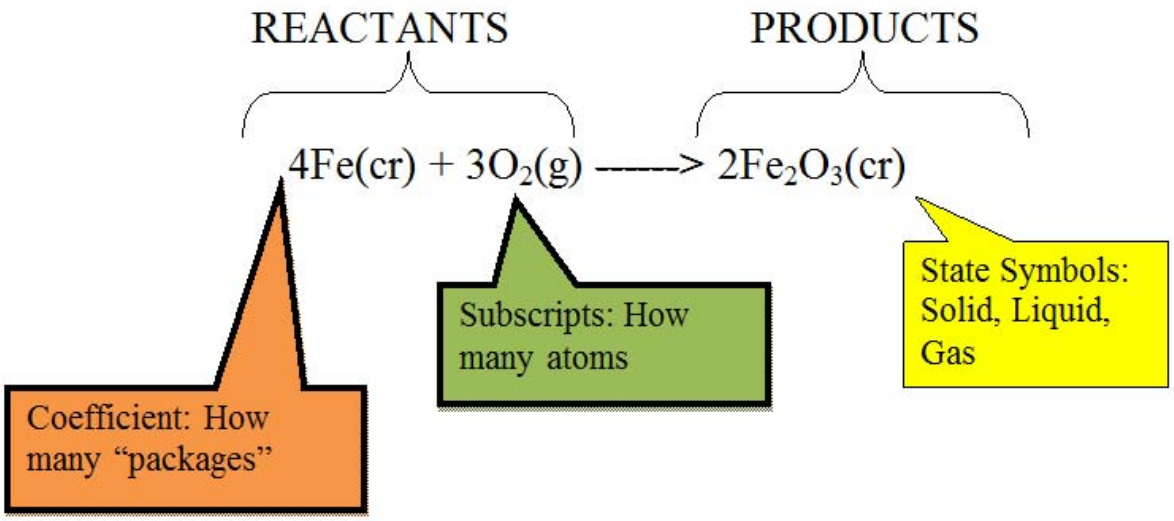
A chemical reaction is a well defined example of a chemical change. In a chemical reaction substances are changed to new substances. You start with reactants and the new substances are the products

The relationship can be written as follows:

Reactants → Products

Recall conservation of mass. In a chemical reaction matter cannot be created or destroyed.

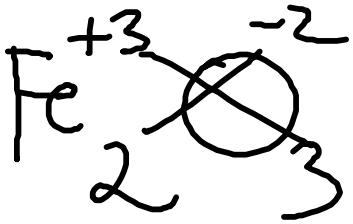
Describing chemical equations:



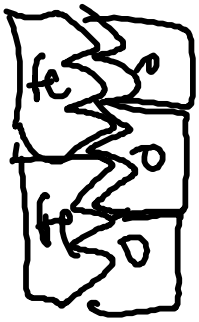
IRON AND OXYGEN PRODUCE IRONOXIDE

WORD EQUATION

$Fe + O_2 \rightarrow Fe_2O_3$



CHEMICAL EQUATION



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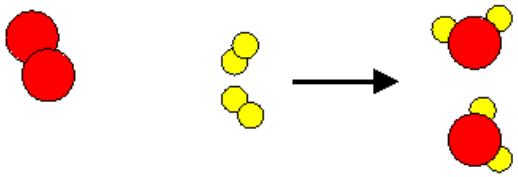
O_2 (g) + $2H_2$ (g) ----->$2H_2O$ (l)

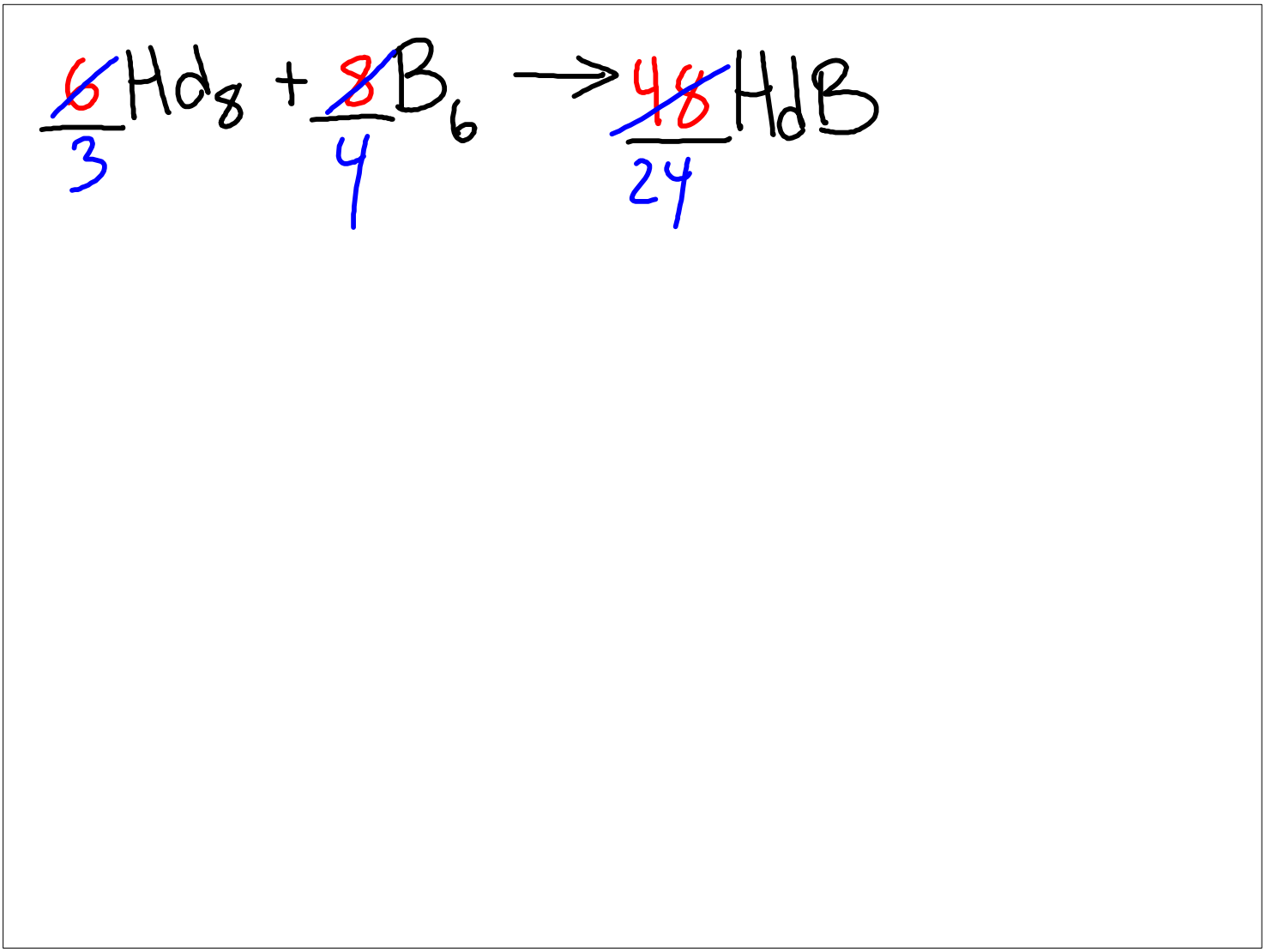


The total number of atoms before the reaction is equal to the total number of atoms after the reaction.

Symbols Used In Chemical Equations			
→	Produces, forms, yields, makes	(aq)	Dissolved in water, Aqueous solution
+	Plus, and	heat →	Reactants are heated
(cr)	Crystal, solid	light →	Reactants are exposed to light
(l)	liquid	elect. →	Reactants are exposed to electricity
(g)	gas		

Assignment

1. STUDY GUIDE "Chemical Changes in Matter"
2. REINFORCEMENT "Chemical Changes in Matter"


6 Hd8 + 8 B6 → 48 HdB
3
4
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Aim: Demonstrate how to write balanced chemical equations.

A balanced chemical equation has the same number of atoms of each element on both sides of the equation

Subscripts can NEVER be changed! Only coefficients can be changed.

Steps for writing balanced chemical equations

1. Describe the reaction in words.

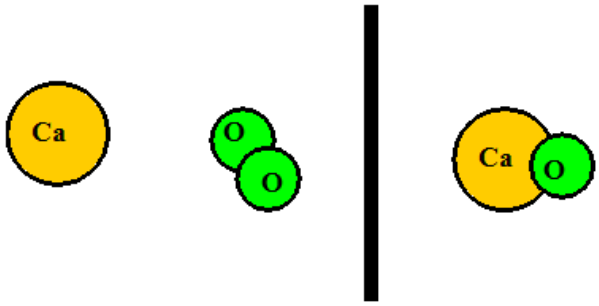
Calcuim and oxygen produce calcium oxide

2. Write a chemical equation for the reaction using formulas and symbols.

$$Ca(cr) + O_2(g) \rightarrow CaO(cr)$$

3. Check the equation for balance.

Before		After	
Ca	O	Ca	O
1	2	1	1



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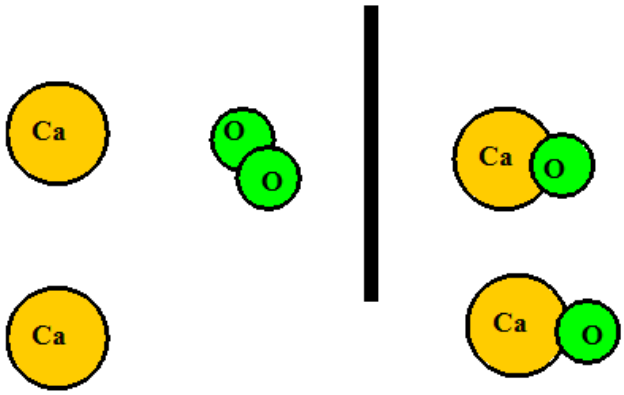
4. Choose coefficients that balance the equation.

Before		After	
Ca	O	Ca	O
2	2	2	2



Assignment

1. STUDY GUIDE "Chemical Equations"
2. REINFORCEMENT "Chemical Equations"

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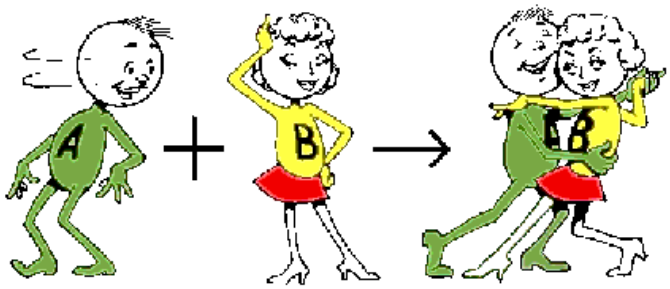
Aim: describe four types of chemical reactions using their generalized formulas.

Synthesis Reaction

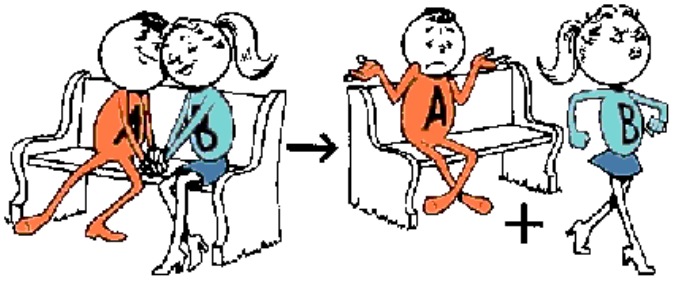
$$A + B \rightarrow AB$$



$$2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$$

Decomposition Reaction

$$AB \rightarrow A + B$$



$$2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$$

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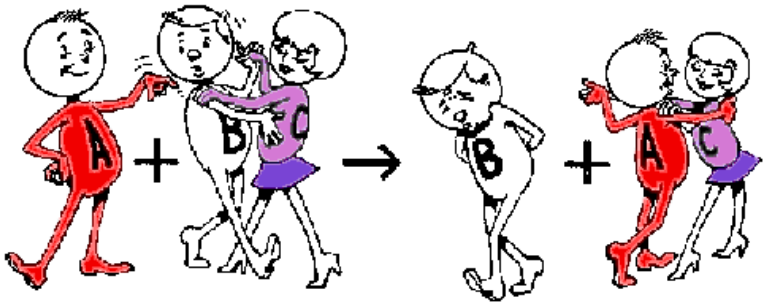
Single Displacement Reaction

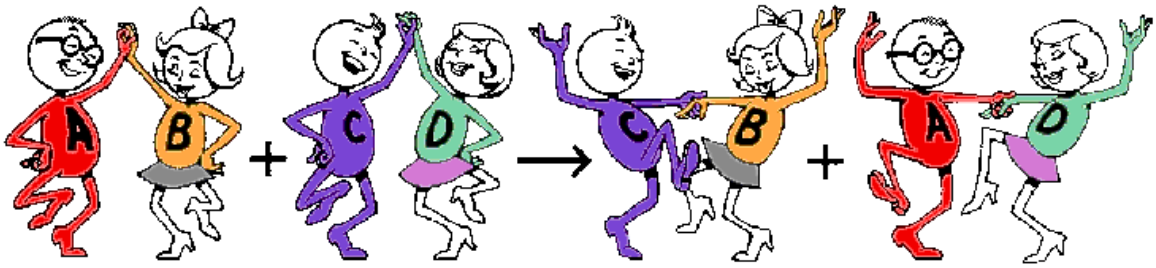
$$A + BC \rightarrow B + AC$$



$$Zn(cr) + Cu(NO_3)_2(aq) \rightarrow Zn(NO_3)_2(aq) + Cu(cr)$$

Double Displacement Reaction

$$AB + CD \rightarrow CB + AD$$



$$AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(cr) + NaNO_3(aq)$$

Assignment

1. STUDY GIUDE "Types of Chemical Reactions"
2. REINFORCEMENT "Types of Chemical Reactions"

Aim: Differentiate between an exothermic reaction and an endothermic reaction.

More energy is required to break bonds than to form new ones. Forming new bonds releases energy.

Endothermic reactions: Energy must be provided for the reaction to take place . At sports events, when someone gets injured, cold packs take advantage of endothermic reactions.

Exothermic reactions: Reactions where energy is given off. Burning of fuels and rusting are exothermic reactions. Heat packs take advantage of exothermic reactions.

Assignments

1. STUDY GUIDE "Energy and Chemical Reactions"
2. REINFORCEMENT "Energy and Chemical Reactions"