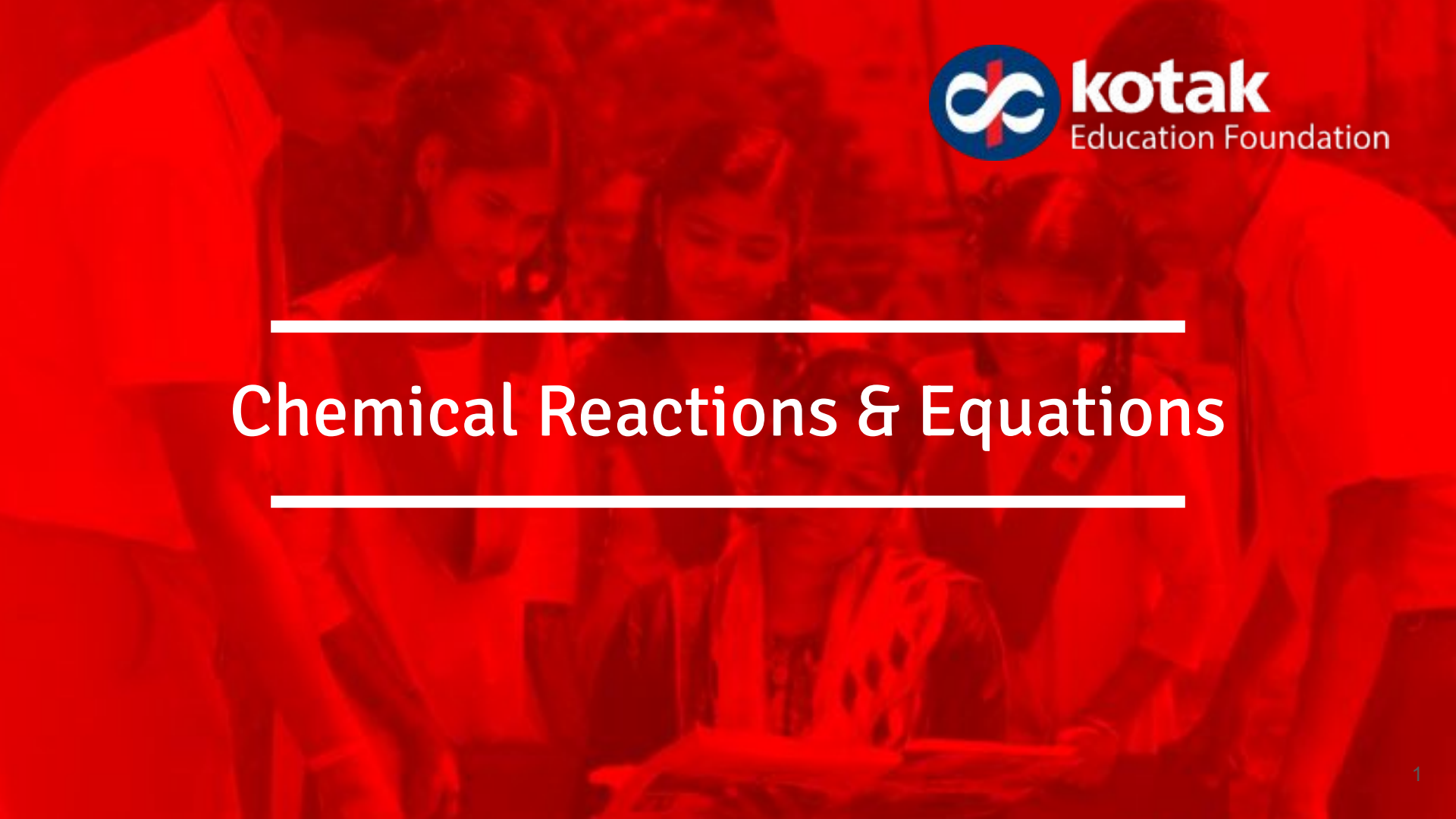
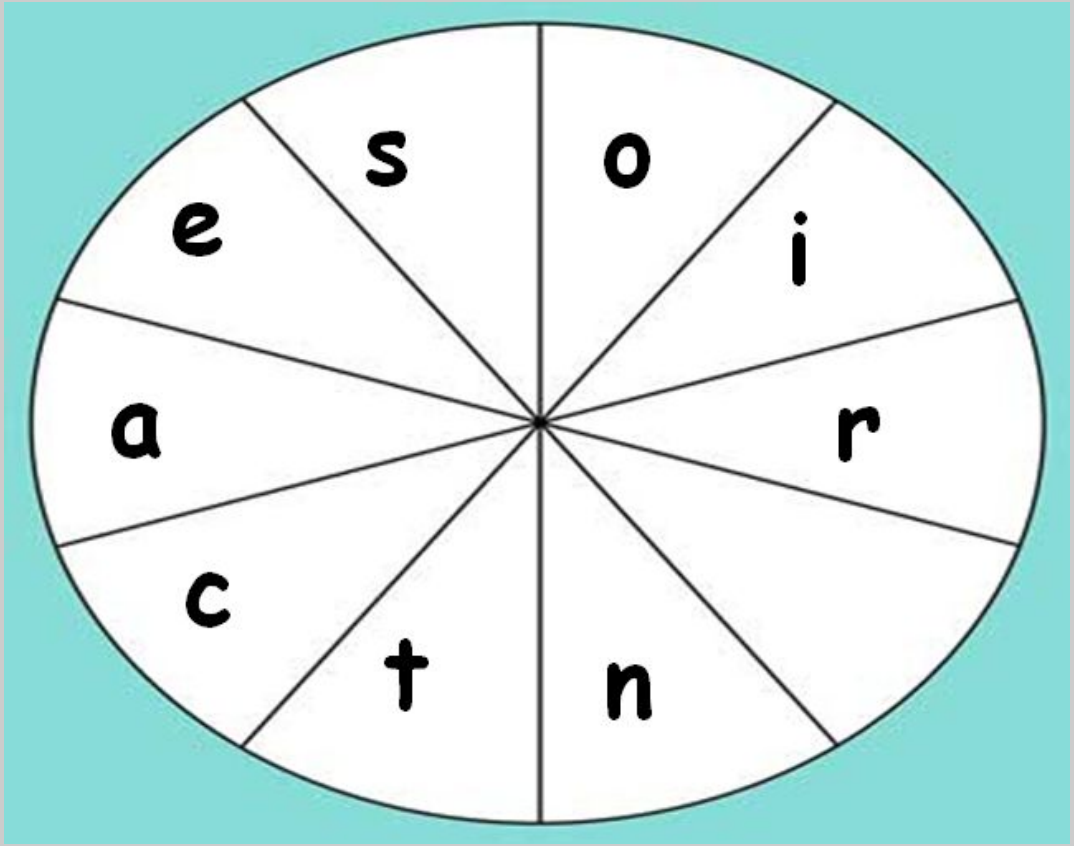


kotak Education Foundation

Chemical Reactions & Equations

Try to find this word...

kotak Education Foundation



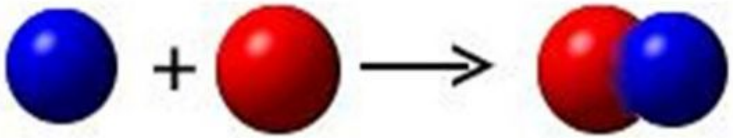
It is a word related to the lesson

Types of reactions

Synthesis: A + B -> AB

Type 1: **Synthesis (Composition)**

- In a synthesis reaction (also known as a composition reaction), two substances combine to form a larger substance.



Analogy: boy A walks into the dance, sees girl B and ask her to dance. They then form couple AB.

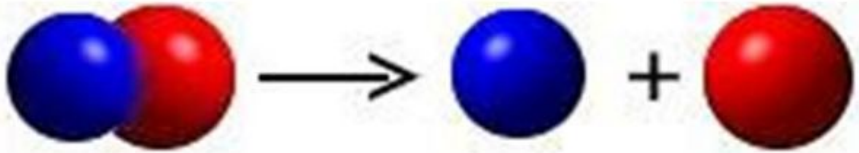
Tip to remember...Compare it with dance floor

Types of reactions

kotak Education Foundation

Type 2: **Decomposition**

In a decomposition reaction, a larger substance breaks apart and forms two or more simpler substances.



Dancers Analogy: boy A steps on girl B's toe. She gets upset and walks away.

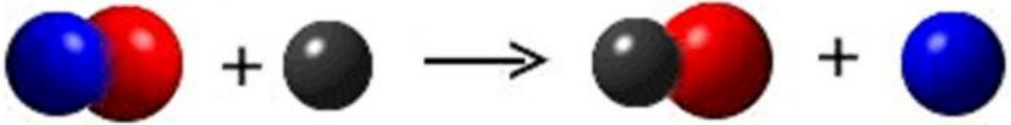
Tip to remember...Compare it with dance floor

Types of reactions

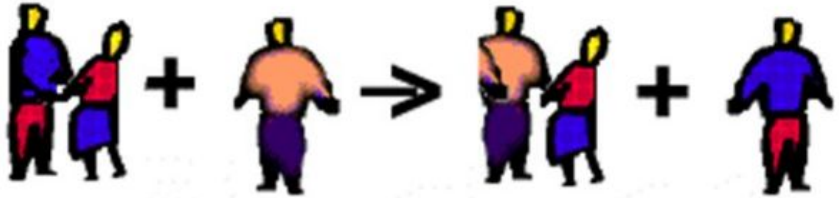
kotak Education Foundation

Type 3: Single Replacement

- In a single replacement reaction, a more active element replaces a less active element in a compound.



- Analogy…



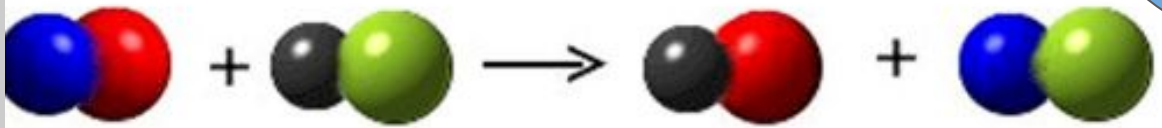
Tip to remember…Compare it with dance floor

Types of reactions

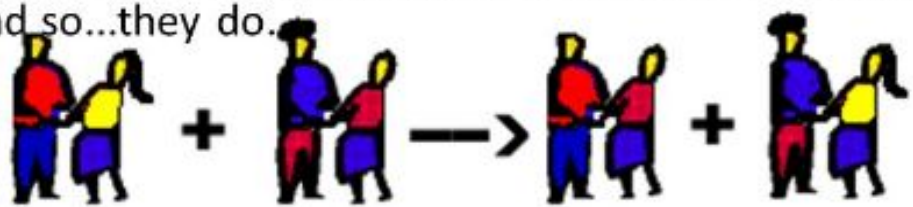
kotak Education Foundation

Type 4: Double Replacement

- In a double replacement reaction, two metal ions (cations -in aqueous compounds) switch places.

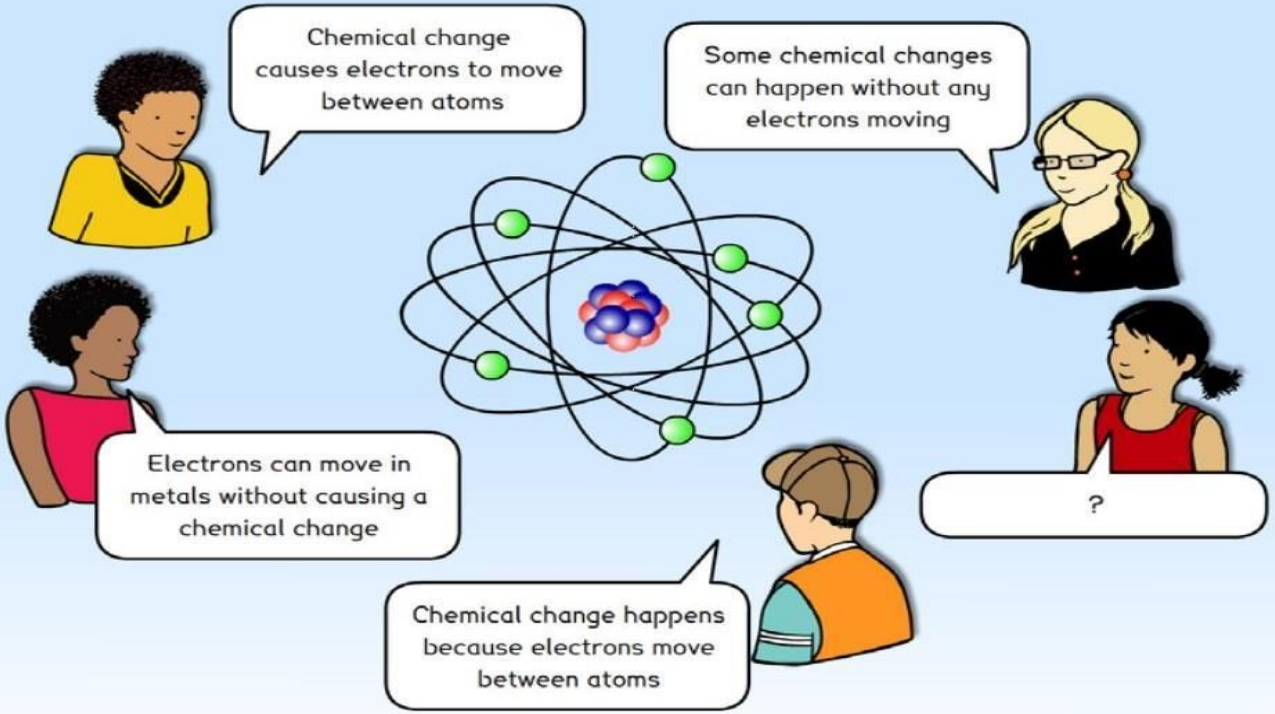


Analogy of dancers: Two couples are dancing . The two girls look over and state they wish to switch partners. And so...they do.



Tip to remember...Compare it with dance floor

Thinking Time



Chemical Equations Practice when Online

kotak Education Foundation

Balancing Chemical Equations

https://phet.colorado.edu/sims/html/balancing-chemical-equations/latest/balancing-chemical-equations_en.html

Periodic Table

https://www.rsc.org/periodic-table

Some sites to explore...When online

https://interactives.ck12.org/simulations/chemistry/balancing-chemical-equations/app/index.html?screen=rwes&lang=en&referrer=ck12Launcher&backUrl=https://interactives.ck12.org/simulations/chemistry.html

Some Important Questions

kotak Education Foundation

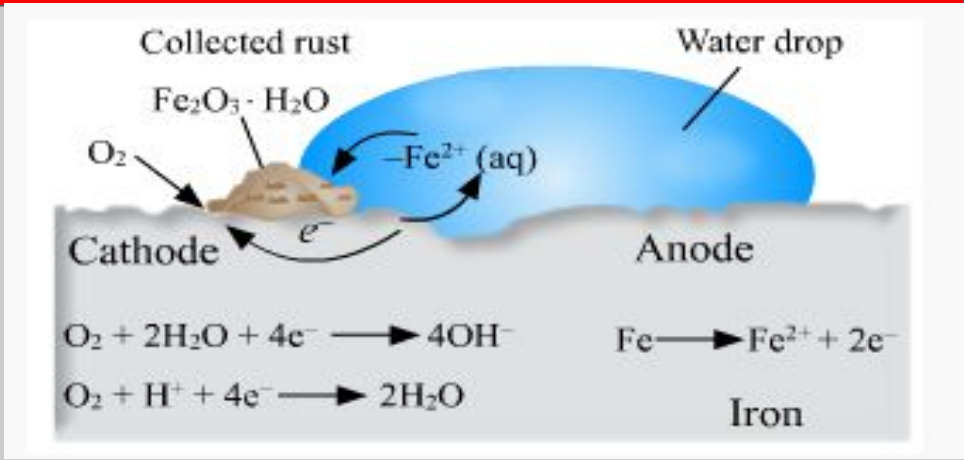
a. To prevent rusting, a layer of **zinc** metal is applied on iron sheets.

The conversion of ferrous sulphate to ferric sulphate is **oxidation** reaction.

When electric current is passed through acidulated water of **electrolysis** water takes place.

Addition of an aqueous solution of $ZnSO_4$ to an aqueous solution of $BaCl_2$ is an example of **double displacement** reaction.

Observe the following picture and write down the chemical reaction



Different regions on the surface of iron become anode and cathode.

(1) Fe is oxidised to Fe^{2+} in the anode region,

$Fe(s) \rightarrow Fe^{2+}(aq) + 2e^-$

(2)O_2 is reduced to form water in the cathode region.

$O_{2(g)} + 4H^+_{(aq)} + 4e^- \rightarrow 2H_2O_{(l)}$

When Fe^{2+} ions migrate from the anode region they react with water and further get oxidised to form Fe^{3+} ions.

A reddish coloured hydrated oxide is formed from Fe^{3+} ions. It is called rust. It collect on the surface.

$2Fe^{3+}_{(aq)} + 4H_2O_{(l)} \rightarrow Fe_2O.H2O_{(s)} + 6H^+_{(aq)}$...

Some important questions

Identify from the following reaction the reactants that undergo oxidation and reduction.

a. $Fe + S \rightarrow FeS$

Answer

$Fe + S \rightarrow FeS$

In a reaction, Fe is changing to FeS. That means, iron loses electrons to form FeS. Loss of electron from a substance is called oxidation, so iron undergoes oxidation.

b. $2Ag_2O \rightarrow 4\,Ag + O_2 \uparrow$

Answer

$2Ag_2O \rightarrow 4\,Ag + O_2 \uparrow$

In a reaction, silver oxide is changing to silver. That is, oxygen is being removed from silver oxide. Removal of oxygen from substance is called reduction, so silver oxide undergoes reduction.

Some important questions

kotak Education Foundation

c. $2Mg + O_2 \rightarrow 2MgO$

Answer

$2Mg + O_2 \rightarrow 2MgO$

In a reaction, magnesium is changing to magnesium oxide. That means, oxygen is being added to magnesium. Addition of oxygen to a substance is called oxidation, so magnesium undergoes oxidation.

Balance these equations

a. $H_2S_2O_{7(l)} + H_2O_{(l)} \rightarrow H_2SO_{4(l)}$

Answer

$H_2S_2O_{7(l)} + H_2O_{(l)} \rightarrow H_2SO_{4(l)}$

Step1. Count the number of each atom in reactant side:

H= 4 S=2 O=8

Step2. Count the number of each atom in product side:

H= 2 S=1 O=4

Step3. Then balance the number of each atom in an equation by multiplying reactant and product side with numeral value:

If we multiply product side by 2, then number of atoms in product and reactant side gets balance.

$H_2S_2O_{7(l)} + H_2O(l) \rightarrow 2H_2SO_{4(l)}$

Balance these equations

$SO_{2(g)} + H_2S_{(aq)} \rightarrow S_{(s)} + H_2O_{(l)}$

Step1. Count the number of each atom in reactant side:
H= 2
S=2
O=2
Step2. Count the number of each atom in product side:
H= 2
S=1
O=2
Step3. Then balance the number of each atom in an equation by multiplying reactant and product side with numeral value:
If we multiply H_2S by 2 in the reactant side and S by 3 and H_2O by 2 in the product side, then number of atoms in product and reactant side gets balance.
$\mathbf{SO_{2(g)} + 2H_2S_{(aq)} \rightarrow 3S_{(s)} + 2H_2O_{(l)}}$

Balance these equations

$NaOH_{(aq)} + H_2SO_{4(aq)} \rightarrow Na_2SO_{4(aq)} + H_2O_{(l)}$

Step1. Count the number of each atom in reactant side:

Na= 1

H=3

O=5

S=1

Step2. Count the number of each atom in product side:

Na= 2

H=2

O=5

S=1

Step3.Then balance the number of each atom in an equation by multiplying reactant and product side with numeral value:

If we multiply NaOH by 2 in the reactant side and H_2O by 2 in the product side, then number of atoms in product and reactant side gets balance.

$2NaOH_{(aq)} + H_2SO_{4(aq)} \rightarrow Na_2SO_{4(aq)} + 2H_2O_{(l)}$

Balance these equations

$Ag_{(s)} + HCl_{(aq)} \rightarrow AgCl \downarrow + H_2 \uparrow$

Step1. Count the number of each atom in reactant side:

H= 1

Ag=1

Cl=1

Step2. Count the number of each atom in product side:

H= 2

Ag=1

Cl=1

Step3. Then balance the number of each atom in an equation by multiplying reactant and product side with numeral value:

If we multiply Ag by 2 and HCl by 2 in the reactant side and AgCl by 2 in the product side, then number of atoms in product and reactant side gets balance.

$\mathbf{2Ag_{(s)} + 2HCl_{(aq)} \rightarrow 2AgCl \downarrow + H_2 \uparrow}$