



BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

Class- 10

Chemistry

Ch-3: Metals and Non-metals

Week- 5th Oct to 9th Oct'20

No. of blocks- 1 or 2

Guidelines

Dear Students,

- Refer to Science NCERT book before you begin to answer the questions.
- The assignment is to be done in the Chemistry notebook.
- Link for the chapter is :

<http://ncert.nic.in/textbook/textbook.htm?jesc1=2-16>

Sub-Topics

Chemical Properties of metals and non-metals

1.1 Reaction of metals with acids

1.2 Reaction of non-metals with acids

2.1 Reaction of metals with solutions of other metal salts- Displacement Reaction

2.2 Reactivity Series

Instructional Aids /Resources:

- Class 10 Science NCERT textbook.
- You-tube links

<https://www.youtube.com/watch?v=zrLi4OK-pQs>

<https://www.youtube.com/watch?v=C3FIdTkbqcA>

Learning Outcomes

Each student will be able to:

- describe the chemical properties of metals and non- metals
- write the chemical equations involved in the reaction of metals with acids
- discuss the displacement reactions
- convert word equations into balanced chemical equations
- arrange the metals in a reactivity series on the basis of reaction of metals with oxygen, water and acids

Activities

- To prepare a rap song on the reactivity series of metals.
- To write a poem on any one metal or non-metal of your choice.

Alternate Academic Calendar Activities

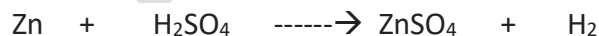
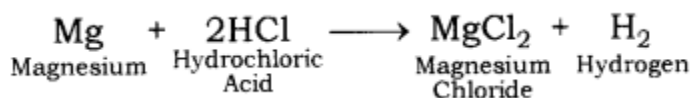
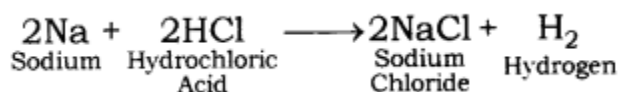
- Prepare an investigatory project to study the necessary conditions for rusting of iron. Carry out the same experiment by dipping an iron nail in solutions like juice, milk, salt solution etc. and study the effect of changing the solvent.
- Collect information and prepare a project report about the **Rust Resistant Monuments in India**.

Lesson Development

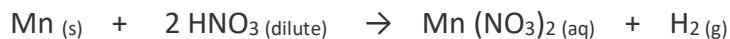
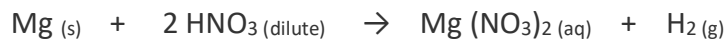
Chemical Properties of Metals and Non-Metals

1.1 Reaction of Metals with Dilute Acids

Metals form respective metal salts on reaction with dilute acids. However, the rate of reaction of different metals with dilute acids is different.



- Metals like Copper, mercury, silver and gold do not react with dilute acids.
NOTE: Copper, gold, silver are known as noble metals. These do not react with water or dilute acids.
- **Hydrogen (H₂) gas is not evolved when metal is treated with dilute nitric acid (HNO₃).** Nitric acid is strong oxidising agent and it oxidises the hydrogen gas (H₂) liberated into water (H₂O) and itself gets reduced to some oxides of nitrogen (like NO, N₂O, NO₂ etc)
- Only Mg and Mn, react with very dilute nitric acid to liberate hydrogen gas.



- The order of reactivity of metals towards dilute hydrochloric acid or sulphuric acid is:
K > Na > Ca > Mg > Al > Zn > Fe > Cu > Hg > Ag

1.2 Reaction of Non-Metals with Acids

Non- metals do not react with dilute acids to produce hydrogen gas. This is because non-metals are electron acceptors, they cannot supply electrons to H⁺ ions to reduce them to hydrogen gas. Therefore, they cannot displace hydrogen from acids to produce hydrogen gas.

2.1 Reaction of Metals with Solutions of other Metal Salts- Displacement Reaction

Those reactions in which a more reactive metal displaces a less reactive metal from its salt solution are known as displacement reactions.



On the basis of reaction of metals with oxygen, water, acids etc., it is found that some metals are highly reactive, some are less reactive while some others are least reactive. Thus, metals can be arranged on the basis of their relative reactivity.

2.2 Reactivity Series or Activity Series of Metals

Reactivity Series is an arrangement of metals in order of their decreasing reactivity.

K	Potassium	Most reactive
Na	Sodium	
Ca	Calcium	
Mg	Magnesium	
Al	Aluminium	
Zn	Zinc	
Fe	Iron	
Pb	Lead	
H	Hydrogen	
Cu	Copper	
Hg	Mercury	
Ag	Silver	
Au	Gold	
	Least reactive	

Reactivity decreases

Assignment Questions (To be done in the Chemistry notebook)

Choose the correct option (Q1 to 3)

1. Which of the following is the correct arrangement of the given metals in descending order of their reactivity?

Zinc, Iron, Magnesium, Sodium

- (a) Zinc > Iron > Magnesium > Sodium
- (b) Sodium > Magnesium > Iron > Zinc

- (c) Sodium > Zinc > Magnesium > Iron
- (d) Sodium > Magnesium > Zinc > Iron

2. Which of the following pairs will give displacement reactions?
 - (a) FeSO_4 solution and Copper metal
 - (b) AgNO_3 solution and Copper metal
 - (c) CuSO_4 solution and Silver metal
 - (d) NaCl solution and Copper metal

3. Aqua regia is a mixture of
 - a) HNO_3 and HCl in the ratio 1:3 by volume
 - b) HNO_3 and HCl in the ratio 3:1 by volume
 - c) HNO_3 and H_2SO_4 in the ratio 1:1 by volume
 - d) H_2SO_4 and HCl in the ratio 1:3 by volume

4. Account for the following statements:
 - a) Hydrogen is not a metal, yet it is placed in the activity series of metals.
 - b) Hydrogen gas is not evolved when a metal is treated with dilute nitric acid.
 - c) Aluminium metal reacts with dilute hydrochloric acid slowly in the beginning.

5. A copper coin is kept immersed in a solution of silver nitrate for some time. What will happen to the coin and the colour of the solution? Write the chemical reaction involved. (If any)

BBPS, Y