

Chemical Reactions & Equations

Chapter 1

Assessment Technique: Demonstration Based Worksheet

Objectives:

To enable the students to:

- Recognise a chemical change
- Differentiate between a chemical and physical change
- List the observations that help to indicate a chemical change
- Understand that a chemical reaction leads to a chemical change
- Develop scientific skills of observation, drawing conclusions and handling chemicals

Task:

Individual

Procedure

- Activity No. 1.3 given on page 2 of Class X, NCERT science textbook may be carried out in the form of a demonstration. Students may be involved in the demonstration.

Assessment Parameters: The following questions may be assessed giving equal weightage of 1 or 2 marks to each question.

Student Worksheet

Time: 10 min

Answer the following questions on the basis of observations made during the demonstration.

- Q1.** What did you observe happening at the bottom of the test tube in the activity performed?
- Q2.** Did you feel any change in the temperature on touching the bottom of the test tube?
- Q3.** Suggest whether the heat is being released or absorbed during the process of the activity?
- Q4.** What observations tell us that addition of dilute acid to zinc granules leads to a chemical change?
- Q5.** Give example of one physical and one chemical change from your daily life.

Suggested Remediation:

- Extra caution may be taken in explaining precautions to the students.



- Attention of the students should be drawn towards how to add the acid slowly with the help of a dropper without spilling any acid.
- The bottom of the test tube becomes very hot if substantial amounts of acid and metal are taken. Care ought to be taken while handling the test tube.
- Development of observation skills in learners is an important expectation from teaching/learning of science. Special focus and attention may be given to this aspect.
- As this activity involves working with acids, the concentration of the acids should not be more than 0.01M or even more dilute. Approximately diluting 1mL of commercially available concentrated acid to 1L aqueous solution.

Chemical Reactions & Equations

Chapter 1

Assessment Technique: Demonstration Based Worksheet

Objectives:

To enable the students to:

- Identify the reactants and products of a chemical reaction
- Write the word equations for the observed chemical reaction
- Write symbols and formulae for the reactants and products
- Write a skeletal chemical equation
- Balance the chemical equation
- Understand and appreciate the need to balance a chemical equation

Task: Individual

Procedure:

1. Activity No. 1.2 given on page 2 of Class X, NCERT science textbook may be performed in the form of a demonstration. Students may be involved in the demonstration.
2. The activity may be performed in step-wise manner leading the students to write a balanced chemical equation for the reaction as the class proceeds.

Assessment Parameters:

Q1. — Q6. Carries 1 mark each

Q7. — Q8. Carries 2 mark each



Student Worksheet

Time:20 minutes

Answer the following questions :

- Q1. Write the names of the reactants taking part in the chemical reaction during the demonstration.
- Q2. Write the chemical formulae of both the reactants.
- Q3. List the observation (s) which justify that a chemical reaction has taken place.
- Q4. The products formed during the reaction are lead oxide and potassium nitrate. Write a word equation for the complete chemical reaction that has taken place.
- Q5. Write the skeletal equation with chemical formulae of reactants and products.
- Q6. Fill the following table on the basis of the above skeletal chemical equation:

Element/Ion	Number on LHS	Number on RHS
Pb		
NO_3^-		
K		
I		

- Q7. Is the equation balanced? If not, balance it.
- Q8. Convert the following word equation to a balanced chemical equation:
Magnesium + Oxygen \longrightarrow Magnesium Oxide

Suggested Remediation:

- Some students may find it difficult to write the molecular formulae for the given compound. Students may be encouraged to memories the symbols and valencies from Table 3.6 on page 37 of Class IX, NCERT science textbook.
- Some students may break the polyatomic ions into their respective elements. Eg: Nitrate = 1 Nitrogen + 3 Oxygen. This will make the task of balancing the chemical equation cumbersome for the students. The teacher may give examples of various displacement and double displacement reactions involving polyatomic ions like sulphate and phosphate to emphasise that polyatomic ions need not be broken into elements while balancing a displacement reaction.



Chemical Reactions & Equations

Chapter 1

Assessment Technique: Diagram based Worksheet

Objectives: To enable students to-

- Recognise a displacement reaction.
- Understand the products formed during a displacement reaction.
- Compare the reactivity of the two elements on the basis of the products of the displacement reaction.

Task: Individual Worksheet

Procedure:

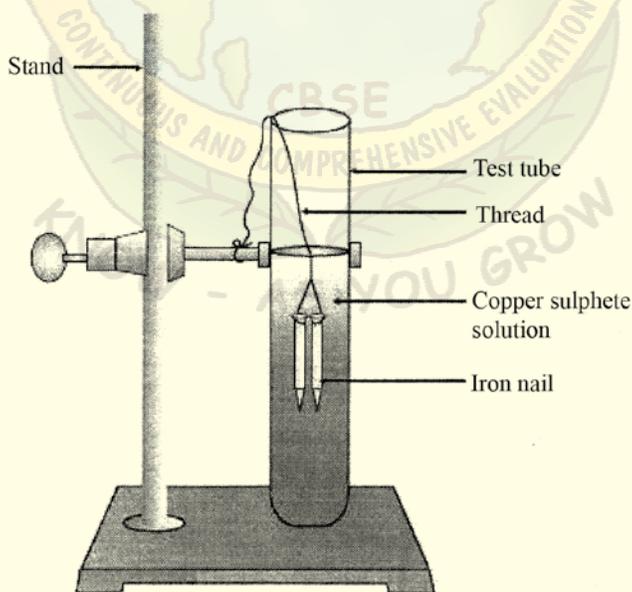
The students may be given the following worksheet with figure 1.8 given on page 10 of class X NCERT textbook, after activity based teaching-learning of displacement reactions and its aspects.

Assessment Parameters: Each of the questions may be given one mark each.

Student Worksheet

Time: 10 minutes

Observe the diagram given below carefully and answer the questions that follow:



(a)

(a) Iron, nails dipped in copper sulphate solution



- Q1. After ten minutes of keeping the set up as shown in the figure, the colour of the iron nail changes, what does this indicate?
- Q2. Name the type of chemical reaction that takes place between copper sulphate and iron nail.
- Q3. Which of the two metals involved in the given process is more reactive?
- Q4. What change do you expect in the reaction mixture if a copper wire is kept immersed in an iron sulphate solution?
- Q5. Write a balanced chemical equation for the reaction, between copper sulphate and iron nail.

Suggested Remediation

- Some students may find it difficult to recall and correlate the diagram to the activity performed in the class; they may be encouraged to perform the activity themselves once again.
- The students may be allowed to describe the change in colour and texture of nail and colour of solution in their own words while carrying out the activity before this sheet is given to them so that, it doesn't become a rote learning exercise.
- Some students may not be able to correlate that the reverse reaction is not possible as iron is more reactive than copper, teacher may let the students perform this activity in groups to appreciate that a more reactive element displaces a less reactive one in a displacement reaction.
- Some more easily available sets of metal and metal salt solutions, like zinc sulphate and magnesium, copper and silver nitrate etc. should be given to the students to help them understand the concept of displacement reactions completely.

Chemical Reactions & Equations

Chapter 1

Assessment Technique: MCQ based worksheet

Objectives: To enable students to:

- Write a word and a skeletal chemical equation.
- Recognise a balanced chemical equation.
- Categorise the given reactions as- combination, decomposition, displacement, double displacement or redox reaction.
- Differentiate between the terms corrosion and rancidity.



Task: Individual

Procedure:

The students may be given the following MCQ based worksheet after the teaching-learning process of whole chapter. This would be a great help in diagnosing the difficulty areas in the chapter.

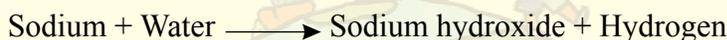
Assessment Parameters: Each of the following questions may be assessed giving equal weight age of 1 mark to each question.

Student Worksheet

Time: 30 minutes

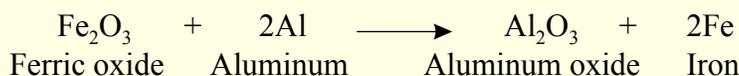
There are 15 multiple choice questions, only one of the options in every question is correct. Choose the correct option.

- Q1.** The given equation represents the reaction of sodium metal with water.



Which of the following chemical equations represents a complete balanced chemical equation for the given word equation?

- A. $2\text{Na(s)} + \text{H}_2\text{O} \longrightarrow 2\text{NaOH(aq)} + \text{H}_2\text{(g)}$
- B. $\text{Na(s)} + 2\text{H}_2\text{O} \longrightarrow \text{NaOH(aq)} + 2\text{H}_2\text{(g)}$
- C. $2\text{Na(s)} + 2\text{H}_3\text{O} \longrightarrow 2\text{NaOH(aq)} + 2\text{H}_2\text{(g)}$
- D. $2\text{Na(s)} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH(aq)} + \text{H}_2\text{(g)}$
- Q2.** Identify the chemical equation which represents a complete balanced equation for the reaction of barium chloride with sodium sulphate to produce barium sulphate and sodium chloride.
- A. $\text{BaCl}_2\text{(aq)} + \text{Na}_2\text{SO}_4\text{(aq)} \longrightarrow \text{BaSO}_4\text{(s)} + 2\text{NaCl(aq)}$
- B. $\text{BaCl}_2\text{(aq)} + \text{Na}_2\text{SO}_4\text{(aq)} \longrightarrow 2\text{BaSO}_4\text{(s)} + 2\text{NaCl(aq)}$
- C. $2\text{BaCl}_2\text{(aq)} + \text{Na}_2\text{SO}_4\text{(aq)} \longrightarrow 2\text{BaSO}_4\text{(s)} + \text{NaCl(aq)}$
- D. $\text{BaCl}_2\text{(aq)} + \text{Na}_2\text{SO}_4\text{(aq)} \longrightarrow \text{BaSO}_4\text{(s)} + \text{NaCl(aq)}$
- Q3.** Ferric oxide reacts with aluminum to produce aluminum oxide and iron. The balanced chemical equation for the given reaction is

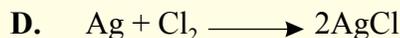
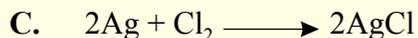
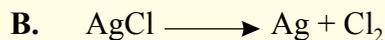
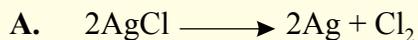


Which of the following substances is oxidized in the given reaction?

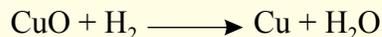
- A. Al_2O_3 B. Fe_2O_3 C. Al D. Fe



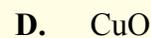
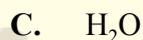
Q4. White silver chloride changes to grey in sunlight because of the formation of silver metal along with the evolution of chlorine gas. Identify the chemical equation that gives a correct representation of the process.



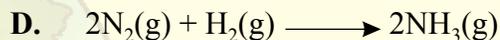
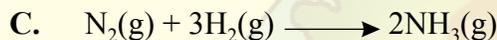
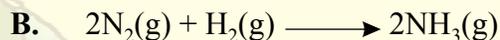
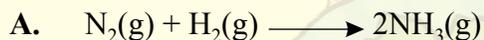
Q5. When copper oxide is treated with hydrogen gas copper is produced along with water. The balanced chemical equation for the given reaction is



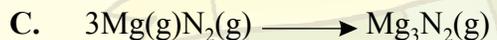
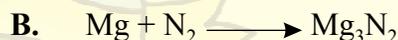
Which substance is oxidized in the given reaction?



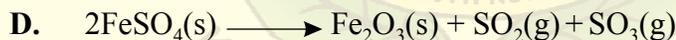
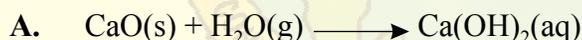
Q6. The balanced chemical equation for the reaction of nitrogen with hydrogen to produce Ammonia gas is-



Q7. Identify the chemical equation that correctly represents production of magnesium nitride by burning magnesium metal in a pure nitrogen atmosphere from the following-



Q8. Which of the following reactions represents a combination reaction?



Q9. Complete the following statement by choosing correct type of reaction for x and y.

Statement 1: The heating of lead nitrate is an example of '**x**' reaction

Statement 2: The burning of magnesium is an example of '**y**' reaction."

A.

x	y
combination	decomposition

B.

x	y
decomposition	combination



C.

x	y
combination	displacement

D.

x	y
displacement	decomposition

Q10. Which of the following reactions represents a double displacement reaction?

- A. $\text{BaCl}_2(\text{aq}) + \text{Na}_2\text{SO}_4(\text{aq}) \longrightarrow \text{BaSO}_4(\text{s}) + 2\text{NaCl}(\text{aq})$
- B. $2\text{FeSO}_4(\text{s}) \longrightarrow \text{Fe}_2\text{O}_3(\text{s}) + \text{SO}_2(\text{g}) + \text{SO}_3(\text{g})$
- C. $2\text{Pb}(\text{NO}_3)_2(\text{g}) \longrightarrow 2\text{PbO}(\text{s}) + 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$
- D. $\text{Zn}(\text{s}) + 2\text{AgNO}_3(\text{aq}) \longrightarrow \text{Zn}(\text{NO}_3)_2(\text{aq}) + 2\text{Ag}(\text{s})$

Q11. Complete the following statement by choosing correct options for x and y. "During the process of respiration, glucose combines with oxygen in the cells of our body and 'x' a large amount of energy. Hence, respiration is an 'y' process."

A.

x	y
releases	endothermic

B.

x	y
absorbes	endothermic

C.

x	y
releases	exothermic

D.

x	y
absorbes	exothermic

Q12. The reaction:



is an example of a-

- A. combination reaction B. double displacement reaction
- C. decomposition reaction D. displacement reaction



Q13. Complete the following statement by substituting **x** and **y** with correct options
 “Corrosion and rancidity are the result of ‘**x**’ reaction of iron articles and oils/fats respectively. Galvanization is done to prevent corrosion of iron articles and ‘**y**’ are used to prevent rancidity of oils or fats.”

A.

x	y
displacement	oxidants

B.

x	y
oxidation	anti-oxidants

C.

x	y
displacement	anti-oxidants

D.

x	y
oxidation	anti-oxidants

Q14. Which of the following statements about the reaction below is incorrect?



- (i) Lead is getting reduced (ii) Carbon dioxide is getting oxidized
 (iii) Carbon is getting oxidized (iv) Lead oxide is getting reduced

- A.** (i) and (ii) **B.** (iii) and (iv)
C. (i), (ii) and (iii) **D.** all

Q15. What happens when dilute hydrochloric acid is added to iron fillings?

- A.** Hydrogen gas and iron chloride are produced
B. Chlorine gas and hydroxide are produced
C. heat is absorbed, i.e. test tube becomes cold.
D. Iron salt and water are produced

Suggested Remediation:

- Students must be encouraged to come prepared with the complete chapter ‘Chemical Reactions and Equations’.



- This worksheet will give a comprehensive overview of the students understanding of concepts dealt with in the chapter. After administration of the assessment tool, a diagnosis of the difficulty areas must be done and the concepts in which students have faced problems must be re-taught.
- Before carrying out the above worksheet, the teacher may take a revision class and draw the attention of the students towards categorizing the reactions into different types studied in this chapter.

Chemical Reactions & Equations

Chapter 1

Assessment Technique: Balanced Chemical Equation Worksheet

Objectives: To enable the students to-

- Write formulae of the compounds and elements appearing in a chemical reaction.
- Write a skeletal equation on the basis of the given information.
- Balance the reaction.

Task:

Individual

Procedure:

The students may be given the following worksheet after the teaching-learning process of writing a balanced chemical equation to strengthen the concept.

Assessment Parameters: Each of the following questions may be assessed giving equal weight age of 2 marks to each question, one mark for skeletal equation and one for balancing.

Student Worksheet

Time: 20 minutes

Q. Write balanced chemical equations for the following word equations:

A. Calcium hydroxide + Carbon dioxide \longrightarrow Calcium carbonate + Water

Skeletal equation: _____

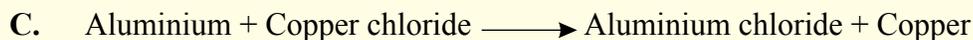
Balanced equation: _____

B. Zinc + Silver nitrate \longrightarrow Zinc nitrate + Silver

Skeletal equation: _____

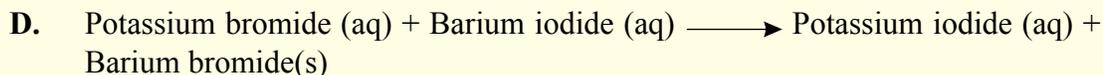
Balanced equation: _____





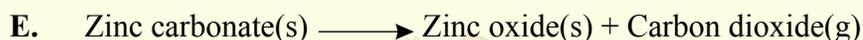
Skeletal equation: _____

Balanced equation: _____



Skeletal equation: _____

Balanced equation: _____



Skeletal equation: _____

Balanced equation: _____

Suggested Remediation

- Students must be encouraged to recall and memories the valance and symbol table 3.6, given in class IX, NCERT science textbook on page 37 so that they may be able to write the formulae of any given inorganic compound by just criss-cross of valencies and do not take to rote memorization of each formula.
- Initially some students may find it difficult to balance the equations directly by counting, they must be encouraged to write all the elements and their number in the skeletal equation on LHS and RHS in a tabular form.
- While carrying out the above worksheet, the teacher may also draw the attention of the students towards categorizing the reactions into different types studied in this unit.



Acids, Bases and Salts

Chapter 2

Assessment Technique: Balancing the chemical equation

Objectives: To enable students to-

- Write balanced chemical equations for reactions of acids and bases with metals, carbonates and hydrogen-carbonates, metallic oxides etc.
- Appreciate that the general chemical equations for the reactions of any acid or any bases are same.
- Conceptualise various reactions shown by acids and bases.

Task:

Individual

Procedure:

The students may be given the following worksheet of writing balanced chemical equations after the teaching-learning of various reactions of acids and bases to strengthen the concept.

Assessment Parameters: Each of the following questions may be assessed giving equal weight age of 2 marks to each question. 0.5 mark for general equation and 1.5 for balanced equation.

Student Worksheet

Time: 20 minutes

Q. Write balanced chemical equations for the following word equations:

A. Reaction of **acid with metal**

Calcium + Hydrochloric Acid \longrightarrow Calcium chloride + Water

General equation: _____

Balanced equation: _____

B. Reaction of **base with metal**

Zinc + Sodium Hydroxide \longrightarrow Sodium zincate + Water

General equation: _____

Balanced equation: _____

C. Reaction of **acid with metal carbonate**

Calcium carbonate + Hydrochloric acid \longrightarrow Calcium chloride + Carbon-dioxide + Water

General equation: _____

Balanced equation: _____



D. Reaction of acid with metal hydrogen carbonate

Sodium hydrogen carbonate + hydrochloric acid \longrightarrow Sodium chloride + Carbon dioxide + Water

General equation: _____

Balanced equation: _____

E. Reaction of acid with metallic oxides

Magnesium oxide + Hydrochloric acid \longrightarrow Magnesium Chloride + Water

General equation: _____

Balanced equation: _____

Suggested Remediation

- Students must be encouraged to recall and memorise the valance and symbol table 3.6, given in class IX, NCERT science textbook on page 37 so that they may be able to write the formulae of any given inorganic compound by just criss-cross of valencies and do not take to rote memorization of each formula.
- Initially some students may find it difficult to generalize the reactions, encourage them by writing more reactions of similar reactants on the board.
- While carrying out the above worksheet the teacher may also draw the attention of the students towards categorizing the reactions into different types studied in the previous unit of 'Chemical Equations and Reactions'.
- An extension to the above worksheet may be designed by the teacher by asking students to formulate their own reactions by taking reactants of their choice.
- Another extension to the same may be done in the form of a game where students of one team write reactants on the board and the members of the other team suggest the products. All this will surely take the students away from rote memorisation of the reactions and will lead to appreciation of the chemical reactions.

Acids, Bases and Salts**Chapter 2**

Assessment Technique: Demonstration Based Worksheet

Objectives:

To enable the students to:

- Identify the products of a chemical reaction between an acid and a base.
- Write the word equations for the observed chemical reaction



- Write symbols and formulae for the reactants and products
- Balance the chemical equation for the observed reaction.
- Derive a general equation for neutralization reactions.
- Understand and appreciate the function of an indicator to indicate completion of a neutralisation reaction.

Task: **Individual**

Procedure:

1. Activity No.2.6 given on page 21 of Class X, NCERT science textbook may be performed in the form of a demonstration with the following suggested variations. Students may be involved in the demonstration.
2. The teacher may also bring about the concept of concentration of an acid by carrying out the activity in four test tubes marked A,B, C and D containing varying strengths/ concentrations of base (NaOH).
3. The pH of all the four NaOH solutions should be found with the help of universal indicator and recorded by the students. In the table provided.
4. The concentration of the acid (HCl) used for neutralisation is to be kept constant. The pH of acid may be found and recorded.
5. The teacher may again reiterate the-choice, use and need of indicator in this activity.
6. Let the students count the number of drops of acid required to change the colour of the solution and neutralize the base.

Assessment Parameters: Each of the questions that follow may be given one mark each and Q1 may be given a weightage of 4 marks to total up to 10 marks.

Student Worksheet

Time:20 minutes

Answer the following questions one by one as the chemical reaction demonstrated in the class is taken forward:

- Q1.** Complete the following table according to the observations made during the demonstration of the activity.

Test tube no.	pH of the base	Colour shown by phenolphthalein indicator	Number of drops of acid required for complete neutralisation. pH of acid =
1			
2			
3			
4			



- Q2. Write the names of the reactants taking part in the chemical reaction during the demonstration.
- Q3. List the observation (s) which justify that a chemical reaction has taken place.
- Q4. Write a word equation and a balanced chemical equation for the complete chemical reaction that has taken place.
- Q5. Write a generalised equation for a neutralisation reaction.
- Q6. Which of the four test tubes contains higher concentration of the base?
- Q7. Does pH of a solution change with dilution?

Suggested Remediation:

- The above activity if performed with patience involving the students will prove an excellent tool for removing misconceptions about strength and concentration of an acid and base. The same activity may then be performed by choosing the set of a weak base sodium carbonate and strong acid-HCl or the set of a weak acid oxalic acid and strong base NaOH.
- Some students may find it difficult to write the chemical reaction involved and a generalised chemical equation. Such students may be encouraged to memories the symbols and valencies from Table 3.6 on page 37 of Class IX. NCERT science textbook and revise writing and balancing of chemical equations.
- Some students may find it difficult to differentiate between the terms - a strong acid/ base and a concentrated acid/ base. They may use the two terms interchangeably, through this activity teacher may clarify this doubt.
- Extra caution may be taken in explaining precautions to the students. Attention of the students should be drawn towards how to add the acid slowly with the help of a dropper without spilling any acid.
- Development of observation skills in learners is an important expectation from teaching/ learning of science. Special focus and attention may be given to this aspect.
- As this activity involves working with acid and base, the concentration of the acids should not be more than 0.01 M or even more dilute. Approximately diluting 1mL of commercially available concentrated acid to 1L aqueous solution.
- 0.4g of NaOH pellets may be dissolved in water to make a solution of 1L to get a 0.01M NaOH solution. Same NaOH solution may be diluted further in presence of students to get four solutions of varying concentrations.



Acids, Bases and Salts

Chapter 2

Assessment Technique: Concept Based Worksheet

Objectives: To enable the students to-

- Recall that an acid reacts with a base to produce salt and water.
- Identify the acid and base that would combine to form the given salt.
- Correlate the acidic, basic or neutral nature of the salt to the strength of the acid and base which may be used to obtain the salt
- Appreciate that all salts are not neutral.
- Conceptualise the formation and nature of a salt.

Task:

Individual

Procedure:

The students may be given the following worksheet of completing the table after the teaching-learning of reaction between acid and base to form salt to strengthen the concept. This worksheet may be used to introduce concept of 'salts' in the class.

Assessment Parameters: Each of the following questions may be assessed giving equal weightage of 2 marks to each salt.

Student Worksheet

Time: 30 minutes

- Q.** Complete the following table with the acids and base used to form a particular salt. Also give the idea whether the acid /base is strong or weak and nature of the salt. First one is being done for you.

S. No.	Salt	Acid used	Strong/weak (S/W)	Base used	Strong/weak (S/W)	Predicted nature of the salt-acidic, basic or neutral
1	Sodium chloride	HCl	(S)	NaOH	(S)	Neutral
2	Potassium nitrate					
3	Zinc sulphate					
4	Sodium acetate					
5	Potassium carbonate					



6	Copper chloride					
7	Aluminium chloride					
8	Sodium hydrogen carbonate					
9	Ammonium chloride					
10	Potassium sulphate					

Suggested Remediation

- Students must be encouraged to recall and memorise the valance and symbol table 3.6, given in class IX, NCERT science textbook on page 37 so that they may be able to write the formulae of any given inorganic compound by just criss-cross of valencies and do not take to rote memorization of each formula.
- Initially some students may find it difficult to identify the acid and base used to make the salt, encourage them by telling them to write reactions of formation of salts.
- Students may be told that a salt of a-
 - weak acid + weak base = almost neutral**
 - strong acid + strong base = neutral**
 - weak acid + strong base = basic**
 - strong acid + weak base = acidic**
- While carrying out the above worksheet the teacher may also draw the attention of the students towards acid, base indicators.
- The predictions made by the students may be checked with the help of litmus paper or solution so as to strengthen their understanding.
- An extension to the above worksheet may be designed by the teacher by asking students to formulate their own salts by taking acids and bases of their choice.
- A list of acids and bases with categories as strong and weak may be given to the students a day in advance before administering this worksheet. A list is given to help.

Acids	Strong/ weak
Hydrochloric acid	Strong
Sulphuric acid	Strong
Nitric acid	Strong
Phosphoric acid	Strong



Acetic acid	Weak
Oxalic acid	Weak
Carbonic acid	Weak
Bases	Strong/ weak
Sodium hydroxide	Strong
Potassium hydroxide	Strong
Ammonium hydroxide	Weak
Aluminium hydroxide	Weak
Copper hydroxide	Weak
Zinc hydroxide	Weak

- Another extension to the same may be done in the form of a game where students of one team write name of a salt on the board and the members of the other team write its formula and suggest the acid, base that may be used to form that salt and predict the nature of the salt. All this will surely take the students away from rote memorisation of the concept.

Acids, Bases and Salts

Chapter 2

Assessment Technique: Multiple Choice Questions Based Worksheet

Objectives: To enable the students to-

- Recall that an acid reacts with a base to produce salt and water.
- Recognise the acid and base that would combine to give the given salt.
- Correlate the pH to acidic, basic or neutral.
- Correlate the type of ions produced in aqueous solution to the type of medium.
- Find relation between colour of an indicator and the nature of the medium

Task: **Individual**

Procedure:

The students may be given the following MCQ based worksheet after the teaching-learning of the complete unit 'Acids, Bases and Salts' to strengthen the concepts.

Assessment Parameters: Choice of each correct answer carries 1 mark.



- Q8.** A base used in the manufacture of soap is
- A. Calcium hydroxide B. Sodium hydroxide
C. Ammonium hydroxide D. Zinc hydroxide
- Q9.** Which of the following solution will turn phenolphthalein pink?
- A. HCl(aq) B. CO₂(aq)
C. KOH(aq) D. CH₃OH(aq)
- Q10.** Fruit juices, such as orange juice, contain:
- A. Boric Acid B. Citric Acid
C. Sulphuric Acid D. Nitric Acid
- Q11.** When dissolved in water, salts
- A. Are non-electrolytes B. Have a bitter taste
C. Are electrolytes D. Release hydrogen ions
- Q12.** A base can be prepared by the reaction between
- A. An active non-metal and water
B. A gas and water
C. A sulphide and water
D. An active metal and water
- Q13.** Of the following, the property that most closely relates to acids is
- A. A bitter taste B. Contains the hydroxide ion
C. Sour taste D. Salty taste
- Q14.** A solution turns red litmus to blue. It's pH is likely to be:
- A. 2 B. 5 C. 7 D. 10
- Q15.** Which of the following represents a base?
- A. KOH B. KCl C. CH₃OH D. CH₃COOH

Suggested Remediation:

- Some students may find it difficult to answer questions based on nature and formation of salts, a separate worksheet only for revising salts concept may be prepared and given to them.
- Some students may find it difficult to understand the meaning of an electrolyte. The teacher may make them recall the concept of electrolysis of water done in unit 1 and correlate by giving examples.
- The teacher may also build a cross-curricular link with chemical effect of electric current.



- The concept that an electrolyte dissociates into ions in aqueous solution; acids, bases and salts are electrolytes may be given to the students. With Q1, 2, 3 and 11 the concept of strong/weak electrolytes and strong/ weak acid and base may be strengthened.
- Some students may find it difficult to correlate that all fruits contain only organic acids and compounds. They may be asked to recognize and differentiate organic and inorganic compounds.
- Some students may bear the misconception that all compounds with OH in the end are basic in nature Q9 and Q15 will help remove this.
- The difficulty in solving Q6 may be removed by reiterating the ionic equation-



If any of the ions is in higher concentration in the solution it will make the solution acidic or basic accordingly.

Acids, Bases and Salts

Chapter 2

Assessment Technique: Crossword Puzzle Worksheet

Objectives: To enable students to-

- Recall various products that are formed when acids or bases react with metals, metal carbonates and hydrogen-carbonates, metallic oxides etc.
- Correlate common names, chemical names and properties of various salts in their syllabus.
- Recall the change of colour for various indicators on change of medium.
- Conceptualise various reactions shown by acids and bases.

Task:

Individual

Procedure:

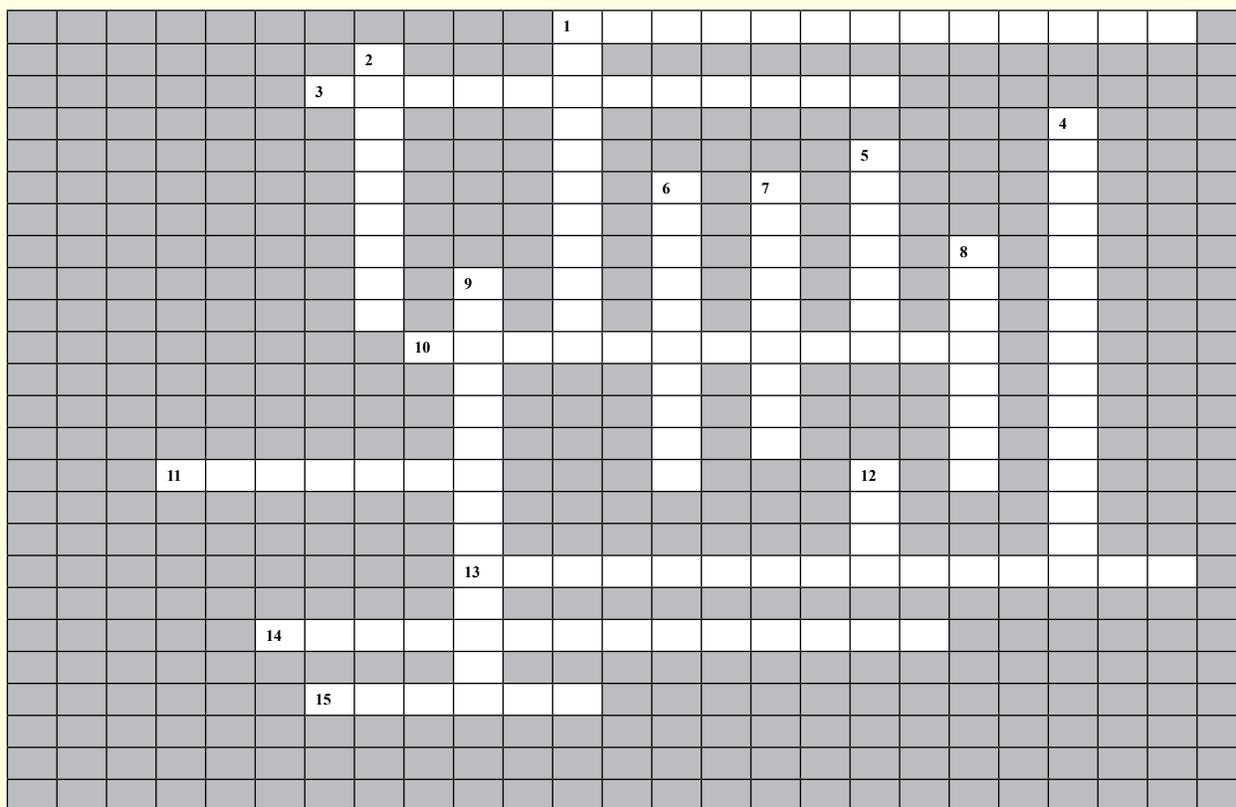
The students may be given the following worksheet of completing the cross word puzzle after the teaching-learning of the complete unit 'Acids, Bases and Salts' to strengthen the concepts.

Assessment Parameters: Each correct solution may be given one mark.



Student Worksheet

Time: 20 minutes

**Down**

1. name of process of electrolysis of aqueous sodium chloride (2 words)
2. Change in colour of litmus in basic medium (3 words)
4. chemical name of washing powder (2 words)
5. medicine for acidity and indigestion
6. common name of sodium hydrogen carbonate (2 words)
7. Change in colour of litmus in acidic medium (3 words)
8. Gas released when an active metal reacts with an acid
9. common name of calcium sulphate heptahydrate (3 words)
12. Acids and bases react to produce water and—

Across

1. Gas released when a metal carbonate reacts with an acid (2 words)
3. This indicator gives reddish pink colour in acidic solution (2 words)
10. mixture of sodium hydrogen carbonate and tartaric acid to make cakes (2 words)
11. Common name of dilute solution of acetic acid
13. This indicator gives magenta pink colour in alkaline solution
14. Acids and bases react to give _____ reaction
15. Plaster of Paris is obtained by heating



Metals and Non-metals

Chapter 3

Assessment Technique: Chemical Equation Based Worksheet

Objectives: To enable students to–

- Recall chemical properties of metals.
- Write balanced chemical equations for reactions of metals.
- Correlate reactivity of a metal with the conditions under which metal reacts with water.

Task: Individual Worksheet

Procedure:

The students may be given the following worksheet after the teaching-learning of the chemical properties of metals to strengthen the concepts.

Assessment Parameters: Each of the following questions may be assessed giving weightage of 2 marks to each.

Student Worksheet

Time: 10 minutes

Write balanced chemical equations for the following reactions–

1. Steam is passed over red hot iron.

2. Aluminium oxide reacts with sodium hydroxide.

3. Potassium oxide is dissolved in water.



4. Iron is heated strongly in oxygen.

5. Calcium reacts with water.

Suggested Remediation:

- Some students may find it difficult to remember various reactions. They may be encouraged to tabulate various reactions of metals in general form and be familiar with all the reactions.
- Revisiting chapter 1 'Chemical Reactions and Equations' may be required for students who find it difficult to write balanced chemical reactions.
- Teacher may draw attention of the students towards categorising the reactions into various types studied in chapter 1.
- This worksheet should be able to help diagnose any difficulties in the understanding of the concepts of chemical properties of metals.

Metals and Non-metals**Chapter 3**

Assessment Technique: Demonstration Based Worksheet

Objectives: To enable Students to-

- Draw correlations between observations made during different sets of experiments to reach a comprehensive conclusion about the reactivity series of metals.
- Recall reactivity series of metals to predict the products of a reaction.
- Apply the conceptual and experimental knowledge about the metals to the uses that these are put to in daily life.

Task: **Individual Worksheet**

Procedure:

1. Activity No.3.12 given on page 44 of Class X, NCERT science textbook may be performed in the form of a demonstration with the following suggested variations. Students may be involved in the demonstration.



- The activity of studying the interaction of metals such as magnesium, zinc, iron, tin, lead, copper, aluminium with salt solution of other metals may also be carried out. Experiment no 11 given on page number 51, NCERT, Laboratory Manual, Science, class X may be followed for this.
- The students may also be shown that gold and silver do not react with any of the salt solutions.

Assessment Parameters: Each of the following questions may be assessed giving weightage as follows, adding total to 20 marks.

Table-1: 1 marks

Table-2: 2 marks

Table-3: 2 marks

Q2: 2 marks

Q3: 2 marks

Q4: 4 marks

Q5: 2 marks

Q6: 2 marks

Student Worksheet

Time: 40 minutes

Answer the following questions

- Q1.** Complete the following tables according to the observations made during the demonstration of the activity.

Table 1

Metal	Colour/appearance of metal before putting into solution
Zinc	
Iron	
Copper	
Magnesium	

Table 2

Aqueous Solution of-	Colour/appearance of solution before putting metals into
Zinc sulphate	
Iron sulphate	
Copper sulphate	
Magnesium sulphate	
Silver Nitrate	



Table 3:

Put a cross in case no reaction is observed and write the colour change in case a reaction takes place.

Metal	Aqueous Solution of-				
	Zinc Sulphate	Magnesium sulphate	Copper Sulphate	Iron sulphate	Silver nitrate
Zinc					
Iron					
Copper					
Magnesium					

Q2. List the observation (s) which justify that a chemical reaction has taken place when iron metal felling is pure but into copper sulphate solution.

Q3. In the following reaction M and N are metals. NS is a salt of metal M. Following reaction takes place when M is added to aqueous solution of NS.



Which of the two metals is more reactive? For the same metals M and N, predict the interaction between MP and N, Where MP is another salt of the metal M.

Q4. Write balanced chemical equations for reaction of magnesium in with (i) Zinc Sulphate (ii) Silver Nitrate

Q5. We can safely store copper sulphate solution in an silver vessel, justify this statement.

Q6. Arrange the metals taken in the increasing order of their reactivity.

Suggested Remediation:

- Some students may find it difficult to realise that reverse reaction is not feasible. This doubt may be cleared by letting the students perform the activity test them selves.
- This activity-worksheet should be able to help diagnose any difficulties in the understanding of the concepts of chemical properties of metals.
- Some students might report no reaction for the sets where reactions are expected this may happen if metals already have an oxide or carbonate layer on their surface. The teacher may advice the students to clean the metals by rubbing them with a piece of sand paper.
- Some students may find it difficult to write the balanced chemical equations for the reactions taking place. It may be reiterates the need to memorise the valencies of the elements and polyatomic ions from Table 3.6 on page 37, class IX, NCERT, Science book.



Metals and Non-metals

Chapter 3

Assessment Technique: Electron dot structures & bonding worksheet

Objectives: To enable the students to-

- Recall writing of electronic configuration of elements.
- Correlate the electronic configuration to the valence and type of bonds formed for elements.
- Write electron dot structures of elements.
- Understand and show formation of ionic compounds by transfer of electrons.

Task:

Individual

Procedure:

The students may be given the following worksheet after the teaching-learning experience of formation of compounds between metals and non-metals, i.e. formation of ionic bonds.

Assessment Parameters: Each of the following questions may be assessed giving weightage as follows.

Q1. 3 marks

Q2. 1 mark

Q3. 1 mark

Q4. 1 mark

Q5. 2 marks

Q6. 2 marks

Student Worksheet

Time: 10 minutes

The atomic numbers of three elements A, B and C are given Answer the following questions on the basis of the data:

A = 12

B = 16

C = 6

Q1. Write the electronic configurations of all the three elements.

Q2. Which of these elements is a metal?



Q3. Which element will form an anion of valency 2?

Q4. Which element will form a cation of valency 2?

Q5. Show the formation of bond by-electron dots.

Q6. Which two elements will combine to form an ionic bond? Also write the formula.

Suggested Remediation:

- Some students may find it difficult to write the electronic configuration of elements, they may be guided to revisit the Bohr's atomic model given in chapter 'Structure of the Atom', class IX, Science, NCERT book.
- Some students may find it difficult to visualise and understand the bond formation through electron transfer, as they may be kinaesthetic learners, such students may be helped by making models with beads to understand the concept.
- As an extension formation of covalent bonds may be dealt here after the students have mastered the formation of ionic bonds.
- Practice at recognising a metal and non-metal after looking at the electronic configuration may be required, teacher may take care to give enough practice to the students.

Metals and Non-metals

Chapter 3

Assessment Technique: Balanced Reactions Based Worksheet

Objectives: To enable students to-

- Recall chemical properties of metals.
- Write balanced chemical equations for reactions of metals.
- Correlate reactivity of a metal with the conditions under which metal reacts with water.



Task: Individual Worksheet**Procedure:**

The students may be given the following worksheet after the teaching-learning of the extraction of metals to strengthen the concepts. Following information may be reiterated and revised before giving the worksheet.

- Metal Sulphides react with dilute acids to release H_2S gas which has a smell of rotten eggs.
- Metal Carbonates react with dilute acids to release CO_2 gas which is an odourless and colourless gas released as brisk effervescence.
- Zinc shows a valence of only +2.
- Iron exists in two common valence states +2 and +3.
- Copper exists in two common valence states of +1 and +2 .
- Figure 3.10 showing a flow chart for the steps involved in the extraction of metals from ores on page no.50, NCERT Class X Science Textbook.

Assessment Parameters: Each of the following questions may be assessed giving weightage as follows.

Q1. 4 marks

Q2. 2 marks

Q3. 4 marks

Student Worksheet**Time: 10 minutes**

- Q1.** An ore of metal 'M' of medium reactivity on treatment with dilute hydrochloric acid gives a smell of rotten egg': Draw a flow chart to depict various steps involved in the extraction of metal 'M' from its ore.
- Q2.** An ore on treatment with dilute hydrochloric acid releases brisk effervescence of a colourless and odourless gas. Identify the type of ore and the method that may be used to get the oxide of metal from the ore.
- Q3.** Following are the facts about a metal 'M'-
- Metal 'M' is extensively found as its ore M_2O_3
 - M_2O_3 combines with moisture present in the air to form flaky brown substance.
 - Metal M is capable of forming two chlorides- MCl_2 and MCl_3
 - Metal M may be extracted from its ore M_2O_3 by thermit reaction
- a. Identify metal M,
 - b. Write the thermit reaction by which it may be obtained

