

Lesson Plan: Chemical Reactions and Equations – Class 10

- **Chapter:** Chemical Reactions and Equations
- **Class:** X
- **Subject:** Chemistry
- **Month:** April
- **Duration:** 5–6 periods

1. Learning Objectives

Students will be able to:

- Define a chemical reaction.
- Identify signs of a chemical reaction.
- Write word and chemical equations.
- Balance chemical equations using the hit-and-trial method.
- Identify different types of chemical reactions.
- Explain oxidation and reduction.
- Explain corrosion and rancidity.
- Describe methods to prevent corrosion and rancidity.

2. Learning Aids

- Textbook
- Blackboard/whiteboard
- Charts and flashcards
- Molecular-model kits
- Reaction cards
- Worksheets
- PPTs/videos
- Safe classroom demonstrations

3. Procedure

- Introduce the topic using examples from daily life:
 - Rusting of iron
 - Burning of paper
 - Curdling of milk
- Explain the meaning of a chemical reaction.
- Discuss reactants and products.
- Introduce chemical equations and symbols.
- Demonstrate how to balance chemical equations.
- Explain types of reactions:
 - Combination
 - Decomposition
 - Displacement
 - Double displacement
- Explain oxidation and reduction with examples.
- Discuss corrosion and rancidity.

- Explain methods of prevention.

4. Students' Participation

- Observe demonstrations.
- Record observations.
- Answer oral questions.
- Identify reactants and products.
- Balance chemical equations.
- Classify reactions.
- Work in pairs/groups.
- Complete worksheets.
- Give examples from everyday life.
- Present answers to the class.

5. Recapitulation

- Ask students:
 - What is a chemical reaction?
 - What are reactants and products?
 - Why do we balance equations?
 - Name four types of chemical reactions.
 - What is oxidation?
 - What is reduction?
 - What is corrosion?
 - What is rancidity?
- Give 3–5 equations as an exit activity for balancing.

6. Integration with Other Domains

- **Mathematics:** Counting atoms and balancing equations.
- **Biology:** Respiration and photosynthesis.
- **Environmental Science:** Corrosion and environmental effects.
- **Home Science:** Rancidity and food preservation.
- **Daily Life:** Rusting, combustion and cooking.
- **ICT:** Videos and animations of chemical reactions.

7. Assignment

- Define chemical reaction and chemical equation.
- Write and balance five chemical equations.
- Give one example of each type of reaction.
- Explain oxidation and reduction with examples.
- Explain corrosion and rancidity.
- Write two methods of preventing corrosion and rancidity.

8. Remedial Teaching

- Re-teach basic chemical symbols and formulae.
- Use colour-coded atoms.

- Provide simple equations first.
- Give partially balanced equations for practice.
- Use peer learning.
- Provide additional worksheets.
- Give individual support to struggling students.

9. Inclusive Practices

- Use visual aids and demonstrations.
- Provide simple, clear instructions.
- Give printed notes and worksheets.
- Encourage peer learning.
- Allow oral, written or diagram-based responses.
- Provide extra time where needed.
- Use differentiated questions.
- Ensure equal participation of all students.

Lesson Plan – Chapter 2: Acids, Bases and Salts

- **Class:** X
- **Subject:** Chemistry
- **Month:** May
- **Chapter:** Acids, Bases and Salts
- **Duration:** 5–6 periods

1. Learning Objectives

Students will be able to:

- Define acids, bases and salts.
- Identify acids and bases using indicators.
- Explain the properties of acids and bases.
- Understand the pH scale and its importance.
- Explain neutralisation reactions.
- Write chemical equations for reactions of acids and bases.
- Explain the preparation and uses of common salts.
- Describe the importance and uses of baking soda, washing soda and bleaching powder.
- Explain the importance of pH in everyday life.

2. Learning Aids

- Science textbook
- Blackboard/whiteboard
- Charts and diagrams
- Litmus paper
- Universal indicator/pH paper
- Samples of acidic and basic substances
- Test tubes and droppers

- Worksheets
- PPTs/videos
- pH scale chart

3. Procedure

- Introduce the chapter using common substances such as lemon juice, vinegar, soap solution and baking soda.
- Ask students to identify which substances are acidic or basic.
- Explain the meaning and properties of acids and bases.
- Demonstrate the use of:
 - Blue and red litmus
 - Universal indicator
 - pH paper
- Explain the pH scale from 0 to 14.
- Discuss strong and weak acids and bases.
- Explain reactions of acids with:
 - Metals
 - Metal carbonates
 - Metal hydrogen carbonates
 - Bases
- Explain neutralisation reactions with examples.
- Introduce salts and their formation.
- Discuss important salts:
 - Baking soda
 - Washing soda
 - Bleaching powder
 - Plaster of Paris
- Explain their properties, preparation and uses.
- Discuss the importance of pH in daily life.

4. Students' Participation

- Observe demonstrations.
- Test substances using indicators.
- Record colour changes.
- Identify acidic and basic substances.
- Determine approximate pH values.
- Write and balance chemical equations.
- Participate in group activities.
- Classify substances as acidic, basic or neutral.
- Discuss applications of acids, bases and salts in daily life.
- Complete worksheets and present answers.

5. Recapitulation

- Ask students:
 - What are acids and bases?
 - What happens to blue litmus in an acid?
 - What happens to red litmus in a base?

- What is the pH scale?
- What is neutralisation?
- What happens when an acid reacts with a metal?
- Name some common salts.
- What are the uses of baking soda?
- What is washing soda used for?
- Why is pH important in our daily life?

6. Integration with Other Domains

- **Mathematics:** Understanding and comparing pH values.
- **Biology:** Role of pH in digestion, tooth decay and soil.
- **Home Science:** Uses of baking soda, washing soda and acids in household activities.
- **Agriculture:** Importance of soil pH for crops.
- **Environmental Science:** Acid rain and its effects.
- **Daily Life:** Use of soaps, medicines, antacids and cleaning agents.
- **ICT:** Videos and digital pH-scale activities.

7. Assignment

- Define acids, bases and salts with examples.
- Write the properties of acids and bases.
- Explain the pH scale.
- Write three reactions of acids with suitable equations.
- Explain neutralisation with an example.
- Write the preparation and two uses of baking soda.
- Write two uses each of washing soda and bleaching powder.
- Explain the importance of pH in everyday life.

8. Remedial Teaching

- Revise basic concepts using simple daily-life examples.
- Use colour-coded indicator charts.
- Provide a pH-scale worksheet.
- Give simple equations for practice.
- Conduct additional indicator-testing activities.
- Use peer learning and group support.
- Provide short notes and practice questions.
- Give individual assistance to students who need extra support.

9. Inclusive Practices

- Use visual aids, charts and demonstrations.
- Give instructions in simple and clear language.
- Provide printed notes and worksheets.
- Encourage pair and group activities.
- Allow students to answer orally, in writing or through diagrams.
- Provide additional time when required.
- Use differentiated questions according to learning levels.

- Encourage participation of every student.

Lesson Plan – Chapter 3: Metals and Non-Metals

- **Class:** X
- **Subject:** Chemistry
- **Month:** July
- **Chapter:** Metals and Non-Metals
- **Duration:** 5–6 periods

1. Learning Objectives

Students will be able to:

- Define metals and non-metals.
- Identify the physical properties of metals and non-metals.
- Compare metals and non-metals based on their properties.
- Explain the reactions of metals with oxygen, water and acids.
- Understand the reactivity series of metals.
- Explain displacement reactions.
- Describe the formation and properties of ionic compounds.
- Explain extraction of metals from their ores.
- Understand corrosion and methods of preventing it.
- Describe the uses of metals and non-metals in daily life.

2. Learning Aids

- Science textbook
- Blackboard/whiteboard
- Charts of the reactivity series
- Samples/pictures of metals and non-metals
- Iron, copper, aluminium and sulphur samples
- Activity sheets and worksheets
- Molecular-model kits
- PPTs/videos
- Diagrams of metal extraction and corrosion

3. Procedure

- Introduce the topic using everyday examples such as iron, copper, aluminium, coal and sulphur.
- Ask students to identify metals and non-metals around them.
- Explain physical properties:
 - Lustre
 - Hardness
 - Malleability
 - Ductility
 - Sonority
 - Conductivity

- Discuss exceptions to the general properties.
- Explain chemical reactions of metals with:
 - Oxygen
 - Water
 - Acids
- Introduce the **reactivity series of metals**.
- Explain displacement reactions with suitable examples.
- Discuss reactions of non-metals with oxygen and other substances.
- Explain the formation of ionic compounds.
- Discuss properties of ionic compounds.
- Introduce extraction of metals from ores.
- Explain basic steps of extraction:
 - Concentration
 - Reduction
 - Refining
- Explain corrosion and methods of preventing corrosion.
- Discuss important uses of metals and non-metals.

4. Students' Participation

- Observe and identify different samples.
- Compare metals and non-metals.
- Participate in classroom demonstrations.
- Record observations in their notebooks.
- Arrange metals according to the reactivity series.
- Identify displacement reactions.
- Draw diagrams of ionic compounds.
- Solve worksheets and chemical equations.
- Participate in group discussions.
- Give examples of metals and non-metals used in daily life.

5. Recapitulation

- Ask students:
 - What are metals and non-metals?
 - What is malleability?
 - What is ductility?
 - Why are metals good conductors?
 - How do metals react with acids?
 - What is the reactivity series?
 - What is a displacement reaction?
 - What are ionic compounds?
 - What is corrosion?
 - How can corrosion be prevented?
- Give a short worksheet for identifying properties and reactions.

6. Integration with Other Domains

- **Mathematics:** Arranging metals according to their reactivity.
- **Physics:** Electrical and thermal conductivity of metals.

- **Chemistry:** Chemical reactions, ionic compounds and extraction.
- **Environmental Science:** Mining, metal extraction and pollution.
- **Geography:** Distribution of mineral ores.
- **Technology:** Uses of metals in machines, buildings and electronics.
- **Daily Life:** Use of iron, aluminium, copper, zinc and other materials.

7. Assignment

- Write five physical properties of metals.
- Write five physical properties of non-metals.
- Differentiate between metals and non-metals.
- Explain the reactivity series.
- Write three chemical reactions of metals.
- Explain displacement reaction with an example.
- What are ionic compounds? Write their properties.
- Explain corrosion and two methods of preventing it.
- Write the uses of iron, aluminium, copper and zinc.

8. Remedial Teaching

- Revise the basic differences between metals and non-metals.
- Use real-life objects and pictures for identification.
- Provide a simplified reactivity-series chart.
- Practise chemical equations step-by-step.
- Use colour coding to remember the reactivity series.
- Provide additional worksheets and simple questions.
- Conduct peer-learning activities.
- Give individual support to students who need extra practice.

9. Inclusive Practices

- Use real objects, charts, diagrams and demonstrations.
- Give instructions in simple and clear language.
- Provide printed notes and worksheets.
- Encourage pair and group activities.
- Allow oral, written and diagram-based responses.
- Provide extra time where required.
- Use differentiated questions according to students' learning levels.
- Encourage active participation of every student.

Lesson Plan – Chapter 4: Carbon and Its Compounds

- **Class:** X
- **Subject:** Chemistry
- **Month:** August/October
- **Chapter:** Carbon and Its Compounds
- **Duration:** 5–6 periods

1. Learning Objectives

Students will be able to:

- Explain the unique properties of carbon.
- Understand **tetravalency** and **catenation** of carbon.
- Explain covalent bonding with suitable examples.
- Draw electron-dot structures of simple carbon compounds.
- Understand saturated and unsaturated carbon compounds.
- Identify different types of hydrocarbons.
- Explain homologous series and functional groups.
- Name simple carbon compounds.
- Describe important chemical properties of carbon compounds.
- Explain the properties and uses of ethanol and ethanoic acid.
- Understand the cleansing action of soaps and detergents.

2. Learning Aids

- Science textbook
- Blackboard/whiteboard
- Molecular-model kit
- Charts of carbon compounds
- Electron-dot structure diagrams
- Ball-and-stick models
- Samples/pictures of ethanol, vinegar, soaps and detergents
- Worksheets
- PPTs/videos
- Structural formula charts

3. Procedure

- Introduce the chapter by discussing common carbon compounds such as:
 - Sugar
 - Cooking oil
 - Petrol
 - Alcohol
 - Vinegar
- Explain why carbon forms a large number of compounds.
- Discuss **tetravalency** and **catenation**.
- Explain covalent bonding using methane as an example.
- Demonstrate electron-dot structures of simple compounds.
- Explain saturated and unsaturated compounds.
- Introduce:
 - Alkanes
 - Alkenes
 - Alkynes
- Explain the concept of a **homologous series**.
- Introduce common functional groups.
- Discuss basic nomenclature of carbon compounds.
- Explain chemical properties:
 - Combustion
 - Oxidation

- Addition reaction
 - Substitution reaction
- Explain important properties and uses of **ethanol and ethanoic acid**.
- Explain esterification.
- Discuss soaps and detergents.
- Demonstrate/explain the cleansing action of soap.

4. Students' Participation

- Observe molecular models and diagrams.
- Construct models of carbon compounds.
- Draw electron-dot structures.
- Identify saturated and unsaturated compounds.
- Identify functional groups.
- Write structural and molecular formulae.
- Participate in group activities.
- Complete worksheets on nomenclature and reactions.
- Compare soaps and detergents.
- Discuss uses of carbon compounds in daily life.
- Present their answers and observations to the class.

5. Recapitulation

- Ask students:
 - Why is carbon able to form so many compounds?
 - What is tetravalency?
 - What is catenation?
 - What is a covalent bond?
 - What are saturated and unsaturated compounds?
 - What is a homologous series?
 - What is a functional group?
 - What is an addition reaction?
 - What is esterification?
 - How do soaps clean clothes?
- Give a short worksheet involving structures, formulae and reactions.

6. Integration with Other Domains

- **Biology:** Carbon compounds in carbohydrates, proteins, fats and DNA.
- **Physics:** Properties and uses of fuels.
- **Environmental Science:** Carbon dioxide, greenhouse effect and pollution.
- **Home Science:** Soaps, detergents, oils and vinegar.
- **Agriculture:** Organic compounds and fertilizers.
- **Daily Life:** Fuels, medicines, plastics, cosmetics and food products.
- **ICT:** Molecular modelling and animations of chemical bonding.

7. Assignment

- Explain tetravalency and catenation of carbon.

- Draw the electron-dot structure of methane.
- Differentiate between saturated and unsaturated compounds.
- Define homologous series with examples.
- Write the names and structures of five carbon compounds.
- Explain combustion, oxidation, addition and substitution reactions.
- Write the properties and uses of ethanol and ethanoic acid.
- Explain esterification with a chemical equation.
- Differentiate between soaps and detergents.
- Explain the cleansing action of soap.

8. Remedial Teaching

- Revise basic concepts of valency and chemical bonding.
- Use molecular models to explain carbon bonding.
- Provide colour-coded structural formulae.
- Practise drawing electron-dot structures step-by-step.
- Give simple examples before introducing complex compounds.
- Provide additional worksheets on functional groups and nomenclature.
- Use peer learning and group activities.
- Give individual support to students who require additional practice.

9. Inclusive Practices

- Use models, diagrams, charts and visual demonstrations.
- Explain concepts using simple and clear language.
- Provide printed notes and worksheets.
- Allow students to learn through models and hands-on activities.
- Encourage pair and group learning.
- Accept oral, written and diagram-based responses.
- Provide additional time where required.
- Use differentiated questions according to learning levels.
- Ensure equal participation and encouragement for all students.