

- c. What is the brown flaky substance?
- d. What are the common valencies shown by metal 'M'?

Suggested Remediation:

- Some students may find it difficult to remember various reactions and properties of metals, their compounds and gases evolved during reactions of the carbonates and sulphide ores with dilute acids. 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.
- Attention of the students may be drawn towards categorising the reactions into various types studied in chapter 1.

Metals and Non-metals**Chapter 3**

Assessment Technique: Multiple Choice Questions Based Worksheet

Objectives: To enable students to-

- Recall various physical and chemical properties of metals and non-metals.
- Draw correlation between the oxide of an element and pH of its aqueous solution.
- Recall reactivity series of metals to predict the products of a reaction.
- Apply the conceptual knowledge to daily uses of the elements.

Task:

Individual

Procedure:

The students may be given the following MCQ based worksheet after the teaching-learning of the complete unit 'Metals and Non-metals' to strengthen the concepts.

Assessment Parameters: Each of the following questions may be assessed giving equal weightage of 1 mark to each correct answer.

Student Worksheet:**Time: 30 minutes**

Choose the most correct in each of the following :

1. All the following materials show property of malleability except
 - a. Iron
 - b. Graphite
 - c. Aluminium
 - d. Silver



2. The solution of ash obtained after burning magnesium ribbon in air will turn.
- Red litmus to blue because it is acidic in nature.
 - Blue litmus to red because it is basic in nature.
 - blue litmus to red because if is acidic in nature.
 - Red litmus to blue because it is basic in nature.
3. x is the product formed when sulphur reacts with oxygen, it dissolves in water to produce y . Choose correct option for x and y.

	X	Y
a	SO ₂	Acid
b	SO ₃	Neutral
c	SO ₂	Base
d	SO ₃	Acid

4. Sodium metal is stored in x because it reacts vigorously to produce y . Choose the correct option for x and y.

	X	Y
a	Water	Acidic oxide
b	Alcohol	Neutral oxide
c	Kerosene	Basic oxide
d	Air tight container	Acidic carbonate

5. Metal x reacts vigorously with water to produce gas y which burns with the “pop” sound. Choose the correct option for x and y.

	X	Y
a	Sodium	Oxygen
b	Magnesium	Oxygen
c	Sodium	Hydrogen
d	Sodium	Sodium oxide



6. Which of the following can be beaten into thin sheets?
 a. Zinc b. Phosphorus c. Sulphur d. Oxygen
7. Read the following statements carefully and select the correct statements about the physical and chemical properties of metals-
- I. All metals are ductile
 II. Generally metals are ductile
 III. Metals which are more reactive than hydrogen react with acids to release hydrogen gas.
 IV. All metals react with acids to release hydrogen gas.
- The correct statement of the above are-
- a) 1 and IV b) I and III,
 c) II and III d) II and IV
8. Aluminium foil is used for wrapping food because-
- a. It is ductile b. It is malleable
 c. It is a good conductor of heat d. It is sonorous
9. What happens when dilute sulphuric acid is poured on a copper plate?
 a. No reaction takes place b. Zinc sulphate formed
 c. Copper chloride formed d. Copper sulphate formed.
10. Which material is hard in nature?
 a. Iron b. Graphite c. Oxygen d. sodium
11. Which one of the following metal is used in thermo meters?
 a. Copper
 b. Mercury
 c. Aluminium
 d. Iron
12. Correct the statement by substituting the x and y with correct option.
X can't be drawn into wires because it is not Y in nature.

	X	Y
a	Coal	Ductile
b	Copper	Malleable
c	Aluminium	Ductile
d	Coal	Malleable



13. Zinc replaces copper from X solution because it is Y than copper. Substitute X and Y with correct option.

	X	Y
a	Zinc sulphate	Less reactive
b	Copper sulphate	more reactive
c	sulphuric acid	more reactive
d	Copper sulphate	Less reactive

14. Most metallic oxides are-

- a. Acidic in nature b. Neutral in nature
c. Basic in nature d. Amphoteric in nature

15. X is used for decorating sweets because it is Y in nature? Substitute X and Y with correct choice.

	X	Y
a	Silver foil	Ductile
b	Copper foil	Malleable
c	Aluminium foil	Ductile
d	Silver foil	Malleable

Suggested Remediation:

- Some students may find it difficult to remember difference between ductility and malleability. Spending time on Q.13 and 15 will help remove this difficulty. More over some mnemonic may be given to the students eg. Drawn into wires-Ductility.
- Some students may find it difficult to comprehend the difference between the sentences- 'all metals —' and 'generally most metals have the property—' teacher should help them in understanding the difference.
- This worksheet should be able to help diagnose any difficulties in the understanding of the concepts of physical and chemical properties of metals and non-metals.



Carbon and its Compounds

Chapter 4

Assessment technique: Content based worksheet

Objectives: To enable students to:-

- Learn that ethyl alcohol is a major component of wine.
- Learn that vinegar is 5-8 % solution of ethanoic acid.
- Understand that ethanol is oxidized to ethanoic acid on heating with Alkaline KMnO_4 or acidified Potassium dichromate.
- To correlate the given facts about an organic compound to solve a problem identification of unknown compound

Task:

Individual

Proc:edure: The following worksheet may be given to the students after a teaching-learning episode on chemical and physical properties of ethanol and vinegar.

Teachers may give the following information to the students as a recall before giving them the worksheet -

- $\text{CH}_3\text{CH}_2\text{OH}$ is a major component of wine.
- Alcohols on oxidation with Alkaline KMnO_4 or acidified Potassium dichromate are converted to carboxylic acids.
- Example: $\text{CH}_3\text{CH}_2\text{OH} \longrightarrow \text{CH}_3\text{COOH}$
- Vinegar is 5-8% solution of ethanoic acid, it is widely used as a preservative in pickles.

Stupent Worksheet

Time = 10 min

Study the given problem carefully and answer the following questions:

Problem-

An organic compound A ($\text{C}_2\text{H}_4\text{O}_2$) is a constituent of wine. This compound, on heating with alkaline potassium permanganate gets oxidised to, give, another compound B which turns blue litmus red.

Q1. Identify compound A. Write down its chemical name and chemical formula.

Chemical name _____

Chemical formula _____



- Q2. Identify compound B. Write down its chemical name and its chemical formula.
Chemical name _____
Chemical formula _____
- Q3. Identify the functional groups in the compounds A and B.

- Q4. Write the chemical equation for the reaction of A with alkaline KMnO_4 to produce B.

- Q5. Name the type of reaction that takes place for formation of B from A.

- Q6. What is the nature of compound B?

- Q7. What is 5-8 % solution of B in water called?

Suggested Remediation:

- Some students may not be able to identify the compounds in the given problem. Help them recall the properties of the organic compounds in the 10th std syllabus. Encourage the students to make a table of properties of all the organic compounds in their course.
- Some students may find it difficult to write the chemical formula or identify the functional groups of the compounds they may be helped by giving some extra task of solving problems, writing the formula and identification of the functional group.
- Teacher may take up a quiz in the class where one group poses the question and other answers.

Carbon and its Compounds**Chapter 4**

Assessment technique: Demonstration based worksheet

Objectives: To enable students to

- Understand that alcohols and carboxylic acid react in presence of an acid catalyst to form esters and the reaction is known as etherification reaction.
- Learn that esters are sweet smelling compounds and are used in making perfumes and flavouring agents.



- Enhance their observation skill.
- Correlate the occurrence of a chemical reaction to the evolution of sweet odour.

Task: **Individual**

Procedure:

Teachers may perform activity no. 4.8 on page 73, of class X NCERT Science textbook and may explain that —

- Alcohols and carboxylic acid react in presence of acid catalyst to form esters and the reaction is known as etherification.
- The chemical reaction involved in the process is-
$$\text{CH}_3\text{COOH} + \text{CH}_3\text{CH}_2\text{OH} \longrightarrow \text{CH}_3\text{COOC}_2\text{H}_5$$
- The mixture is to be heated in a water bath as alcohol is inflammable.
- Esters are sweet smelling compounds and are used in making perfumes and flavouring agents.

Assessment criteria —

The teacher may mark the answers to the questions given in the worksheet by keeping a weight age of 2 marks each for Q .1 & Q.2 and 1 mark each for Q3 to Q8

Student Worksheet

Time: 10 min

On the basis of the activity performed, answer the following questions -

Q1. Name the two reactants taken.

(a) _____

(b) _____

Q2. Identify the functional group present in the two reactants.

(a) _____

(b) _____

Q3. Why is the reaction mixture heated on a water bath?

Q4. Mention one identification characteristic of the product formed.



Q5. What is the general name of the functional group of the product formed?

Q6. Give one use of the group of compounds to which the product formed belongs.

Q7. What is the name given to this type of reactions.

Q8. Write a chemical equation for the reaction that has taken place.

Suggested Remediation:

- Some students may find it difficult to understand the formation of an ester and linkages in the ester group when carboxylic acid and alcohol react with each other. The teacher may explain this by depicting the removal of water from the reactants on the board and making the students recall that concentrated sulphuric acid is a dehydrating agent, i.e. it removes water. The teacher may even show charring of a paper when conc. sulphuric acid drops fall on it.
- As an extension to the above activity the teacher may help the students appreciate the reverse reaction of esterification, i.e. saponification.
- Some students may find it difficult to give reason for heating the reaction mixture on a water bath, help them in understanding this by -
 1. making them compare the boiling points of water, alcohol and acetic acid
 2. drawing their attention towards the fact that these organic compounds are highly inflammable and undergo combustion to produce CO_2 and water

Carbon and its Compounds

Chapter 4

Assessment Technique: Data based worksheet

Objectives: To enable the students to:

- learn that a group of compounds with same functional group are called Homologues
- discover that in a homologous series the difference in the formula of two adjacent compounds is of ' $-\text{CH}_2$ ' and difference in molecular mass is ' -14 u '
- appreciate that chemical properties of members of a Homologous series are similar, formulate the general formula for a homologous series.
- Predict the next members of a Homologous series.



Task: Individual

Procedure:

Teacher may give this worksheet to the students after, they have learnt to derive a general formula for compounds with same functional groups. The following brief idea about a Homologous series may be given to the students.

- A series of compounds with same functional group is called a Homologous series.
- Each Homologous series can be given a General formula in which number of carbon atom is denoted by n and then number of hydrogen is related to n . If any other hetero element like 'O' (oxygen) is present in the compound, its number is also written as a subscript. e.g. general formula of alkanol series is $C_nH_{2n+2}O$
- If one knows the general formula of a Homologous series, the molecular formula of members can be written. After the completion of the worksheet teacher may add other significant information related to the concept.

Assessment Parameters

- Question 1: carries 3 marks
 Question 2: carries 1 mark each
 Question 7: carries 2 marks.

Student Worksheet

Time: 15 minutes

Instructions:

Few pairs of organic compounds are given below:

- A. CH_3OH & C_2H_5OH
 B. C_2H_5OH & C_3H_7OH
 C. C_3H_7OH & C_4H_9OH

Atomic mass : C = 12 u, H = 1 u, O = 16 u

Answer the following questions on the basis of above data.

- Q1.** Calculate the difference in formula and molecular masses in the pairs given above a, b, and c.

For pair (a) Difference in formula: _____; Difference in molecular mass: _____

For pair (b) Difference in formula: _____; Difference in molecular mass: _____

For pair (c) Difference in formula: _____; Difference in molecular mass: _____

- Q2.** What is common in the above result?



- Q3. Name the functional Group / Groups present in the Hydrocarbons listed above.
- Q4. Arrange the above hydrocarbons in order of increasing number of carbon atoms.
- Q5. What is such type of series called?
- Q6. Write down a general formula for the series formed in Question No. 4 indicating the number of C, H and O atom.
- Q7. With the help of the result of Question No. 1 write the next two members of this series obtained in Question No. 4.
- i) _____
- ii) _____

Suggested Remediation:

- Some students may find it difficult to generalize that two adjacent members of series of same type of compounds have difference of $-CH_2$ group in formula and '14 u' in molecular mass. Teacher may help them realise this by giving more examples.
- Some students may find it difficult to make the general formula, teacher may help them by giving them examples of series with other functional groups (eg. alkenes, alkenes etc.)
- Some students find it difficult to extend the series by adding more members. Teacher may explain, the concept again to them.
- Further teacher may add that chemical properties of the members of a Homologous series are same as they all have same functional group and chemical properties of a compound mainly depends on the functional group present in it. Data about physical properties of members of a homologous series may be shared with the students to make them appreciate the constant gradation in the physical properties of the homologues.

Carbon and its Compounds:**Chapter 4**

Assessment Technique: Project

Objectives: To enable the students to -

- Gain expertise in the skill of naming hydrocarbons
- Write the structural formula of hydrocarbons

Task: **Individual**

Procedure:

The teacher may give this task to the students after explaining the concept of nomenclature of hydrocarbons.



Naming of a carbon compound can be done using the following steps. Identify the longest chain in the compound carrying functional group and count the number of carbon atoms in that. The number of carbon atoms in the longest chain form the root word.

Number of carbons	Word Root
1	meth
2	eth
3	prop
4	but
5	pent
6	hex
7	hept
8	oct
9	non
10	dec

Prefixes and suffixes may be added to the root word according to their presence in the compound as follows (the following rules suffice the class X syllabus of CBSE and are in accordance with NCERT class X science book)-

Prefix + Root word + primary suffix + secondary suffix

Primary suffixes

Identification group	Class of compound	Suffix
Single bonds	Alkane	ane
Double bond	Alkene	ene
Triple bond	Alkyne	yne

Prefixes

Structure of functional group	Class of compound	Prefix
Cl, Br	halides	- Chloro, - bromo



Secondary Suffixes

Structure of functional group	Class of compound	Suffix
-OH	alcohols	-ol
-CHO	aldehydes	-al
-CO ⁻	ketones	-one
-COOH	Carboxylic acids	-oic acid

Student Worksheet

Time: 5-6 Days

Aim of the Project:

To study the technique of naming different hydrocarbons and name minimum 30 hydrocarbon and also write their structural formula.

Project Report:

The students may be asked to prepare a written report of the project undertaken using the format given below:

- Aim of the Project
- Introduction
- Theory
- Procedure
- Result

Assessment parameters:

Area of Assessment	Value Points
Presentation	2
Content	2
Result	2
Creativity	2
Viva	2
Total	10



Suggested Remediation:

- A few students may find it difficult to write the correct name or structure of the simple hydrocarbons, they may be encouraged to name the simple compounds first by following the rules.
- Some students may find it difficult to differentiate between aldehydes, ketenes and alcohols. When written in condensed form, they may be helped by writing the open and condensed structures of the same compound.
- Some students may forget to count the carbon of carboxyl group in the base (root) chain. Teacher may reiterate that all the carbons that are linked to each other in a chain without any hetero atom (O, N etc.) in between are to be counted in the chain.

Carbon and its Compounds**Chapter 4**

Assessment Technique: Diagram Based Worksheet

Objectives:

To enable the students to -

- appreciate that some elements form compounds by sharing of electrons to form covalent bonds. Understand that carbon with four valence electrons, forms only covalent bonds.
- Correlate the bonds formed as single, double or triple to the number of pairs of electrons shared between the atoms, learn writing electronic dot structure for formation of covalent compounds calculate and identify the number and types of bonds in a compound formed by sharing of electrons.

Task:**Individual Procedure**

Teachers may give this worksheet to the students after teaching-learning experience of bonding in carbon.

- Carbon has 4 electrons in outermost shell so it can neither lose electrons nor accept electrons to attain a noble gas configuration as both the processes involve high energy. So it forms bond by sharing its valence electrons with atoms of other elements to gain an octet of electrons. The shared electrons belong to the outermost shells of both the atoms and lead to both atoms attaining the noble gas configuration.
- The bond formed by sharing electrons is called covalent bond, Not only carbon, but many other elements form molecules by sharing electrons.
- A single covalent bond represented by a line between the two atoms, is formed by sharing one pair of electrons.
- A double bond represented by two lines between the two atoms, is formed by sharing two pairs of electrons.



- A Triple bond represented by three lines between the two atoms, is formed by sharing 3 pairs of electrons between two atoms.

Assessment Parameters:

Question 1 - 8 carries one mark each.

Question 9 carry 2 marks.

Student Worksheet**Time: 10 minutes****INSTRUCTIONS:**

Look at the following diagram showing electronic dot structure carefully and answer their questions that follow:

Figure 4.3, 4.4, 4.5 page 44 of class X, NCERT, Science Text Book.

Q1. Name the molecule whose electronic dot structure is depicted in diagram I and III

Q2. Identify the type of bond being formed in the molecules shown above.

Q3. How many pairs of electrons are being shared between the two atoms of oxygen?

Q4. How many bonds are formed between two atoms of Oxygen?

Q5. Write down the structural formula of the compound being shown in diagram III.

Q6. Write the electronic dot structure of Methane.

Q7. Write the electronic dot structure of ethene

Q8. Write the electronic dot structure of propane

Q9. Give the number of different type of bonds present in one molecule of propane.



Suggested Remediation:

- Some students may not know the molecular formula of methane, ethane and propane, teacher may give them the formula before asking to write the electron dot structures of these compounds.
- Some students may find it difficult to recollect the number of valence electrons in carbon and hydrogen atom and their placement around the central atom for bond formation. They may be helped by asking them to write the electronic configurations of the elements to find the number of valence electrons and valency some students may miss, a bond while counting different type of bonds.
- They may be asked to be cautious while counting the number of bonds in case of double and triple bonded compounds.

Carbon and its Compounds**Chapter 4**

Assessment Technique: Content based Assessment.

Objective: To enable the students to

- Recall chemical properties of hydrocarbons, alcohols and carboxylic acids. Write chemical equations for the organic reactions with main products formed during the reaction.
- Draw correlations between the type of functional group and the chemical properties of organic compounds.
- Recognise various reagents like -a reducing or an oxidising agent used in organic reactions.

Task:

Individual

Procedure:

The following formative assessment sheet may be given to the students to assess their understanding of the chemical properties shown by hydrocarbons, alcohols and carboxylic acids.

A revision of the following concepts may be done before the assessment.

- Hydrocarbons burn, in oxygen to give carbon dioxide, water and heat.
- Alcohol when heated with Alkaline KMnO_4 or acidified potassium dichromate, are converted to carboxylic acid.
- Unsaturated hydrocarbons add hydrogen in the presence of catalysts such as Palladium or nickel to give saturated hydrocarbons.
- In the presence of sunlight, saturated hydrocarbons undergo substitution reacting with chlorine.
- Alcohol react with sodium metal to form sodium alkoxide and hydrogen gas.



- On heating ethanol with excess conc. H_2SO_4 at 443K ethane and water is formed.
- When carboxylic acid and alcohol reacting presence of acid, sweet smelling ester is formed and ester react in presence of an acid or a base to give back the alcohol and carboxylic acid.
- Carboxylic acid reacts with a base like NaOH to give sodium salt of carboxylic acid and water.
- Carboxylic acid reacts with carbonates and hydrogen carbonates to give salts, water and carbon dioxide.

Assessment Parameters:

One mark for every correct chemical equation. The reactions should clearly show the catalyst used and the major products formed. Balancing of organic reactions is not must. Reactions given in NCERT. chapter IV, class X text book may be used as criteria of marking.

Student Worksheet**Time: 20 minutes**

Write balanced chemical equation for the following chemical reaction:

- A. Combustion of Methane.

- B. Reaction of ethanol with hot alkaline potassium permanganate.

- C. Reaction of propene with Hydrogen in presence of palladium or nickel

- D. Reaction of Methane with chlorine in presence of sunlight.

- F. Reaction of ethanol with Sodium Metal

- G. When ethanol is reacted with hot conc. Sulphuric Acid.

- H. Reaction of ethanoic acid with ethanol in presence conc. H_2SO_4 .

- I. Reaction of ethylethanoate ($\text{CH}_3\text{COOC}_2\text{H}_5$) with Sodium hydroxide.



J. Reaction of ethanoic acid with sodium hydroxide.

K. Reaction of ethanoic acid with Sodium bicarbonate

Suggested Remediation:

- Some students may find it difficult to write the correct formula of an organic compound. Teacher may encourage the students to write the general formulae and the functional groups of organic compounds in their syllabus on a chart and revisit the naming of organic compounds.
- Some students may find it difficult to recall the products of the chemical reaction or balance the equation. The teacher may ask them to tabulate all the reactions of a particular functional group together and draw correlations in the reactions. Correlations serve as a memory tool.

Carbon and its Compounds

Chapter 4

Assessment technique: Content Based (or Writing chemical formula)

Objectives: To enable the students to

- Write down the molecular formula of hydrocarbons.
- Recognise the functional group through the name of the hydrocarbon.
- Appreciate that if molecular formula and functional group present in the compound is known, structure of the compound can be written.

Task:

Individual

Procedure:

This worksheet may be given to the students after teaching them the nomenclature of the hydrocarbons and skill of drawing the structure of hydrocarbon.

Assessment parameter: Every correct answer carries 1 mark.

Student Worksheet

Time: 10 min.

Instructions:

Write the molecular formula and draw the structure for the following compounds.



Compound	Molecular formula	Structure
Ethanoic acid		
Bromopentane		
Butanone		
Hexanal		
Heptyne		

Suggested Remediation:

- Some students may not be able to recall the molecular formula of the compound so may draw the structure wrong, Teacher may need to repeat the revision exercise.
- A few students may not count Carbon of Carboxyl group in the base chain and may write ethanoic acid as C_2H_5COOH . Teacher may need to revise the concept- and explain then that all the carbons that are linked to each other in a chain without any hetero atom in between are to be counted in root chain.
- Some students may assume the hexanal to be an alcohol.
- Some students may not consider the balance of carbon while writing the structure of compound e.g. Heptyne and carbon may be forming 5 bonds. Teacher need to explain to them the significance of number of bonds formed by a carbon atom.

Carbon and its Compounds**Chapter 4**

Assessment technique: Data based Worksheet

Objectives: To enable the students to

- Understand the Homologous series and its characteristics.
- Write the general formula of Homologous series.
- Apply the general formula of a homologous series to identify any compound in the series.

Task: **Individual**

Procedure:

Teacher may give this worksheet to the students after teaching - learning the concept of The homologous series.

Teacher may give the following information to the students as a recall:-

- A series with the hydrocarbons having same functional group is called Homologous series.



- Difference in the formula and molecular mass of two consecutive compounds members of same
- Homologous series is '-CH₂' and -14 u respectively.
- A homologous series can be identified with a general formula which helps in determining the other members of the series.

Assessment parameters: As indicated in the worksheet.

Student Worksheet

Time: 10 minutes

Instructions:

Arun wrote few series of hydrocarbon and left blanks in between. Look at the chemical formula in the series of hydrocarbons carefully and answer the questions that follow:

I	II	III	IV	V
CH ₄	C ₂ H ₄	C ₂ H ₂	CH ₃ OH	D
C ₂ H ₆	C ₃ H ₆	B	C ₂ H ₅ OH	CH ₃ COOH
C ₃ H ₈	A	C ₄ H ₆	C ₃ H ₇ OH	C ₂ H ₅ COOH
C ₄ H ₁₀	C ₅ H ₁₀	C ₅ H ₈	C	C ₃ H ₇ COOH

- Q1.** What is the difference in the formula and molecular mass between C₂H₆ & C₃H₈ ; C₃H₈ and C₄H₁₀?
- Q2.** What are such series of Hydrocarbons called?
- Q3.** Substitute the blanks A,B,C,D with correct chemical formula of the compound.
- A. _____ B. _____
- C. _____ D. _____
- Q4.** Name the functional group present in the series IV & V.
- _____
- Q5.** Which is the first member of the alkane series?
- _____
- Q6.** What is the general formula of the homologous series of alkyne and alcohol.
- _____
- Q7.** Name the chemical formula of 6th member of alkyne series and 15th member of alcohol series.
- _____



Suggested Remediation:

- Some students may not be able to make and use the general formula of homologous series of alkyne and alcohol. They may be given more practice using different examples from same and different homologous series.
- Some students may not be able to identify the compound and functional group present in that. Help them to recall the same.

Carbon and its Compounds**Chapter 4****Assessment technique:** Facts based Worksheet**Objectives:** To enable the students to

- Learn the basic facts about carbon atom like electronic configuration, valency and its combustion.
- understand the versatile nature of carbon atom.
- Appreciate that carbon forms compounds by sharing electrons.
- Learn that alkanes are saturated but alkenes and alkynes are unsaturated
- hydrocarbons where pair of carbons are bonded with double and triple covalent bond respectively.

Task:**Individual****Procedure:**

Teacher may give this worksheet to the students after discussing about the nature of carbon atom and its bonding ability

Teacher may give the following information to the students as a recall:-

- Compounds of carbon and hydrogen are called Hydrocarbons.
- Carbon forms covalent bonds by sharing the electrons.
- Alkanes are saturated hydrocarbons with a pair of carbon atoms bonded together with double bond.
- Alkynes are unsaturated hydrocarbons with a pair of carbon atoms bonded together with triple bond.
- Hydrocarbons on combustion produce CO_2 , H_2O heat and energy.
- Functional group are atoms or group of atoms present in hydrocarbon which determines its chemical properties.

Assessment parameters: As indicated in the worksheet. (Q1-Q8 1 mark)

Student Worksheet**Time : 10 min**

Kunal got a fact sheet about carbon atom which has stormed his brain with many questions.

- Atomic number of carbon is 6.
- It is tetravalent in nature that is why one carbon atom combines with 4 Hydrogen atom to form methane.
- It can neither give electron or take electron to form a compound.
- It has a versatile nature and form many hydrocarbon like alkanes alkenes, alkynes, alcohol, carboxylic acid.
- The chemical properties of hydrocarbon, are determined by the functional group present in it.

Few of the questions are listed below can you help him with the answers . Try it

Q1. What is the electronic configuration of carbon?

Q2. Carbon is tetravalent in nature. What does it mean ?

Q3. What is the valance of carbon in ethane?

Q4. Carbon neither gives electron or takes electron then how does it complete its octet and what is the type of bond to formed.

Q5. What is a hydrocarbon?



Q6. What is the difference between alkanes and alkenes?

Q7. When carbon is burnt carbon dioxide is formed. Name the products formed when hydrocarbons are burnt.

Q8. What is a functional group?

Q9. Why does carbon form many compounds? (Give two reasons)

1.

2.

Suggested Remediation:

- A few students may be puzzled to find out the valence of carbon in ether. Teacher may need to explain. As carbon that valence of carbon never changes (Valence is the Capacity to form bonds has four electron in outermost shell its valance is 4)
- A few students may write that alkanes are saturated and alkenes are unsaturated hydrocarbon or alkenes have one pair of carbon atoms bonded with double bond.
- A few students may not correlate that one of the major component of hydrocarbon is carbon and therefore their combustion also leads to the production of CO_2 and H_2O heat and light Teacher may help them to understand.

Carbon and its Compounds

Chapter 4

Assessment technique: Formula Based Worksheet (Brain storming)

Objectives: To enable the learners to

- Learn the molecular formula of a hydrocarbon and with its structure and versa.



- Establish the relation between Hydrocarbon's molecular formula and structure and name
- Apply the concept of nomenclature of hydrocarbon.

Task : **Individual**

Procedure:

Teacher may give this worksheet to the students to assess their understanding of Nomenclature of hydrocarbons and skill of drawing the structure of the hydrocarbon,

Assessment parameter: Each question carries 2 marks

Student Worksheet

Time: 10 min.

Instructions:

Given below are the name, molecular formula and structure of a few hydrocarbons. In one of the three columns, there is some error. Identify the wrong entry and write the correct answer in the box given beside.

Hydrocarbon	Formula	Structure
Propanol	C_3H_8O	$ \begin{array}{ccccccc} & H & & H & & H & \\ & & & & & & \\ H & - C & - & C & - & C & = O \\ & & & & & & \\ & H & & H & & & \end{array} $
Chlorobutane	C_4H_8Cl	$ \begin{array}{cccccccc} & H & & H & & H & & H \\ & & & & & & & \\ H & - C & - & C & - & C & - & C & - Cl \\ & & & & & & & \\ & H & & H & & H & & H \end{array} $
Ethanoic acid	C_2H_5COOH	$ \begin{array}{ccccccc} & H & & H & & O & \\ & & & & & & \\ H & - C & - & C & - & C & - OH \\ & & & & & & \\ & H & & H & & & \end{array} $
Propanone	C_3H_7O	$ \begin{array}{ccccccc} & H & & O & & H & \\ & & & & & & \\ H & - C & - & C & - & C & - H \\ & & & & & & \\ & H & & & & H & \end{array} $



Heptyne	C_7H_{14}	$ \begin{array}{ccccccc} & H & H & H & H & H & \\ & & & & & & \\ H & - C & - C & - C & - C & - C & - C = C - H \\ & & & & & & \\ & H & H & H & H & H & \end{array} $
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Suggested Remediation:

- Some students may not be able to establish the relation of hydrocarbon-name, molecular formula, structure, they need to be given more practice.
- Some students may not be able to recall the molecular formula.
- Some may not include the carbon of carboxyl group in base chain. Teacher may need to guide them.
- Some students may not check the valence of the carbon atom e.g.(in Heptyne) and so may not find any error in question 5. They need to explain the same.

Carbon and its Compounds**Chapter 4****Assessment technique:** Content based**Objectives:** To enable the students to

- understand and learn the chemical properties of Hydrocarbons..
- Identify the reactants used and products formed in different reactions.

Task:**Individual****Procedure:**

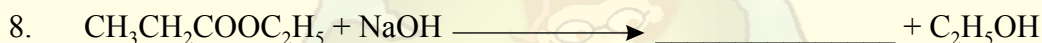
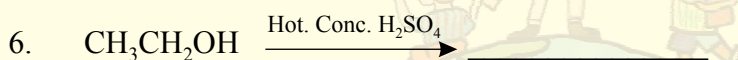
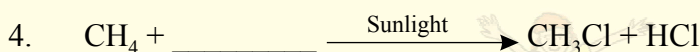
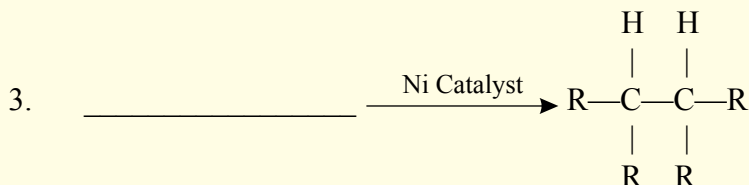
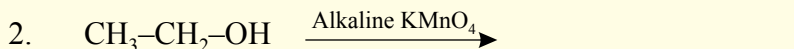
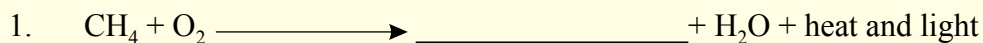
Teacher may give this worksheet to the students after teaching - learning the properties of Hydrocarbons. Assessment parameter-1 mark for each correct answer

Student Worksheet**Instructions:**

Mr.Puri explained the chemical properties of hydrocarbons to students and wrote the chemical equations for the reactions. He asked the students to note them in their note books. Suddenly the bell rang. As he moved out, Rishel rubbed a few compounds from the blackboard. Now students are in a fuss. Can you help them in placing chemical formula of correct compound to complete the chemical equation for the reactions:



Try–

**Suggested Remediation:**

- Some students may find it difficult to identify the product or guess the reactant used in the chemical reaction.
- Teacher may help them recall the learning and repeat the revision exercise.

Carbon and its Compounds

Chapter 4

Assessment technique: Match the column

Objectives: To enable the students to

- learn the nomenclature of the hydrocarbons apply the understanding of technique of naming of hydrocarbons
- Identify the reactants used and products formed in different reactions.

Task :

Individual



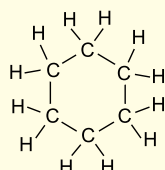
Procedure:

- Teacher may give this worksheet to the students after teaching - learning of Nomenclature of the hydrocarbons. Following points may be recalled in concern with the nomenclature of hydrocarbons.
- Carbon in the basic chain with functional group is identified and named using suitable prefix or suffix for the functional group e.g. if it is alcohol suffix used is 'ol' and if aldehyde suffix used is 'al'.
- To name a cyclic alkane suffix used is cyclo .
- C_6H_6 is benzene.

Assessment parameter: 1 mark for every correct match.

Student Worksheet**Time: 10 min.****Instructions:**

Match the structures of hydrocarbons given in column B with their IUPAC names in column C and write the corresponding s.no. number to the correct name in column A

Column A	Column B	Column C	Column A	Column B	Column C
1	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	Pentyne	6	$\begin{array}{c} \text{O} \\ \\ \text{H}-\text{C}-\text{H} \end{array}$	2-Chloropropane
2	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}=\text{C}-\text{H} \\ \\ \text{H} \end{array}$	Butanone	7	$\begin{array}{c} \text{O} \\ \\ \text{H}_3\text{C}-\text{C}-\text{OH} \end{array}$	Propene
3	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}\equiv\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	Benzene	8	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}=\text{C}-\text{C}-\text{H} \\ \quad \\ \text{H}-\text{C}=\text{C} \\ \\ \text{H} \end{array}$	Methanol
4		Ethane	9	$\begin{array}{c} \text{H} \quad \text{O} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	Cyclohexane
5	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{OH} \\ \\ \text{H} \end{array}$	Ethaneic Acid	10	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}_3\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	Methanal



Suggested Remediation:

- Some students may not recall the prefix for a particular number of carbon and may name the base chain wrong.
- Some students may confuse between the prefix 'al' is for alcohol'.
- A few students may not differentiate the structure cyclohexane and benzene.
- A few students may not count the carbon of carboxyl group in the base chain. Teacher may repeat the revision exercise.

Carbon and its Compounds**Chapter 4**

Assessment technique: Match the column

Objectives: To enable the students to

- Understand the nomenclature of the hydrocarbons.
- Identify the name of a hydrocarbon.
- Appreciate the general formula of a Homologous series.

Task:

Individual

Procedure:

Teacher may give this worksheet to the students to practice the nomenclature of the hydrocarbons after teaching the same.

Types of bonds and use of general formula of a Homologous series should be recalled prior to that.

- General formula of Alkanes series is C_nH_{2n+2} . In it all the bonds are single.
- General formula of Alkenes is C_nH_{2n} . It contains one double bond.
- General formula of Alkynes series is C_nH_{2n-2} . It contains one triple bond.

Assessment parameter:

1 mark for every correct match and one mark for completing and verifying the magic square correctly.

Student Worksheet

Time: 10 min.

Instructions:

Put the number of the hint from the list into the square with appropriate match. Check your answer by adding the numbers to see if all the sum of the rows both across and down add upto the same number, the magic number.



CH_3COOH		C_5H_{10}		CH_3COOH		Magic number
$\text{CH}_3\text{CH}_2\text{Cl}$		HCHO		$\text{C}_{15}\text{H}_{32}$		Magic number
CH_3COCH_3		C_6H_{10}		$\text{C}_2\text{H}_5\text{OH}$		Magic number
Magic number		Magic number		Magic number		

HINT LIST:

1. Ethanol
2. Chloroethane
3. An alkene
4. Methanal
5. Its dil. Form is used as Vinegar.
6. Ketone with 3 carbon atom.
7. An alkyne
8. Contains a triple bond.
9. An alkane.

Suggested Remediation:

- A few students may not associate all the squares with the correct hint, confusion may be between methanol and methanal.
- Students can check themselves by adding the number in the rows and think over the answer again or teacher may help them to recall.



Period Classification of Elements

Chapter 5

Assesment Technique: Data Based Worksheet

Objectives: To enable the students to -

- Learn the salient features of the Modern Periodic table.
- Understand the trends of different properties on the periodic table.

Task: **Individual**

Procedure:

- This worksheet may be given to the students after recalling the salient features of the periodic table using a chart displaying Modern Periodic Table.
- The valence electrons change across a period but remains same in the groups and so the valency.
- Atomic size decreases across a period but increases down the group.
- Metallic character decreases across a period but increases down the group.
- Non metallic character increases across a period but decreases down the group.

Assessment Parameter

½ mark for each correct answer

Student Worksheet

Read the following lines written about the Modern Periodic Table and fill in the blanks

I am the Modern Periodic Table, where elements are arranged on the basis of _____.

I have _____ Horizontal rows called _____ and _____ vertical columns are called _____. My first period is very short with _____ elements and 2 and 3 Period contain _____ elements, 4 and 5 has _____ elements. 6 period has _____ elements but 7 period is _____. With space for more elements. 17 group is of _____ 18 is of _____. Atomic size of my elements _____ across the period but _____ down the group same as the metallic character but the non metallic character is _____ to that Number of valence electrons _____ across the period so varies the valency but valency of the elements is _____ in a group. All the properties of elements are the Periodic fuction of _____.



Suggested Remediation:

- A few students may not recollect the salient features of the modern periodic table.
- the table can be displayed for the help.
- A few students may not recall the trend in different properties.
- Teacher may explain the same again.
- Teacher may suggest the students to learn the Poem.

Period Classification of Elements**Class 5****Assesiytent Technique:** Diagram/ (Periodic Table) Based Worksheet**Objectives:** To enable the students to -

- Appreciate the periodic trends in properties of elements.
- Learn salient features of new periodic table.
- Study and analyse the given table for the placement and properties of elements in the Modern Periodic Table.

Task:**Individual****Procedure:**

The teacher, may give the following worksheet after the teaching-learning about the modern periodic table. The following information may be recalled with the students before they start working on the worksheet:

- Elements of 1st group are called alkali metals,
- 2nd group elements are called alkaline Earth metals,
- Elements of group 17 are called Halogens and that of group 18, are called noblegases.
- Atomic number of elements increases from left to right in the period and top to bottom in the group in periodic table.,
- Valency (the combining capacity) of an element can be .determined by-
 1. The number of, valence electrons if the number is equal to or less than 4.
 2. (8 - Valence electrons) if the number of valence electrons is more than 4.
 3. The group number for elements of group 1 and 2.

