

BUDHA DAL PUBLIC SCHOOL, SAMANA

ANNUAL CURRICULUM PLAN SESSION 2023-24

CLASS: XII

SUBJECT: CHEMISTRY

Month & Working Days	Theme/Sub-theme	Learning Objectives		Activities & Resources	Expected Learning Outcomes	Assessment
		Subject Specific (Content Based)	Behavioural (Application based)			
APRIL	<p><b>SOLUTIONS:</b></p> <ul style="list-style-type: none"> <li>different types of solutions;</li> <li>concentration of solution in different units</li> <li>Henry's law and Raoult's law; ideal and non-ideal solutions</li> <li>Deviations of real solutions from Raoult's law</li> <li>colligative properties of solutions</li> <li>Abnormal colligative properties exhibited by some solutes in solutions.</li> </ul>	<p>Students will learn to:</p> <ul style="list-style-type: none"> <li>Describe the formation of different types of solutions</li> <li>Express concentration of solution in different units</li> <li>State and explain Henry's law and Raoult's law</li> <li>Understand the difference between ideal and non-ideal solutions</li> <li>Explain the deviations of real solutions from Raoult's law</li> <li>Describe the colligative properties of solutions</li> <li>Explain abnormal colligative properties and correlate them to</li> </ul>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>Dissolve samples of solute in a suitable solvent keeping in view solute-solvent interactions</li> <li>Choose a suitable factor to enhance solubility or decrease the same as per the need</li> <li>Demonstrate the use of concentrated and dilute solutions in daily life</li> <li>Apply the effect of addition of a non-volatile solute to decrease the freezing point of water or any other solvent and increase the boiling point of water or any other solvent as required.</li> </ul>	<ul style="list-style-type: none"> <li>Volumetric Analysis <math>\text{KMnO}_4</math> vs. Mohr's Salt Solution</li> <li>Volumetric Analysis <math>\text{KMnO}_4</math> vs. Oxalic Acid Solution</li> </ul>	<p>Students will learn to</p> <ul style="list-style-type: none"> <li>Describe the formation of different types of solutions</li> <li>Express concentration of solution in different units</li> <li>State and explain Henry's law and Raoult's law</li> <li>Understand the difference between ideal and non-ideal solutions</li> <li>Explain the deviations of real solutions from Raoult's law</li> <li>Describe the colligative properties of solutions</li> <li>Explain abnormal colligative properties and correlate these to association or dissociation of the specific entity.</li> </ul>	<p>Solving numerical on molarity, molality, mole fraction and ppm.</p>

			<p>association or dissociation of the specific entity.</p> <ul style="list-style-type: none"> <li>• Employ strategies to overcome the atmospheric conditions to deal with a situation like scuba diving, boiling at high altitude etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Utilize the concept of osmosis in injecting isotonic saline solutions into the body.</li> <li>• Appreciate the use of saline water to treat sore throat.</li> <li>• Appreciate the process of dialysis in the human system.</li> <li>• Prepare different categories of solutions for various studies and researches.</li> <li>• Illustrate examples from daily life to relate the effect of pressure differences on living system.</li> <li>• Employ strategies to overcome the atmospheric condition to deal with a situation like scuba diving, boiling at high altitude etc.</li> </ul>			
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<p>April</p>		<ul style="list-style-type: none"> <li>c</li> </ul> <p><b>ELECTROCHEMISTRY</b></p> <ul style="list-style-type: none"> <li>• electrochemical cell and difference between galvanic and electrolytic cells</li> <li>• Nernst equation for calculating the emf of galvanic cell and standard potential of the cell</li> <li>• relation between standard potential of the cell</li> <li>• Gibbs energy of cell reaction and its equilibrium constant</li> <li>• resistivity, conductivity (k) and molar conductivity of ionic solutions</li> <li>• difference between ionic (electrolytic) and electronic conductivity</li> <li>• measurement of conductivity of</li> </ul>	<p><b>Students will be able to</b></p> <ul style="list-style-type: none"> <li>• To describe an electrochemical cell and differentiate between galvanic and electrolytic cells</li> <li>• to apply Nernst equation for calculating the emf of galvanic cell and define standard potential of the cell</li> <li>• derive relation between standard potential of the cell, Gibbs energy</li> </ul>	<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• develop insights into the functioning of cells and batteries in everyday life.</li> <li>• They will develop an insight to enhance the efficiency of the cells and batteries by choosing an appropriate cathode and anode.</li> </ul>	<ul style="list-style-type: none"> <li>• Plotting graphs between molar conductance and concentration, plotting graph for 1 and 2 order reactions conc. vs time</li> <li>• <b>Observing the galvanic cell and its working in the lab.</b></li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<p>Solving numerical on Nernst equation and ncert questions from the textbook</p> <div data-bbox="2268 1008 2532 1133" style="border: 1px solid black; height: 77px; width: 98px; margin-top: 10px;"></div>
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	<p>electrolytic solutions and calculation of their molar conductivity</p> <ul style="list-style-type: none"> <li>variation of conductivity and molar conductivity of solutions with change in their concentration (molar conductivity at zero concentration or in infinite dilution)</li> <li>Kohlrausch law and its applications quantitative aspects of electrolysis</li> <li>construction of some primary and secondary batteries and fuel cells</li> <li>corrosion as an electrochemical process.</li> </ul>	of cell reaction and its				
<b>JULY</b>	<p><b>d &amp; f BLOCK ELEMENTS</b></p> <ul style="list-style-type: none"> <li>oxidation states of the elements.</li> <li>various reactions of the elements and their compounds.</li> <li>preparation, properties and uses of the elements and their important compounds electronic configurations of the transition (d-block) and the inner transition (f-block) elements;</li> <li>relative stability of various oxidation states in terms of electrode potential values</li> <li>preparation, properties, structures and uses of some important compounds such as <math>K_2Cr_2O_7</math> and <math>KMnO_4</math></li> <li>properties of the f-block elements and comparative account of the lanthanoids and actinoids with respect to their electronic configurations, oxidation states and chemical behaviour.</li> <li>understand the general characteristics of the d- and f-block elements and the general horizontal and group trends in them.</li> </ul>	<p><b>Students will be able to</b></p> <ul style="list-style-type: none"> <li>learn the positions of the d- and f-block elements in the periodic table</li> <li>know the electronic configurations of the transition (d-block) and the inner transition (f-block) elements;</li> <li>appreciate the relative stability of various oxidation states in terms of electrode potential values;</li> <li>describe the preparation, properties, structures and uses of some important compounds such as <math>K_2Cr_2O_7</math> and <math>KMnO_4</math>;</li> <li>understand the general characteristics of the d- and f-block elements and the</li> </ul>	<p><b>Students will be able to</b></p> <ul style="list-style-type: none"> <li>To make students understand and realize the importance of transition (change) in every aspect of life.</li> <li>Students will appreciate the importance and use of alloys in their surroundings so as to carefully use them and spread awareness about the same.</li> <li>They will develop their logical and critical thinking skills after having discussions on various behaviors of d and f block elements.</li> <li>Sensitivity towards environmental protection and judicious use of transition metal compounds will be developed.</li> <li>They will be able to apply the knowledge of use of various</li> </ul>	<p>Teacher will <b>demonstrate</b> and the Students will <b>perform</b> the following identifying tests (chemical reactions) under qualitative analysis to study the properties of the compounds.</p> <p>(i) Chromyl chloridetest (ii) Nessler's reagenttest</p> <p>Salt analysis for detection of <math>Mn^{2+}</math>, <math>Zn^{2+}</math>, <math>Cr^{3+}</math>, <math>Co^{2+}</math>, <math>Ni^{2+}</math> etc. ions</p>	<ul style="list-style-type: none"> <li>Students will learn about the process and importance of change (transition) in properties of elements from metallic to non-metallic end and now they can predict the probable properties of elements situated at particular places in the periodic table. They can appreciate and understand the importance of change in life.</li> <li>Students will learn to understand and explain the trends in properties of d and f block elements and now they can reason the abnormalities, similarities and variation in properties of the elements.</li> <li>Students will be able to write various reactions related to preparation &amp; properties of <math>K_2Cr_2O_7</math> and <math>KMnO_4</math> and deduce their structure.</li> <li>Students can appreciate and justify the cause of</li> </ul>	<ul style="list-style-type: none"> <li>General discussion of properties of d and f block elements</li> <li>NCERT textbook questions</li> </ul>

			<p>general horizontal and group trends in them;</p> <ul style="list-style-type: none"> <li>describe the properties of the f-block elements and give a comparative account of the lanthanoids and actinoids with respect to their electronic configurations, oxidation states and chemical behaviour.</li> </ul>	<p>transition metals in medicine, biological phenomena, storage, comfortable living, industries and agriculture.</p> <ul style="list-style-type: none"> <li>Students will be able to think, apply and appreciate the use of various elements in the manufacture of electrical fibre, space ship and airship, nuclear reactors.</li> </ul>		<p>using alloys and transition metal compounds in various fields in their surroundings.</p> <ul style="list-style-type: none"> <li>Students can identify transition elements and their compounds on the basis of their characteristics.</li> <li>Students can extend their knowledge of using the transition metals &amp; their compounds judiciously, to create awareness about the same.</li> </ul>	
<b>AUGUST</b>		<p><b>COORDINATION CHEMISTRY</b></p> <ul style="list-style-type: none"> <li>properties of the f-block elements and comparative account of the lanthanoids and actinoids with respect to their electronic configurations, oxidation states and chemical behaviour.</li> <li>postulates of Werner's theory of coordination compounds;</li> <li>coordination entity, central atom/ion, ligand, coordination number, coordination sphere, coordination polyhedron, oxidation number, homoleptic and heteroleptic;</li> <li>rules of nomenclature of coordination compounds</li> <li>formulae and names of mononuclear coordination compounds;</li> <li>different types of isomerism in coordination compounds;</li> <li>nature of bonding in coordination compounds in terms of the Valence Bond and Crystal Field theories;</li> <li>stability of coordination compounds;</li> <li>applications of coordination compounds in our day to day life.</li> </ul>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>Understand and appreciate the postulates of Werner's theory of coordination compounds</li> <li>know the meaning of the terms: coordination entity, central atom/ion, ligand, coordination number, coordination sphere, coordination polyhedron, oxidation number, homoleptic and heteroleptic, denticity;</li> <li>learn the rules of nomenclature of coordination compounds;</li> <li>write the formulae and names of mononuclear coordination</li> </ul>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>develop insights into the functioning of vital components of biological systems. They will know that Chlorophyll, hemoglobin and vitamin B<sub>12</sub> are coordination compounds of magnesium, iron and cobalt respectively. On the same line they will be able to apply the understanding of coordination linkages &amp; entities to the existence &amp; formation of various compounds of industrial, agricultural, medicinal and biological importance.</li> </ul>	<ul style="list-style-type: none"> <li>Qualitative Inorganic analysis</li> <li>Students will be involved in problem solving (a set of questions to be discussed in class) based on the above aspects for better understanding of the introductory part of the unit.</li> </ul>	<ul style="list-style-type: none"> <li>Students will learn to write structure and IUPAC names of coordination compounds and they can explain about all terms used in coordination chemistry for in depth study of complexes.</li> <li>They can identify various coordination compounds and can predict some of their properties after carrying out complete analysis of the composition, bonding, structure, geometry and related features of the compounds.</li> <li>They can apply VBT and CFT to explain the bonding and related features in coordination entities.</li> <li>They have learnt to describe the structural features of the organometallic</li> </ul>	NCERT questions from the Coordination compounds

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			<ul style="list-style-type: none"> <li>• definedifferenttypes of isomerism incoordinationcompounds;</li> <li>• understand the natureof bonding incoordinationcompounds interms of the Valence BondandCrystalField theories;</li> <li>• learn thestabilityofcoordinationcompounds;</li> <li>• Appreciate theimportance andapplications ofcoordinationcompounds in ourdaytodaylife.</li> </ul>	<ul style="list-style-type: none"> <li>• Students intending topursue further studiesin the field of sciencewillbeable <b>tocorrelate</b>theseconcepts withandreasoneffectivelyabout the cause andeffect relationship in a variety ofmetallurgicalprocesses,industrialcatalysis andanalyses.</li> <li>• They will be able <b>tosensitizepeople</b>aboutthoughtfuluseofchemicalresourcesin contextof their advantages &amp;disadvantages,availability andscarcity.</li> <li>• They will get awareof environmentalhazards of using some of thecoordinationcompoundssoastofurther sensitizepeopleaboutthesame.</li> <li>• Students willappreciate theformationofgemstonesasapplicationof formationofcoordinationcompounds.</li> <li>• They will developtheir <b>analyticalskills</b> while undergoing indepthstudyof</li> </ul>		<p>biological, medicinal,industrial and agriculturalfields.</p> <ul style="list-style-type: none"> <li>• They have learnt todifferentiate betweenuseful and harmful effectsof using coordinationcompounds and can createawareness in people aboutthesame.</li> </ul>	
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August		<p><b>HALOALKANES ANDHALOARENES:</b></p> <ul style="list-style-type: none"> <li>• Nomenclature of haloalkanes and haloarenes according to the IUPAC system</li> <li>• reactions involved in the preparation of haloalkanes and haloarenes.</li> <li>• correlate the structures of haloalkanes and haloarenes with various types of reactions</li> <li>• stereochemistry in haloalkanes</li> <li>• applications of organo-metallic compounds</li> <li>• environmental effects of polyhalogen.</li> </ul>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>• name haloalkanes and haloarenes according to the IUPAC system of nomenclature from their given structures</li> <li>• describe the reactions involved in the preparation of haloalkanes and haloarenes and understand various reactions that they undergo</li> <li>• correlate the structures of haloalkanes and haloarenes with various types of reactions</li> <li>• use stereochemistry as a tool for understanding the reaction mechanism</li> <li>• highlight the uses and environmental effects of polyhalogen compounds.</li> </ul>	<p>structure, bonding, isomerism and properties of coordination compounds.</p> <p>Students will be able to</p> <ul style="list-style-type: none"> <li>• name haloalkanes and haloarenes according to the IUPAC system of nomenclature from their given structures</li> <li>• describe the reactions involved in the preparation of haloalkanes and haloarenes and understand various reactions that they undergo</li> <li>• correlate the structures of haloalkanes and haloarenes with various types of reactions</li> <li>• use stereochemistry as a tool for understanding the reaction mechanism</li> <li>• highlight the uses and environmental effects of polyhalogen compounds.</li> </ul>	<ul style="list-style-type: none"> <li>• Qualitative Inorganic analysis</li> <li>• draw the resonating structure of haloarenes</li> </ul>	<ul style="list-style-type: none"> <li>• IUPAC nomenclature of halogen containing compounds and their classification</li> <li>• about various reagents used in preparation of fluoro, chloro, bromo, iodoalkanes and aryl halides.</li> <li>• Physical and chemical properties of haloalkanes, haloarenes and electrophilic substitution reaction given by haloarenes.</li> <li>• mechanism of <math>S_N^1</math> &amp; <math>S_N^2</math> reaction and reactivity of primary, secondary and tertiary alkyl halides.</li> <li>• Stereochemical aspects of nucleophilic substitution reaction i.e. inversion, retention and racemisation of configuration.</li> <li>• to convert haloalkanes to alkanes and alkenes</li> <li>• about the ambident nucleophiles and the products obtained on reaction with haloalkanes.</li> <li>• about beneficial and hazardous effects of polyhalogen compound.</li> </ul>	<p>Practice questions: Conversions</p>
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<b>August</b>		<p><b>ALCOHOLS, PHENOLS AND ETHERS:</b> Nomenclature of alcohols, phenols and ethers according to the IUPAC system reactions involved in the preparation of alcohols from (i) alkenes (ii) aldehydes, ketones and carboxylic acids;</p> <p><b>TO BE CONTINUED IN THE NEXT MONTH....</b></p>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>Name Alcohol, phenol and ethers according to the IUPAC system of nomenclature from their given structures</li> <li>describe the reactions involved in the preparation of alcohols, phenol and ether</li> </ul>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>the use of <b>phenol</b> as an antiseptic in soaps, lotion and ointments and for treating wounds caused by the bite of mad dogs as a disinfectant, fungicide and bactericide,</li> </ul>	<ul style="list-style-type: none"> <li>Qualitative Inorganic analysis</li> </ul>	<ul style="list-style-type: none"> <li>To name alcohols, phenols and ethers according to the IUPAC system of nomenclature</li> </ul>	<p>Practice questions: Conversions</p>
		<p>....CONTINUED</p> <p><b>ALCOHOLS, PHENOLS AND ETHERS:</b></p> <ul style="list-style-type: none"> <li>reactions involved in the preparation of phenols from (i) haloarenes (ii) benzene sulphonic acids (iii) diazonium salts and (iv) cumene;</li> <li>reactions for preparation of ethers from (i) alcohols and (ii) alkyl halides and sodium alkoxides/aryloxides;</li> <li>physical properties of alcohols, phenols and ethers with their structures;</li> <li>chemical reactions of the three classes of compounds on</li> </ul>	<ul style="list-style-type: none"> <li>correlate physical properties of alcohols, phenols and ethers with their structures</li> <li>Understand chemical reactions of the three classes of compounds on the basis of their functional groups.</li> <li>Highlight the uses of alcohol, phenol and ether</li> <li>Identify the common</li> </ul>	<p>Students will learn</p> <ul style="list-style-type: none"> <li>use of <b>alcohol</b> as a fuel, as an antiseptic in hospitals, as a preservative for biological specimens.</li> <li>Students will appreciate the use of <b>phenol</b> in manufacture of drugs like Aspirin, Salol, Phenacetin</li> <li>use of <b>diethyl ether</b></li> </ul>	<p>Detection Of alcoholic and phenolic groups in the given organic compound.</p>	<ul style="list-style-type: none"> <li>The reactions involved in the preparation of <b>alcohols</b> from alkenes (ii) aldehydes, ketone and carboxylic acids</li> <li><b>phenols</b> from (i) haloarenes (ii) benzene sulphonic acids (iii) diazonium salts and (iv) cumene</li> <li><b>ethers</b> from (i) alcohols (ii) alkyl halides and sodium</li> </ul>	<p>Questions on resonance and organic conversions</p>

October	<p>the basis of their functional groups.</p> <p><b>ALDEHYDES, KETONES AND CARBOXYLIC ACIDS AMINES, POLYMERS</b></p> <p>common and IUPAC names of aldehydes, ketones and carboxylic acids;</p> <ul style="list-style-type: none"> <li>• structures of the compounds containing functional groups namely carbonyl and carboxyl groups;</li> <li>• important methods of preparation and reactions of these classes of compounds;</li> <li>• physical properties and chemical reactions of aldehydes, ketones and carboxylic acids, with their structures;</li> <li>• mechanism of a few selected reactions of aldehydes and ketones;</li> <li>• factors affecting the acidity of carboxylic acids and their reactions</li> <li>• uses of aldehydes, ketones and carboxylic acids.</li> </ul> <p>Method of preparation of amines and their properties, distinguishing tests for primary, secondary and tertiary amines.</p> <p>Classification of polymers and their preparation and properties.</p>	<p>and IUPAC names of aldehydes, ketones and carboxylic acids</p> <ul style="list-style-type: none"> <li>• structures of the compounds containing functional groups namely carbonyl and carboxyl groups</li> <li>• understand and become aware of important methods of preparation and reactions of these classes of compounds</li> <li>• know physical properties and chemical reactions of aldehydes, ketones and carboxylic acids, with their structures</li> <li>• mechanism of a few selected reactions of aldehydes and ketones</li> <li>• factors affecting the acidity of carboxylic acids and their reactions</li> <li>• uses of aldehydes, ketones and carboxylic acids.</li> <li>• Method of preparation of amines and their properties, distinguishing tests for primary, secondary and tertiary amines.</li> <li>• Classification of polymers and their preparation and</li> </ul>	<p>as a refrigerant and an inhalation anaesthetic in surgery as it produces unconsciousness without affecting lungs and heart,</p> <ul style="list-style-type: none"> <li>• use of <b>methanol</b> in the preparation of dyes, medicines and perfumes, use of ethanol in manufacture of beverages.</li> <li>• Students will be sensitized about the harmful effects of consumption of ethanol on human health and will be aware how consumption of alcohol leads to addiction and lack of control and coordination in the body which may result in accidents.</li> <li>• To recognize the drunken person by performing acidified <math>K_2Cr_2O_7</math> solution test.</li> <li>• Appreciate the use of polymers in daily life.</li> </ul>		<p>alkoxides/aryloxides</p> <ul style="list-style-type: none"> <li>• Difference in physical properties on the basis of intermolecular forces.</li> <li>• Chemical properties of alcohol, phenol and ethers and corresponding chemical equations.</li> <li>• Electrophilic substitution reaction of phenol and aromatic ethers.</li> <li>• Uses of alcohol, phenol and ethers and harmful effects of drinking alcohol</li> </ul>	
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July		<p><b>CHEMICAL KINETICS</b></p> <ul style="list-style-type: none"> <li>• Rate of a reaction ,Rate of a reaction and concentration , Rate law and order of a reaction</li> <li>• Integrated rate Equations, Effect of temperature on Rate of Reaction</li> <li>• Effect of catalyst on rate of reaction</li> </ul>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>• To describe an average and instantaneous rate of a reaction.</li> </ul>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>• develop insights wrt importance of speed.</li> <li>• create a logical approach to</li> </ul>		<p>Students will be able to</p> <ul style="list-style-type: none"> <li>• To describe an average and instantaneous rate of a reaction.</li> <li>• to apply the rate law to</li> </ul>	

		<ul style="list-style-type: none"> <li>• Collision Theory of Reaction Rate.</li> <li>• <b>Numericals on related formula</b>: calculation of rate of reaction, calculation of order of reaction, calculation of activation energy.....</li> </ul>	<ul style="list-style-type: none"> <li>• to apply the rate law to calculate the order of reaction.</li> <li>• derive integrated rate equations for zero, first order reactions.</li> <li>• Analyse the collision theory and explain the effect of temperature satisfactorily for most of the reaction.</li> </ul>	<p>happenings that take place and the cause that actually leads to the same by studying the collision theory and Arrhenius theory.</p> <ul style="list-style-type: none"> <li>• Differentiate between the decaying of fruits in different conditions (temperature)</li> </ul>		<p>calculate the order of reaction.</p> <ul style="list-style-type: none"> <li>• derive integrated rate equations for zero, first order reactions.</li> <li>• Analyse the collision theory and explain the effect of temperature satisfactorily for most of the reaction.</li> </ul>	

October		<p><b>BIOMOLECULES :</b></p> <ul style="list-style-type: none"> <li>• define the biomolecules like carbohydrates, proteins and nucleic acids;</li> <li>• classification of carbohydrates, proteins, nucleic acids and vitamins on the basis of their structures</li> <li>• explain the difference between DNA and RNA.</li> </ul>	<ul style="list-style-type: none"> <li>• define the biomolecules like carbohydrates, proteins and nucleic acids</li> <li>• classify carbohydrates, proteins, nucleic acids and vitamins on the basis of their structures</li> <li>• explain the difference between DNA and RNA;</li> </ul>	<ul style="list-style-type: none"> <li>• importance of biomolecules in biosystem</li> <li>• relate the metallurgical operations going on in the factories to appreciate its role in obtaining of metals.</li> <li>• Understand the importance of resources and the elaborative procedures that it takes to obtain a piece of metal.</li> </ul>		<ul style="list-style-type: none"> <li>• define the biomolecules like carbohydrates, proteins and nucleic acids</li> <li>• classify carbohydrates, proteins, nucleic acids and vitamins on the basis of their structures</li> <li>• explain the difference between DNA and RNA of biomolecules in biosystem.</li> <li>• Understand the importance of resources and the elaborative procedures that it takes to obtain a piece of metal.</li> </ul>	<ul style="list-style-type: none"> <li>• NCERT textbook questions from the exercise and within the text.</li> </ul>
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