CHOITHRAM SCHOOL, MANIK BAGH, INDORE

ANNUAL CURRICULUM PLAN SESSION 2017 – 2018

CLASS: XI

SUBJECT:BIOLOGY

Month & Working Days	Theme/ Sub-theme	Learning Objectives		Activities &Resources	Expected Learning Outcomes	Assessment
		Subject Specific (Content Based)	Behavioural (Application based)			
June	**Theme-Diversity in the Living World** **Sub themes-Living World**	To make students understand and differentiate between Living and Non living organisms To classify different Living organism on the basis of hierarchy To familiarize with different Taxonomical Aids like Herbarium, botanical garden, Zoological museum and facilitate, identify and classify different	To emphasizeon the development of observational and analytical skills and inculcating values like Responsibility, Coordination AwarenessandConcern	1.To observe a video on various taxonomical aids 2.Group discussion on how these aids are helpful for biology students. 3.Classifying organisms on the basis of hierarchy	Analyze the importance of Zoological parks and museum in creating interest about wild life, providing education , furnishing recreation and conservation of endangered species They were able to evaluate the importance of botanical garden in educating public about country's plant wealth and stimulate people to grow more trees.	Group discussion, Classification

		organisms				
July	**Biological Classification Plant Kingdom**	Understand and describe about two, three,four,five kingdom classification. Understand and explain systematics under four heads- identification, classification Nomenclature, Taxonomy Explain and comprehend the characteristic features of different kingdom (monera, protista, fungi) with examples, their physiology and their connectivity to different kingdom Classify and describe plant kingdom under different divisions	To emphasize on development of observational, analytical skills and inculcating values like Responsibility, Coordination and Collaboration, Creativity, Awareness**,** Concerns Students will be able to- Develop team work, cooperation, concern, empathy by studying diversity in living organisms. Inculcate the value of usefulness by studying the economic importance of microbes and different organisms. Develop sensitivity, concern and empathy towards nature by studying flora and fauna . Appreciate the change	1.To study different parts of microscope and its working 2.To observe different slides of the kingdom monera and protista and comment on it 3.To observe different specimens and slides of kingdom Fungi and comment on it 4.To observe the different specimens of plant kingdom and comment on it 5.**Spotting-** To identify the given organism, classify, draw and write its significant characteristics	The learner have learnt and understood about the structure, habitat, physiology , life cycle and economic importsnce of different organisms of Kingdom- Monera, Protista, Fungi, Plant kingdom Learners have comprehended that basis of diversity is the adaptation evolved by organisms to survive in diverse environment in the face of competition for limited resources. Analyse and evaluate role of various microbes in the different products of our daily life. They were able to explore their critical thinking on systematics and were able to justify classifying different organisms on the basis of evolutionary and other relationships They were able to evaluate	Spotting Unit Test Assignment

		– thalophyta, brophyta, pteridophyta, gymnosperm and angiosperm. The students will be able to comprehend and relate how cryptogams and phanerogams plants differ in their life cycle.	in higher organisms which was due to the gradual changes in the lower organisms. Develop curosity and eagerness to find the missing links between organisms of same kingdom and connecting links between organisms of different kingdom.		that blue green algae (ancient phosynthetic prokaryotes)added oxygen to the atmosphere which helped the evolution of aerobic eukaryotes	
August	**Animal Kingdom**	Students will be able to learn, understand the concept and classify Animal kingdom under different phylum porifera, cnidaria, ctenophore, platyhelminthes, aschelminthes, annelid, mollusca, arthropoda, echinodermata, chordata. They will explore their critical thinking by Connecting the lower forms of	To emphasize on development of observational, analytical skills and inculcating values like Responsibility, Coordination and Collaboration, Creativity, Awareness**,**Concerns To emphasize on development of observational,	1.To observe the different specimens of animal kingdom and comment on it 2.**Spotting-** To identify the given organism, classify, draw and write its significant characteristics	The learner have learnt and understood about the structure, habitat, physiology , life cycle and economic importance of different organisms of Kingdom Animalia Learners have comprehended that basis of diversity is the adaptation evolved by organisms to survive in diverse environment in the face of competition for limited resources.	**Spotting**

	Digestion and Absorption – Types of Nutrition Human Digestive System Nutritional disorders	organisms to the higher forms which led to evolution. **Digestion and Absorption** To make them understand about the Digestive system and various organs related to it. To comprehend the mechanism of Digestion of Food starting with ingestion, digestion, absorption, assimilation and egestion To analyze the different enzymatic action on various food component and make them aware about different disorders of Digestive system	analytical skills and inculcating values like Responsibility, Coordination and Collaboration, Creativity, Awareness**,** Concerns Students will apply the knowledge of nutrient deficiency can cause protein deficiency disease' The learners can infer the cause of obesity due to excess of fatty food. Students will be able to Identify type of food that should be taken at morning and evening	1.To explain digestion with the help of human model and specifying the process of digestion which takes place in each part to convert complex food into the simplest one into glucose, Amino acids and fatty acid with the action of enzymes. (group activity) 2.To test the presence of protein starch and fats in the different food samples	Students understood different modes of nutrition involved in life process. 2. The learners learnt about the process of digestion in different parts of the digestive system 3.They were able to analyze that duration for digestion of fats is more than protein and carbohydrates. 3. They were able to evaluate the importance of enzymes and gastric juices in the process of digestion. 4. They were able to recognize that problem of acidity or ulcer or any other disorder is due to improper function of different organs of digestive system. .	To test the presence of protein starch and fats in the different food

	Breathing and Exchange of Gases Types of respiration Human respiratory System Disorders of Respiratory System	**Breathing and Exchange of Gases** To familiarize with different Respiratory organs To make them understand and differentiate the concept of breathing and respiration. To make them aware about the working of respiratory system To educate them with the Disorders of respiratory system To correlate them with day to day life **Photosynthesis in Higher Plants** To make them understand update with the Early Experiments To explain and	Interpret that problem of acidity is due to the presence Different gastric enzymes Analyse the role of hormones in absorption of food Interpret the causes of diseases due to hormonal deficiency **The learners analysed the formation of assimilatory power**	To prove lime water turns milky during exhalation	The learners learnt about the mechanism of respiration and different parts responsible for the respiratory system	

	Photosynthesis in Higher Plants **History of Photosynthesis** **Chloroplast and its pigments** **Process and Mechanism of Photosynthesis** **Factors Affecting Photosynthesis**	make them understand the structure of chloroplast where Light reaction takes place To make them understand the mechanism of Light reaction To make them aware and understand about Electron Transport System To enumerate the process of formation of Assimilatory Power To comprehend and analyze the C_4 pathway To make them familiarize about Photorespiration and the factors affecting photosynthesis with day to day life	**which helped in the process of photosynthesis** **The learners evaluated the essentiality of light, water and CO2 for the process of photosynthesis**	1.To observe the effect of light in photosynthesis 2.To observe the stomata in the lower and upper epidermis of leaf and find the stomatal index 3.To detect the formation of starch in different leaves 4.To prove the presence of chlorophyll by paper chromatography	The learners learnt about the mechanism of light and dark reaction in the process of photosynthesis They were able to synthesized the importance of light, water and CO2 for the light and dark reaction of photosynthesis along with the role of stomata The learners understood and analyzed the C3 -C4 cycles	Assignment .To observe the stomata in the lower and upper epidermis of leaf and find the stomatal index

October	**Locomotion and Movement** Types of movement - ciliary, flagellar, muscular; skeletal muscle-contractile proteins and muscle contraction; skeletal system and its functions; joints; disorders of muscular and skeletal system - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.	To understand different types of bones associated with various movement To make them aware of the mechanism of muscle contraction **Skeletal System** To explore the working of various joints To understand the cause of different Muscular Disorders	To apply the learning to determine the effect of contractile proteins and Ca+2 in muscle contraction. Able to differentiate between male and female bone. Able to evaluate tetany, muscular dystrophy, arthritis, osteoporosis, gout	1.Study of different types of bones and cartilage of human body by models. 2.To identify different bones of skull vertebral column, sternum, girdles, Forelimb and Hind limb from the human skeleton and comment on it. 3Role play of synovial joints with various day to day life activities.	Identify and describe the functions of the skeletal system. Distinguish between long bones, short bones, flat bones, and irregular bones and provide an example of each. Identify the parts of a typical long bone. . Identify all the bones of the appendicular skeleton on a model and on a real human skeleton with identification of individual structures within those bones Identity the bones of the skull on a real human skull and a model Compare differences between male and female skeletons, and differences between the bones of individuals at different ages Diagnose specific types of bone fractures on X-ray images Describe and diagnose	Half yearly .Study of different types of bones and cartilage of human body by models

					disorders of the skeletal system Reconstruct a skeleton from disarticulated bones (Lab) Summarize the microscopic structure of skeletal muscle tissue and the sliding filament model of muscle contraction. Describe the structure and function of the neuromuscular junction. Describe the roles of calcium (Ca^{2+}) and ATP in muscle contraction List the major risk factors for osteoporosis and its prevention.	
November	**Neural control and Coordination** Neuron and nerves; Nervous system in humans - central nervous system; peripheral nervous system and visceral	To familiarize with different parts of Neural System To study different parts of brain and their function.	Able to evaluate how information passes from one neuron to another. Analyze how an action potential is generated and propagated	To observe the reflex action in day to day life by observing sudden with drawl of body on coming in contact with hot, cold or pointed objects, jerking of knee when hit below knee cap. -Closing of eye when strong light is	Explain the general functions of the nervous system Describe the Schwann cells of the peripheral nervous system.	Spotting Unit Test Assignment To draw T.S. of Cochlea and Eye

	nervous system; generation and conduction of nerve impulse; reflex action; sensory perception; sense organs; elementary structure and functions of eye and ear. **Chemical Coordination and Integration** Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid,	To explore about Reflex Action and Arc and analyze critically its involvement with day to day life. To illustrate conduction of nerve impulse with diagram. To make them understand about the different sensory organ like eyes, ear and study the mechanism of Sensory Reception and Processing Appreciate the importance of different Endocrine glands and the hormones they secrete. To apply the learning to determine the effect of	Summarize how alcohol, nicotine, drugs, cocaine, heroin, and marijuana affect the nervous system. Recall the components of the urogenital systems, classify their control by the autonomic nervous system, and differentiate the similarities and differences of the male and female pelvis and perineum. Able to analyse how rods and cones in eye helps in identifying different colours. Able to analyse and interpret the cause of different hormonal diseases	suddenly focused on it. -Watering of mouth by seeing delicious food. -To study the defects of eye by making ray diagram of myopia (short sight) and hypermetropia (long sight) -To draw T.S. of Cochlea and Eye identify normal partial pressure gradients for oxygen and carbon dioxide in the lungs and at resting and working tissue -A case study on any disease caused due to hypo or hyper hormonal imbalance in your family/neighbor	Describe the general structure of a neuron. Explain how differences in structure and function are used to classify neurons. Explain how information passes from one neuron to another. Explain how a membrane becomes polarized. Describe the events that lead to the generation of an action potential. Compare nerve impulse conduction in myelinated and unmyelinated neurons. Identify the changes in membrane potential associated with excitatory and inhibitory neurotransmitters. Describe the function of each part of a reflex arc, and name two reflex examples. Name the major parts and functions of the brain. Distinguish among motor, sensory, and association	

	adrenal, pancreas, gonads; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease.	hypo and hyper secretion of hormones from different glands.			areas of the cerebral cortex. Distinguish between the sympathetic and parasympathetic divisions of the autonomic nervous system. Identify and describe the effects of the hormones that are released by the anterior pituitary gland. Know what stimulates their production and where they are produced. Understand how the regulation of GH, PRL, and MSH differs from that of TSH, ACTH, LH, and FSH. Describe and give an example of negative feedback inhibition in the endocrine system. Know what hormones are produced by the thyroid and what each does. Know the function(s) of PTH and in which	

	Transport in Plants Movement of water, gases and nutrients; cell to cell transport, Diffusion, facilitated diffusion, active transport; plant-water relations, Imbibition, water potential, osmosis, plasmolysis; distance transport of water - Absorption, apoplast, symplast, transpiration pull, root pressure and guttation; transpiration, opening and closing of stomata; Uptake and translocation of mineral nutrients - Transport of food, phloem transport, massflow hypothesis; diffusion of gases	To make them familiar with various terms of transportation in plants To make them understand about the long distance transport of water through transpiration pull or capillary action. To make them understand the concept of Transpiration and relate it with other physiological process like photosynthesis To make them link the importance of uptake and transport of Mineral nutrients to the leaf with the process of photosynthesis. To make them understand and analyze the mode of transportation of food through Phloem	evaluate how water and minerals move upward through the xylem and how water balance keeps plants upright. Learners can analysed why some plants may die when their roots are submerged, in water for longer time.	1.To study Osmosis (endosmosis and exosmosis) using potato osmometer. 2.To study plasmolysis and de-plasmolysis in cells 3.To determine the imbibitions percentage in raisins 4.Demonstration of path of ascent of sap. 5.Demonstration of root pressure. 6.To observe the rate of transpiration in upper and lower surface of leaves	endocrine gland this hormone is produced. Know why the pancreas is both an endocrine and exocrine gland and how its secretions are involved with the regulation of blood glucose. Will understand how water and minerals move upward through the xylem and how water balance keeps plants upright. Explain the roles of transpiration and “pushing” from water pressure in roots relative to water and mineral movement in the xylem. What are the roles of plasmodesmata and aquaporins? Describe the relationship between osmosis, energy, and water potential. What physical forces are involved in water potential? Relate root pressure to guttation. Explain the relationships among water potential, solute potential, and pressure potential.	

	Mineral Nutrition Essential minerals, macro- and micronutrients and their role; deficiency symptoms; mineral toxicity; elementary idea of hydroponics as a method to study mineral nutrition; nitrogen metabolism, nitrogen cycle, biological nitrogen fixation **Respiration in plants** Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules	evaluate the role of the endodermis and the Casparian strip in maintaining turgidity of roots. To make aware of different essential mineral nutrients for plants. To understand the mechanism of Absorption of minerals and translocation of solute To understand about nitrogen fixation biologically and through artificial source. To make the student understand the mechanism of Glycolysis and relate it with other physiological process.	Learners will be able to apply and explain the functions of minerals with reference to the techniques of hydr oponics and aeroponic analyse various deficiency symptoms of macr o and micr o nutrients Able to analyse the cause of	1.To make a slide of bacterial root nodule and observe and draw the cell. 2. Demonstration of hydrophonics growth system by providing nutrient solution. 3.To collect different leaves from school garden/house garden/road side and relate the deficiency symptom if any by nutrient deficiency of particular element. 1.To compare the rate of respiration in germinating seeds (carbohydrate, proteins and fats)	Describe the factors that regulate the rate of transpiration. Explain why phloem transport is considered a bidirectional process. What transport process is primarily responsible for transport in the phloem. Understand the importance of nutrients for plant growth Understand the roles and deficiency symptoms associated with macronutrients and micronutrients Understand the importance of Hydroponics and nutrient solution Understand the importance of soil characters with respect to nutrient availability Learn about migration of nutrients towards the rhizo Understand and be able to discuss the	

	generated; amphibolic pathways; respiratory quotient **Plant - Growth and Development** Seed germination; phases of plant growth and plant growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA; seed dormancy; vernalisation; photoperiodism	To make them differentiate between Fermentation/Anaerobic and Aerobic respiration To make the student understand about growth and Development To make them comprehend the above concepy and relate it with Differentiation, Dedifferentiation and Re-differentiation To explain and make them understand about different Plant growth regulators and their function To make them analzse growth and development with different growth regulators and its importance in day to day life.	aerobic and anaerobic respiration Evaluate the process of fermentation in daily food items differentiate between growth and development and explain growth curve; analyze the factors affecting plant growth and importance of growth regulators; differentiate among short-day plants, long-day plants and day-neutral plants;	2.To prove anaerobic respiration takes place in yeast.(alcohol fermentation) 3. To prove CO_2 is given out during respiration (aerobic) 1.To observe phototrophism in plants 2.To observe chemotrophism –growth of pollen tube in stigma 3. To observe the effect of plant growth regulators auxin* and gibberlin* in plant growth. *Auxin- Surface sterilized seeds allowed to germinate in moist filter paper. When roots of seedlings become 1cm in length root length is measured. Half seedling are grown in test solution containing auxin and half normally in moist soil.Length of the root will be observed after 48 hrs.	metabolic pathway for the catabolism of glucose. sphere Be able to identify key intermediates and the location of the key processes in cellular respiration. 3. Be able to explain the chemiosmotic mechanism of ATP synthesis. 4. Explain how glucose, fats, and proteins enter pathways for energy release. 5. Be able to describe and identify the structures of the mitochondrion. Recognize the developmental steps of a eudicot embryo and compare the function of its cotyledons to that of a	

		To make them differentiate between Photoperiodism Vernilisation	identify the effects of salt stress and water stress on plants; analyze various types of movement like geotropism, phototropism, nastic and turgor movements		cotyledon in monocots. Identify different types of fruits. Label seed structure and describe germination and dispersal.	
December	**Cell: Structure and Function** Cell theory and cell as the basic unit of life: Structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system, endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles;	To make them comprehend and to connect with the earlier understanding s about the cell and its organelle To make them understand about the Cell theory and its different Discoveries and inventions of Cell To make them differentiate between prokaryotic and eukaryotic; unicellular and multicellular To make the students able to understand about totipotant cell and	. Recognize that if substance is boiled and then kept in different concentrated solution it will not show any difference as cell are dead example boil potato does not show any change with tonicity. Relate importance of saline solution while giving injection to human.	To observe the structure of cell	understanding cell structure and function learning outcomes a student is able to: –Identify the cellular components of an animal cell –Identify the cellular components of a plant cell –State the functions of the cellular components in an animal cell –State the functions of the cellular components in a plant cell –Compare and contrast an animal cell and a plant cell –Relate the density of certain organelles with the functions of specific cells. The functions o It controls all the activities in a cell. o	Practice Questions

	mitochondria, ribosomes, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function); nucleus, nuclear membrane, chromatin, nucleolus. **Biomolecules** Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, nucleic acids, enzymes, types, properties, enzyme action. **Cell Cycle and Cell Division** Cell cycle, mitosis, meiosis and their significance.	its various application in day to day life **Biomolecules** To make them understand about the Primary and Secondary metabolites To make them understand about the structure and function of different Bio macromolecules and enzymes To relate the function of biomolecules and enzymes in day to day life **Cell cycle and Cell division** To explain the importance of cell division	Effectively and clearly communicate scientific information in written and oral form. Use library and Internet resources to gather, organize, and understand scientific information. Collect, present and analyze scientific data gathered in the laboratory. Understand basic chemistry and math and apply them to a study of the life sciences. Know the	1.To prove heat destroys the activity of enzymes and not the catalyst. 2. to prove that change of pH inhibits the enzyme activity. 1.To observe the different stages of meiosis through permanent slides 2.To prepare the onion root tip slide and to observe different stages of mitosis Students will be able to identify that cuts and wound heals due to the process of cell division They will be sensitized and will be able to apply their knowledge that genetic disorder cannot be cured. They will be analyzing that formation of one organelle facilitates the	The nuclear pores allow exchange between the nucleus and the cytoplasm. o Chromosomes in the nucleoplasma carry genetic materials which determine the characteristics and functions of a cell . able to describe the basic properties of enzymes. 2. Be able to describe the components of a metabolic pathway. 3. Understand how ATP is used in coupled reactions, and	

		To make them understand about the various stages of Mitosis in cell and relate with various examples of cell division Differentiate between amitosis and mitosis To make them understand the various phases of meiotic cell division of Meiosis I & II and relate it with the gamete formation in gonads. To evaluate and analyse the importance of meiosis in maintaining the DNA consistency of cell	structures and functions of cells. Know the structures and functions of biomolecules (DNA, proteins, lipids, carbohydrates)	formation of other organelle which will inculcate the value of coordination. They will interpret and will be able to share their opinion on evolution of self autonomous organelles like- Mitochondria and plasmid	phosphorylation. Be able to recognize oxidation/reduction reactions List the four stages of interphase, and describe the major events that occur during each stage in preparation for cell division. Describe the difference between mitosis and cytokinesis. List the checkpoints that regulate the progression of cells through the cell cycle. Explain the mechanisms within the G1 cell cycle checkpoint that evaluate growth signals, determine nutrient availability, and assess DNA integrity. Describe the structure of a eukaryotic chromosome. Define chromosome and	

					chromatid. Explain how a chromosome is duplicated. List the phases of mitosis in a eukaryotic cell, and discuss the major events that happen during each phase. Compare and contrast cytokinesis in animal and plant cells. Explain the difference between therapeutic and reproductive cloning of animals.	