CHOITHRAM SCHOOL, MANIK BAGH, INDORE

ANNUAL CURRICULUM PLAN SESSION 2020 – 2021

CLASS: XI

SUBJECT: Biotechnology

Month & Working Days	Theme/ Sub-theme	Learning Objectives		Activities &Resources	Expected Learning Outcomes	Assessment
		Subject Specific (Content Based)	Behavioural (Application based)			
May	**BIOTECHNOLOGY WITHIN YOUR REACH**	• To help the learners know and understand basic facts and concepts of the subject at elementary stage. • To expose the students to different basic processes and basic techniques used in Biotechnology • To make them understand , modern biotechnology has integrated several disciplines, varying from physics, chemistry, biology, engineering, economics, law and management • To familiarize students with the development in biotechnology field and its applications in health care and agriculture.	• To develop conceptual competence in the learners so as to cope up with professional courses in future • To acquaint students with different applications of biotechnology in everyday life • To develop an interest in students to study biotechnology as a discipline • To prescribe practical work will make the learners competent to	Instrumentation To study and perform various sterilization techniques Virtually all the above activities will be conducted also Video will be shown on aseptic conditions carried in microbiology lab https://youtu.be/nr1tV_LuqJk • Teacher will introduce student to	• List out tools, technique and instruments used in biotechnology lab. • To comprehend about various including health, agriculture and industries, • To apply he production strategies in biotech • To analyze the global	1.online worksheets 2. Half yearly exams 3. Assignments 4. lab work

		• To familiarize the learners to understand the relationship of the subject to health, nutrition,environment, agriculture, industry, etc • To study the production strategies in biotech • To know the global market of biotech products. • To understand public perception of biotechnology. • To learn scenario of biotechnology in India and global trends. • To introduce student to biotechnology lab • To comprehend about various tools and techniques used in biotechnology lab.	meet the challenges of academic as well as professional courses after studying the subject at senior secondary stage • To learn safety rules in biotechnology laboratory • To analyze the importance of aseptic environment needed in biotechnology lab. • To inculcate scientific temperament in students.	biotechnology lab. Teacher will explain structure and working of various instruments kept in biotech lab. Video will be shown on aseptic conditions carried in microbiology lab https://youtu.be/nr1tV_LuqJk Preparation of solid and liquid media Video will be shown followed by discussion https://youtu.be/UkgcptAz9IA-application of biotechnology https://youtu.be/7RpYDL5bpNsclassical	market of biotech products. • To evaluate public perception of biotechnology. • The scope biotechnology in India and global trends. • Apply sterilization technique and follow aseptic condition in biotechnology lab. • To develop conceptual competence in the learners so as to cope up with professional courses in future	

				Vs Modern biotechnology https://youtu.be/c31PGSri4_k Sterilization technique		
JUNE JULY	**GENETICS AND MOLECULAR BIOLOGY GENETICS**	• To study historical perspective • Studying of mandelian genetics • Understanding laws of inheritance ,incomplete and codominance • Concept of linkage and crossing over • Study of gene mapping and gene interaction additive and non additive effects • Understanding extranuclear and quantitative inheritance • Study of genes at the population level. • Discovery of DNA as genetic material • Understanding molecular mechanisms of mutation • Study of various DNA repair mechanisms • Analyze genetic disorders and their effect on human health • Genome organization and	• Students will learn that traits are observable characteristics that are passed down from parent to child. • An individual will have many traits they share in common with others. • An individual's overall combination of traits makes them unique. • Students will inventory their own inherited traits, they will know if they are prone to any genetical disease • Students will able to take precaution if they are prone to any genetical diseases • Illustrate some cutting-edge thinking on scientific practices	• 1.To find your own blood group by agglutation method Before experiment virtually experiment will be conducted through the video https://youtu.be/-jKzLLHjRfs • 2. To find the amount of blood glucose in a sample by GOD/ POD method Before experiment virtually experiment will be conducted through the	• To explain Mendel's principles of inheritance and apply these to problems of inheritance • Describe the different forms of inheritance patterns and identify these in genetic data • Describe various types of genetic crosses and indicate when/why they would be used by a geneticist • Explain more complex modes of inheritance and how sex influences the inheritance and expression of	1. online worksheets 2. Half yearly exams 3. Assignments 4. participation in Panel discussion 5. Lab work

August September	**MOLECULAR BIOLOGY**	difference between prokaryotic and eukaryotic genome • Understanding the molecular mechanism of DNA replication • Definition of gene and understanding how genes transcribes message to RNA • Basic process of transcription • Study of genetic code • Understanding the procedure how RNA translates into protein • Regulation of gene expression in prokaryotes and eukaryotes • Student will learn blood group determination. • Students will able to check whether the person is hypoglycaemic or Hyperglycaemic.	today with implications for science education. • Learner will to raise voice against gender discrimination • They will learn to accept the people born with genetically disorders • They will imbibe eunuchs are humans born with sexual abnormality • Students will get awarded that blood group determination is necessary before donation.	video https://youtu.be/DyGIvs9zrVA • **3.** To Prepare Karyotype and to check chromosomal abnormalities • 4. Discussion will be carried in class regarding the acceptance of eunuchs and transgender in society. • 5.observe how their trait inventories differ from those of others. Students record their observations in a data table and make a bar graph to show the most and least common traits in the group	genes (e.g. sex-influenced traits, cytoplasmic inheritance, genomic imprinting) • Use this information in predicting genetic outcomes and the analysis of genetic data • Students will be able to apply principles of heredity in assessment of pedigrees to identify genotypes of family members, conclude the mode of inheritance for a trait, and predict mating outcomes. • Compare the effect of linkage and independent assortment on genetic	

				• **After teaching concepts, animated videos of following will be shown** https://www.youtube.com/watch?v=3m3envz536A Video **https://youtu.be/gG7uCskUOrA** (DNA to ptotein) https://youtu.be/dKubyIRiN84 (DNA REPLICATION) https://youtu.be/DKgJPhvCDU8 (DNA Transcriotion https://youtu.be/2BwWavExcFI (Translation) https://youtu.be/AVuj0q4mKa8 (Lac Operon)	outcomes and assess data to determine if genes are linked or on separate chromosomes • Explain how crossing over produces recombination and use recombination frequencies to construct a genetic map • Use genetic maps to predict gamete outcomes • Describe some of the methods that can be used to place a gene on a particular chromosome (e.g. FISH) • Describe and recognize a variety of abnormalities in chromosome structure and number and explain how these anomalies	

					arise and are detected • Explain the molecular structure of chromosomes as it relates to storage, gene expression, and sequence function • Describe early studies that led to DNA as the genetic material and/or interpret results from these studies • Indicate similarities and differences molecular structure of DNA and RNA • Describe the historic experiment that demonstrated DNA replication follows a semi-conservative model • Analyze the process of DNA	

					replication in prokaryotes at the biochemical level • Explain how proofreading and repair is accomplished during DNA synthesis • describe how DNA is replicated in viruses, plasmids, and eukaryotes and identify similarities and differences between these and replication in prokaryotes • describe at the biochemical level the events that occur to go from gene to phenotype • Identify different types of RNA, note their properties, how they are processed to yield a	

					functional form, and their function in gene expression • Recognize the importance of regulating gene expression in prokaryotes and eukaryotes and describe the levels at which gene expression is controlled and the mechanisms used by prokaryotes and eukaryotes	
October November	**BIOMOLECULES**	**BIOMOLECULES** ***building blocks of biomolecules*** • To study structure and dynamics of building blocks of carbohydrate • Understanding mono and disaccharides structure • Structure, physical, chemical properties of building block of proteins-amino acids • Structure and dynamics of lipids • Study of simple fatty	• Apply the Understanding of catabolic nature of respiration and anabolic understanding of the core principles and topics of Biochemistry and their experimental basis, and to enable students to acquire a	To estimate protein by biuret method Before experiment virtually experiment will be conducted through the video https://youtu.be/ijxMMRljnjs	• Learners will understand structure and dynamics of building blocks of carbohydrateUnderstanding mono and disaccharides structure • Explore and	1. Unit test 3. Assignments

		acid, sphingosine, glycerol and cholesterol. • Structure and properties of nucleotides • To study and understand biochemical transformation study of structure of ATP • Study of glycolysis pathway and its significance • Study of Krebs cycle – amphibolic pathway • Homofermentative and heterofermentative pathways • Understanding photosynthesis processes. Diagram of chloroplast • Light reaction-Zscheme • Dark reaction- CALVIN CYCLE • Difference between C3 and C4 cycle • Definition of nitrogen fixation and study of nitrogen cycle • Understanding the activities of nitrogenase' and their utility in organic farming ***Structure and function of macromolecules*** • Difference between biomolecules and	specialized knowledge • To enable learner that biomolecule rarely works in isolation, they interact with each other to form large super molecular assemblages. • Make them understand the working of biomolecules in both health and disease • To make them aware of methods to manipulate cells and constituents for human welfare. • To make them realize how biochemical transformation take place inside living bodies which are necessary for	To isolate milk protein casein from milk Before experiment virtually experiment will be conducted through the video https://youtu.be/Agc4S5hTb6g and https://youtu.be/HN4jD2MCKfg To test various biomolecules in food sample https://youtu.be/sLP8dcnWnJg **Study of various protin sample and plot the graph of their absorbtion** • **Link of video will be shared with students regarding**	Analyze the Structure, physical, chemical properties of building block of proteins-amino acids Structure and dynamics of lipids simple fatty acid, sphingosine, glycerol and cholesterol. • Understand theStructure and properties of nucleotides and apply to synthesize structure of DNA and RNA • Understand how ATP act as reservoir of energy. • Impotanceof biochemical	

		macromolecules • Organization of monosaccharide to form polysaccharides • Study of carbohydrates as energy givers •	survival. • Fermentative potential of microorganism s can be realized and optimized for production of commercial products • Explore the enzyme nitrogenise how it helps in nitrogen fixation which can lead to organic farming • nature of photosynthesis in calculating energy Understand the role of proteins as performers • Structure of protein • Understanding sequencing strategies • Study of enzymes and their role as catalyst. • To understand why nucleic acids are called as	**cell cycle https://youtu.be/Q6ucKWIIFmg** • • **immune response** **https://youtu.be/Rpj0emEGShQ**	• Learner will understand how respiration is carried in living cell, they will get detail knowledge of glycolysis pathway and its significance Krebs cycle –amphibolic pathway • Homofermentative and heterofermentative pathways • Students will learn how plant prepare their food through photosynthesis. They will explore in length about various cycles	

			managers • To study lipids and biomembrane as barriers		involve in this process. processes. Diagram of chloroplast Light reaction- Zscheme Dark reaction- CALVIN CYCLE Difference between C3 and C4 cycle Definition of nitrogen fixation and study of nitrogen cycle Understanding the activities of nitrogenase' and their utility in organic farming Difference between biomolecules and macromolec	

					ules Organizatio n of monosaccha ride to form polysacchari des • Study of carbohydrat es as energy givers •	
December	**CELL GROWTH AND DEVELOPM ENT**	• To study cell division. • To understand the difference between mitosis and meiosis and their significance • To study cell cycle and its regulation • To understand how cell communicate with each other. • To study how internal environment is maintained within the cell. • To study immune response in humans and animals • To understand the defense mechanisms in plants	• To study cell division. • To understand the difference between mitosis and meiosis and their significance • To study cell cycle and its regulation • To understand how cell communicate with each other. • To study how internal environment is maintained within the cell. • To study immune	Lab Activity- To study mitosis through onion roots and prepare mitotic index. Before experiment virtual experiment https://youtu.be/VJ678ceiiV0 Video will be shown followed by discussion **https://youtu.be/Q6ucKWIIFmg (Cell Cycle)** **https://youtu.be/Rpj0emEGShQ(**Immune Response)	• Students learnt all organ system work together to make functional organismDe scribe cytological, biochemical , physiologica l and genetic aspects of the cell, including cellular processes common to	Unit test 3. Assignments

		• To study cell division. • To understand the difference between mitosis and meiosis and their significance • To study cell cycle and its regulation • To understand how cell communicate with each other. • To study how internal environment is maintained within the cell. • To study immune response in humans and animals • To understand the defense mechanisms in plants	response in humans and animals • To understand the defense mechanisms in plants • To study cell division. • To understand the difference between mitosis and meiosis and their significance • To study cell cycle and its regulation • To understand how cell communicate with each other. • To study how internal environment is maintained within the cell. • To study immune response in humans and animals • To understand the defense mechanisms in plants • To make them	• Link of video will be shared with students regarding cell cycle https://youtu.be/Q6ucKWIIFmg • immune response • https://youtu.be/Rpj0emEGShQ A video will be shown to students that what are different biochemical changes takes place and how does immune response works , when corona virus attacks a person https://youtu.be/5DGwOJXSxqg With the help of chart teacher will explain mitosis meiosis and immune	all cells, to all eucaryotic cells as well as processes in certain specialized cells. • Relate normal cellular structures to their functions. • Explain cellular processes and mechanisms that lead to physiological functions as well as examples of pathological state. • Apply modern cellular techniques to solve aspects of scientific problems.	

			understand various biochemical reactions which takes place as response of attack of virus, specifically coronavirus • Appreciate various defense strategies adopted by living organism • To realize every living being has some or other defense mechanism, which helps in their survival. • Begin to appreciate the significance of maintaining a state of immune tolerance sufficient to	response **Introduction of concept of Apoptosis Vs Necrosis will be done by showing animated video to students** https://youtu.be/1vaEVcMfa1E	Describe the intricate relationship between various cellular structures and their corresponding functions	

			prevent the emergence of autoimmunity.			