

ANNUAL CURRICULUM PLAN (2020--21)

SUBJECT: BIOLOGY

CLASS: 12

VISION:

- Students should be able to use science and technology to acquire new knowledge and to solve problems, so they may improve quality of their lives and the lives of others.
- Students should be able to address science related societal, economic, ethical and environmental issues critically.
- Students should be able to develop a rational sense of wonder and curiosity about scientific and technological endeavours.

APRIL-SEPTEMBER

Chapter	Transaction Strategy /Innovative Pedagogy	Learning Outcomes
<p>UNIT-6 Reproduction</p> <p>L-1 REPRODUCTION IN ORGANISMS (deleted for current session)</p> <p>-Reproduction a characteristic features of all organisms for continuation of species</p> <p>-Modes of reproduction</p> <p>-Asexual and sexual Reproduction</p> <p>-Asexual reproduction- binary fission, sporulation, budding, gemmule formation, fragmentation, vegetative propagation in plants</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion • Science play card • Mind map • Directed Activity for reading Texts • Question answers round • Testing and evaluation 	<p>The learner will be able to:</p> <ul style="list-style-type: none"> • List the basic features of sexual and asexual reproduction • Define and explain: binary fission ,sporulation, budding, fragmentation, zoospores and conidia. • Differentiate between sexual and asexual reproduction. • Explain pre fertilisation and post fertilisation events. • Describe isogametes and anisogametes • Describe parthenogenesis, external and internal fertilisation. • Enumerate post fertilisation events. • To value the importance of reproduction in organisms
<p>L-2 SEXUAL REPRODUCTION IN FLOWERING PLANTS</p> <p>Flower structure</p> <p>-Development of male and female gametophyte</p> <p>-Pollination –types ,agents and example</p> <p>-Outbreeding devices, pollen pistil interaction, double fertilisation</p> <p>-post fertilisation events- development of endosperm and embryo</p> <p>-Development of seed and formation of fruit</p> <p>Special modes- apomixis, parthenocarpy, polyembryony</p> <p>-Significance of seed dispersal</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Drawing and painting • Science play card • Mind map • Directed Activity for reading Texts • Visiting the park or garden to see how bee pollinate the flower 	<ul style="list-style-type: none"> • Describe the structure of anther as seen in cross section • Describe the process of microsporogenesis and formation of pollen grains • Describe the structure of pollen grain • Describe the structure of ovule, megasporogenesis and formation of female gametophyte • Explain different types of pollination, types of pollinating agents and adaptation that flower has for a particular pollination • Explain double fertilisation and development of endosperm • Explain the development of

<p>and fruit formation</p>	<ul style="list-style-type: none"> • Class test and evaluation • Slide making 	<p>embryo from zygote with diagrams</p> <ul style="list-style-type: none"> • Describe the types of fruits • Explain apomixis and polyembryony with suitable examples
<p>L-3: HUMAN REPRODUCTION</p> <p>-Male and Female reproductive system</p> <p>- Microscopic anatomy of testis and ovary</p> <p>-Gametogenesis- spermatogenesis and oogenesis</p> <p>-Menstrual cycle ,fertilisation</p> <p>-Embryo development upto blastocyst stage</p> <p>-implantation pregnancy and placenta formation</p> <p>-Parturition and lactation</p> <p>-</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion • Discrepant Event • Question on the basis of their prior knowledge • Investigation • Experimentation • Analysis • Testing and evaluation • Flow charts ,diagrams. Pictures, • Frequent oral and written tests 	<ul style="list-style-type: none"> • Describe the structure and functions of the parts of human male and female reproductive system. • Describe the process of spermatogenesis and oogenesis. • Describe the structure of sperm and ovum. • Explain the phases of menstrual cycle and the influence of pituitary and ovarian hormones on the different phases. • Describe the development of zygote into blastocyst and its implantation. • Describe the development of placenta and the events in pregnancy. • Describe parturition and lactation. • Prenatal and postnatal care of mother • Knowledge about menstrual cycle and the myths related to it.
<p>L-4: REPRODUCTIVE HEALTH</p> <p>-Need for reproductive health and prevention of sexually transmitted diseases(STD)</p> <p>-Birth control- need and methods</p> <p>-contraception and medical termination of pregnancy(MTP)</p> <p>-amniocentesis</p> <p>-infertility and assisted reproductive technologies- IVF, ZIFT,GIFT</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,playcard • Open discussion • Discrepant Event • Question on the basis of their prior knowledge • Oral and written test • Street play • Drama/skit 	<ul style="list-style-type: none"> • Mention the problems in human reproductive health and the strategies to build a reproductively healthy society. • Describe amniocentesis its usefulness, misuse and the reason for its statutory ban. • Enumerate the causes and effects of population explosion. • Describe the natural methods of birth control. • Describe various contraceptive methods of birth control for human male and female • Explain causative organisms of various STD and how they can be avoided. • Explain the causes of infertility and the various ART available for infertile couples to bear a child. • Awareness regarding benefits of small family • To spread the awareness and prevention of STD in society

<p>UNIT-7 Genetics and Evolution</p> <p>L-5: PRINCIPLES OF INHERITANCE AND VARIATIONS</p> <p>- Mendelian inheritance ,deviation from Mendelism- incomplete dominance, codominance, multiple allelism and inheritance of blood groups, pleiotropy, elementary idea of polygenic inheritance</p> <p>-chromosomal theory of inheritance</p> <p>-Chromosomes and genes -sex determination in humans, birds and honeybee</p> <p>-Linkage and crossing over</p> <p>-Sex linked inheritance- color blindness, haemophilia</p> <p>-Mendelian disorders in humans- thalassemia, chromosomal disorders in humans</p> <p>-Down syndrome, turner syndrome and klinefelter syndrome</p>	<ul style="list-style-type: none"> • Lecture cum Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • By using threads and sticks showing the process of crossing over • Hands on learning • Science text card • Word parts • Cross over learning • Peer to peer teaching m discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion Science play card • Question on the basis of their prior knowledge • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • Problem solving method • Hands on learning • Science text card • Word parts • Cross over learning • Peer to peer teaching • Testing and evaluation 	<ul style="list-style-type: none"> • Define the terms alleles, genes, phenotypes, genotypes, dominant, recessive, monohybrid, dihybrid cross • Describe Mendel experiment with monohybrid and dihybrid cross. • Explain the three laws of Mendel proposed from his hybridisation experiment on Garden pea plant • Explain the deviations from Mendel ratios due to incomplete dominance, codominance multiple allelism, pileotropy, polygenic inheritance. • Explain linkage as seen in drosophila by Morgan. • Explain the different mechanism of sex determination in animals. • Explain pedigree analysis and construct pedigree charts. • Explain the two categories of genetic disorders- Mendelian disorders and chromosomal disorders and distinguish between them. • Spread the awareness of incurable genetical disorders ,their diagnosis and treatment
<p>L-6: MOLECULAR BASIS OF INHERITANCE</p> <p>-Search for genetic material and DNA as genetic material</p> <p>-Structure of DNA and RNA</p> <p>-DNA packaging</p> <p>-DNA replication</p> <p>-Central dogma</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion, Science play card • DNA isolation 	<ul style="list-style-type: none"> • Describe the structure of nucleotides, nucleosides, DNA and RNA. • Define transformation and describe Griffith experiment • Describe the experiment performed by Hershey and Chase to prove DNA and the protein is the genetic material • Explain the mechanism of DNA replication • Explain the process of transcription and translation

<p>-Transcription</p> <p>-Genetic code</p> <p>-Translation</p> <p>-Gene expression and regulation</p> <p>-Lac –operon</p> <p>-Genome and human and rice genome projects</p> <p>-DNA finger printing</p>	<p>experiment</p> <ul style="list-style-type: none"> • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • Problem solving method • Hands on learning • Science text card • Word parts • Cross over learning • Peer to peer teaching • Testing and evaluation 	<ul style="list-style-type: none"> • Describe the salient features of genetic code • Explain the regulation of gene expression and operon concept • Describe human genome project and its salient features and applications • Explain DNA finger printing and its application • Solve the cases of paternity and crime related issues with DNA finger printing. • Gender equality
<p>L-7: EVOLUTION (Deleted in current session)</p> <p>-Origin of life</p> <p>-Biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences)</p> <p>-Darwin contribution, modern synthetic theory of evolution, mechanism of evolution</p> <p>-Variation(mutation and recombination) and natural selection with example</p> <p>-Types of natural selection</p> <p>-Gene flow and genetic drift</p> <p>-Hardy-Weinberg principle</p> <p>-Adaptive radiation</p> <p>-Human evolution</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,playcard • Open discussion, Science play card • Questions on the basis of their prior knowledge • Written and oral test <ul style="list-style-type: none"> • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • Problem solving method • Hands on learning • Science text card • Word parts • Cross over learning • Peer to peer teaching 	<ul style="list-style-type: none"> • Explain the origin of life and theories explaining it • Explain Darwin idea of evolution • Describe the evidence of evolution from palaeontology, embryology,biogeography ,molecular biology and anatomy • Describe divergent and convergent evolution with example • Explain the mechanism of evolution according to deVries and Darwin • Explain Hardy-Weinberg Principle and the factors affecting the genetic equilibrium • Give a brief account of evolution of plants and animals through the geological time scale • Describe the origin and evolution of man

<p>UNIT-8 –Biology in Human Welfare</p> <p>L-8: HUMAN HEALTH AND DISEASE</p> <p>-Pathogens</p> <p>-parasites causing human diseases(malaria, dengue, chickengunia, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ringworm) and their control</p> <p>-Basic concepts of immunology- vaccines</p> <p>-Cancer ,HIV and AIDS Adolescence- drug and alcohol abuse</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,playcard • Open discussion Science play card • Discrepant Event • Question on the basis of their prior knowledge • Testing and evaluation • Street play • Posters • slogans 	<ul style="list-style-type: none"> • Differentiate between infectious and non infectious diseases • Classify infectious diseases on the basis of – the type of causative agent, mode of transmission • Describe the symptoms, mode of transmission and preventive measures of the disease typhoid, pneumonia, common cold ,dengue, amoebiasis, elephantiasis and ringworm • Define immunity and classify it into- innate and acquired ,active and passive and their chracterstics • Describe the components of our immune system • Prevention from various diseases • Timely vaccination and diagnosis of diseases.
<p>L-9: STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION (deleted in current session)</p> <p>-Improvement in food production</p> <p>-Plant breeding</p> <p>-Tissue culture</p> <p>-Single cell protein</p> <p>-Biofortification</p> <p>-apiculture and animal husbandry</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning , expla nation • Quiz ,playcard • Open discussion Science play card • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • Problem solving method • Hands on learning • Science text card • Word parts • Cross over learning Peer to peer teaching • Testing and evaluation 	<ul style="list-style-type: none"> • Define animals husbandry and describe the management of farm animals like dairy farm, poultry etc • Describe the different methods of animal breeding, advantages and disadvantages of each of them • Describe bee keeping and fisheries • List the factors leading to green revolution • Describe the steps in plant breeding for disease resistance, biofortification, mutation breeding • Explain single cell protein its advantages with example • Define/explain the terms explant, totipotency of cells, tissue culture, microsporogenesis, somatic hybridisation. • List the major application of tissue culture and micropropagation • Role of various nutrients in human body • Importance of taking fortified food
<p>L-10 MICROBES IN HUMAN WELFA RE</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, 	<ul style="list-style-type: none"> • Describe how the microbes are involved in household products. • Give a brief account of the

<p>-In household food processing</p> <p>-Industrial production</p> <p>-Sewage treatment</p> <p>-Energy generation and microbes as biocontrol and biofertilizers</p> <p>-Antibiotic, production and judicious use</p>	<p>application</p> <ul style="list-style-type: none"> • Diagram, smart board, pictures • Peer to peer learning <ul style="list-style-type: none"> • Self learning, explanation • Quiz ,play card • Open discussion <p>Oral and written test</p> <ul style="list-style-type: none"> • Use of text structure <ul style="list-style-type: none"> • Day to day experience <ul style="list-style-type: none"> • Group discussion <ul style="list-style-type: none"> • Lab activity • Observation • Problem solving method • Hands on learning • Science text card <ul style="list-style-type: none"> • Word parts • Cross over learning • Peer to peer teaching <ul style="list-style-type: none"> • Testing and evaluation 	<p>history of discovery of antibiotics and the uses of antibiotics in medicinal field.</p> <ul style="list-style-type: none"> • Describe the uses of yeast in food and beverages industries. • Mention the source and uses of bioactive molecules in medical fields. • Describe the uses of microbes in sewage treatment • Describe the use of microbes in biogas production , the components of a biogas plant • Explain what biocontrol means and use of microbes as biocontrol agents. • Describe bacteria, cyanobacteria and fungi ars used as biofertilisers. • Enumerate the advantages of biocontrol and fertilisers in organic farming over the conventional chemical methods. <p style="text-align: center;">OCTOBER- DECEMBER</p>
<p>UNIT-9- Biotechnology And Its applications</p> <p>L-11: BIOTECHNOLOGY PRINCIPLES AND PROCESSES</p> <p>Genetic Engineering (Recombinant DNA Technology)</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion Science play card • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • Problem solving method 	<ul style="list-style-type: none"> • Define and explain principles of biotechnology • Mention the basic techniques in creation of recombinant DNA • Enumerate the tools of recombinant DNA technology. • Describe in detail the naming and functioning of restriction endonucleases. • Describe principles and use of gel electrophoresis. • Explain cloning vectors and the features that are required to facilitate cloning into vector • Explain need for competent host and the methods of introduction of rDNA or alien DNA into host • Describe the structure and functioning of the commonly used bioreactors and their use in

	<ul style="list-style-type: none"> • Hands on learning • Science text card • Word parts • Cross over learning • Peer to peer teaching • Testing and evaluation 	<p>producing in desired gene product</p> <ul style="list-style-type: none"> • Explain the steps and need for down stream processing.
<p>L-12: BIOTECHNOLOGY AND ITS APPLICATIONS</p> <p>-Application of biotechnology in health and agriculture</p> <p>-Human insulin and vaccine production</p> <p>-stem cell technology, gene therapy</p> <p>-Genetically modified organisms- Bt crops</p> <p>-transgenic animals</p> <p>-Bio safety issues</p> <p>-Biopiracy and patents</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,playcard • Open discussion • Science play card • Videos on concern topic • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • Problem solving method • Hands on learning • Science text card • Word parts • Cross over learning • Peer to peer teaching • Testing and evaluation 	<ul style="list-style-type: none"> • Define genetically modified organisms • Describe uses or advantages of genetically modified crops • Explain the application of biotechnology to produce pest resistant plant like Bt cotton, nematode resistant tobacco plant • Describe the steps in production of genetically engineered insulin • Explain gene therapy, its use in treatment of ADA deficiency • Describe the creation of transgenic animals and their use in producing biological products, to test vaccine safety, and chemical safety, to understand natural physiology and development • Explain the ethical issues related to biotechnology, like biopiracy and the steps taken by Indian government to check such issues. • Role of biotechnology to develop pest resistant plants and to cure various genetical disorders.
<p>UNIT-10- Ecology and Environment</p> <p>L-13: ORGANISMS AND POPULATION</p> <p>-Organisms and environment</p> <p>-habitat and Niche</p> <p>-population and ecological adaptations</p> <p>-Population interactions- mutualism, predation, parasitism</p> <p>-Population attributes- growth , birth rate, death rate, age</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, • Application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion • Science play card • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation 	<ul style="list-style-type: none"> • Define ecology and basic levels of organisation in ecology • Describe the influence of major abiotic factors on organisms and the adaptation the organisms have to live and reproduce in a given environment/habitat. • Define population and the attributes a population but not a individual organisms possesses describe the four basic processes which cause increase or decrease in population density in a given period of time • Describe the population growth models-and their growth curves along with the equations describing them • Describe the various types of

<p>distribution</p>	<ul style="list-style-type: none"> • Problem solving method • Hands on learning • Science text card • Word parts • Cross over learning Peer to peer teaching • Testing and evaluation • Flow charts • Story telling 	<p>population interaction such as predation, competition, parasitism, commensalism, mutualism and ammensalism along with suitable examples</p> <ul style="list-style-type: none"> • Inter dependence of plants and animals on each others • Impotance of each plant and animal species
<p>L-14: ECOSYSTEM (deleted for current session) Ecosystems; patterns , components</p> <p>-productivity and decomposition -energy flow</p> <p>-Pyramids of number, biomass, energy</p> <p>-nutrient cycling (carbon and phosphorus)</p> <p>-Ecological succession</p> <p>-Ecological services, carbon fixation, pollination, seed dispersal, oxygen release</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion Science play card • Oral and written test • Observations • Field trips • Lab activity 	<ul style="list-style-type: none"> • Define and classify ecosystem • Describe structure and basic functions of ecosystem • Define productivity, primary productivity, secondary productivity and differentiate between them • Define and describe the process in decomposition • Describe energy flow in an ecosystem • Differentiate between grazing and detritus food chain • Define and describe different types of ecological prramids and their limitations • Describe ecological succession, its types- hydrach and xerach succession and differentiate between them • Define standing state, biogeochemical cycles, their types(gaseous and sedimentary) • Describe the carbon and phosphorus cycles operating in nature • Enumerate and describe ecosystem services • Importance of plants and animals for survival of human beings.
<p>L-15: BIODIVERSITY AND CONSERVATION</p> <p>Biodiversity-Concept</p> <p>-Patterns, importance, loss of biodiversity</p> <p>-Biodiversity conservation</p> <p>-Hotspots</p> <p>-Endangered organisms</p> <p>-Extinction</p> <p>-Red data book</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, • Application • Diagram, smart board, pictures • Peer to peer learning • Self learning, explanation • Quiz ,play card • Open discussion Science play card • Observations • Project work • Testing and evaluation 	<ul style="list-style-type: none"> • Define biodiversity and the diversity at all levels of biological organisation • Describe the patterns of biodiversity • Explain the species – area relationship • Mention the importance of species diversity to ecosystem functioning • Enumerate cause and effects of loss of biodiversity • Explain the three kinds of arguments for the conservation of biodiversity • Describe the two major approaches(in-situ and ex-situ)

<p>-Biosphere reserves</p> <p>-National parks, sanctuaries and Ramsar sites</p>	<ul style="list-style-type: none"> • Skit/drama • Poster making • Visiting biosphere reserve 	<p>for conservation biodiversity with examples</p> <ul style="list-style-type: none"> • Describe convention on biodiversity • Importance of each organism for maintaining balance in ecosystem.
<p>L-16:ENVIRONMENTAL ISSUES (deleted for current session)</p> <p>-Air pollution and its control</p> <p>-water pollution and its control</p> <p>-agrochemicals and their effects</p> <p>-Solid waste management</p> <p>-Greenhouse effect and climate change impact and mitigation</p> <p>-Ozone layer depletion</p> <p>-Deforestation</p> <p>-Any one case study as success story addressing environmental issues</p>	<ul style="list-style-type: none"> • Lecture cum discussion, chalk board, analysis, application • Diagram, smart board, pictures • Peer to peer learning <p>Self learning, explanation</p> <ul style="list-style-type: none"> • Quiz ,playcard • Open discussion • Project work • Field trips <ul style="list-style-type: none"> • Use of text structure • Day to day experience • Group discussion • Lab activity • Observation • Problem solving method • Hands on learning • Science text card • Word parts • Cross over learning <p>Peer to peer teaching</p> <ul style="list-style-type: none"> • Testing and evaluation 	<ul style="list-style-type: none"> • Define pollution and pollutants • Enumerate cause and effects of air pollution on living organisms • Describe the use of electrostatic precipitators and scrubbers in removal of pollutant from industrial exhaust • Enumerate the steps taken by Delhi Government to reduce vehicular air pollution and its effects on the atmosphere • Describe the major pollutant in sewage water and their effects on aquatic organisms • Describe algal bloom, eutrophication and biomagnification • Describe the ways and means to reduce production of solid waste and methods to dispose them • Define e-waste, and their disposal in developed and developing countries • Describe the green house gases, green house effects and global warming, its effects on environment and living organisms. • Explain the importance of ozone layer in stratosphere, its depletion(causes and effects) and the national and international efforts to reduce emission of ozone- depleting substances • Enumerate the cause and ill effects of deforestation, and the methods to conserve forest alongwith example of human participation in the process of conservation of forests.

