

<b>EVALUATION SCHEME</b>		
<b>Theory</b>		
<b>Units</b>	<b>Title</b>	<b>Marks</b>
<b>VI</b>	<b>Reproduction</b>	<b>16</b>
<b>VII</b>	<b>Genetics and Evolution</b>	<b>20</b>
<b>VIII</b>	<b>Biology and Human Welfare</b>	<b>12</b>
<b>IX</b>	<b>Biotechnology and its Applications</b>	<b>12</b>
<b>X</b>	<b>Ecology and Environment</b>	<b>10</b>
<b>Total (Theory)</b>		<b>70</b>
<b>Total (Practical )</b>		<b>30</b>
<b>Total (Theory+Practical)</b>		<b>100</b>

Unit/ Month	Chapter name / Learning Outcome	Practical and Competency Skill Based Activities/ Experiential Learning	Skills	Assessments
<b>Unit 1:</b> <b>(April-May)</b>	<p><b>Reproduction</b>  <b>Sexual reproduction in flowering plants:</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>Describe:- Flower structure; development of male and female gametophytes.</li> <li>Categorize:- pollination - types, agencies and examples; outbreeding devices, pollen-pistil interaction.</li> <li>Explain:- double fertilization; post fertilization events - development of endosperm and embryo.</li> <li>Analyze:- development of seed and formation of fruit; special modes - apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.</li> </ul> <p><b>Human Reproduction:</b>  Students will be able to:</p> <ul style="list-style-type: none"> <li>Describe:- Male and female reproductive systems; microscopic anatomy of testis and ovary.</li> <li>Explain:- gametogenesis - spermatogenesis and oogenesis; menstrual cycle; fertilization, embryo development upto blastocyst formation, implantation.</li> <li>Illustrate:- pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).</li> </ul> <p><b>Reproductive health:</b>  Students will be able to:</p> <ul style="list-style-type: none"> <li>Discuss the need for reproductive health and prevention of sexually transmitted diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP)</li> <li>Explain amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).</li> </ul>	<p>Prepare a temporary mount to observe pollen germination.  Study/observation of following Flower adapted to pollination by different agencies (Wind/Insects/birds)  Prepare a temporary mount of onion root tip to study mitosis  Controlled pollination - emasculation, tagging and bagging.</p> <p>Identification of stages of gamete development i.e TS of testis and TS of ovary through permanent slides.</p> <p>Meiosis in onion bud cell or grasshopper testis through permanent slide</p> <p>TS of blastula through permanent slides</p> <p>Interaction/ Visit to a gynecologist</p>	<p>Cognitive skills:  Critical thinking, problem solving, observation and analysis, research skills  Practical and technical skills:  Experimentation  Communication skills: Scientific communication, teamwork, listening and interpretation  Emotional and social development:  Curiosity and exploration, patience and perseverance, responsibility and ethics  Academic and career readiness:  Preparation for STEM careers.</p>	<p>Oral Test/  Class test/  Quizzes / lab activity</p>
<b>Unit 2</b> <b>(June- July)</b>	<p><b>Genetics and Evolution</b>  <b>Principles of Inheritance and Variation:</b>  Students will be able to:</p> <ul style="list-style-type: none"> <li>Explain: Heredity and variation: Mendelian inheritance; deviations from Mendelism - incomplete dominance, codominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance</li> </ul>	<p>Prepare a pedigree chart of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colour blindness.</p> <p>Mendelian inheritance using seeds of different colour/sizes of any plant.</p>	<p>Cognitive skills:  Critical thinking, problem solving, observation and analysis, research skills  Practical and technical skills:  Experimentation  Communication</p>	<p>Oral Test/  Class test/  Quizzes / lab activity</p>

	<ul style="list-style-type: none"> <li>Justify: chromosome theory of inheritance; chromosomes and genes; Sex determination - in humans, birds and honey bee; linkage and crossing over; sex linked inheritance - haemophilia, colour blindness.</li> <li>Analyze: Mendelian disorders in humans - Thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.</li> </ul> <p><b>Molecular basis of inheritance:</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>Describe - Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication.</li> <li>Explain - Central dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; genome and human and rice genome projects; DNA fingerprinting.</li> </ul> <p><b>Evolution:</b> Student will be able to:</p> <ul style="list-style-type: none"> <li>Infer Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences).</li> <li>Describe Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples.</li> <li>Categorize types of natural selection.</li> <li>Explain Gene flow and genetic drift; Hardy - Weinberg's principle; adaptive radiation; human evolution.</li> </ul>	<p>Construct structure of DNA and RNA</p> <p>Flash cards models showing examples of homologous and analogous organs.</p>	<p>skills: Scientific communication, teamwork, listening and interpretation Emotional and social development: Curiosity and exploration, patience and perseverance Academic and career readiness: Interdisciplinary learning, preparation for STEM careers</p>	
<p><b>Unit 3 (Aug-Sep)</b></p>	<p><b>Biology and Human Welfare</b> <b>Human health and disease:</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>Discuss Health and disease, Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ringworm) and their control.</li> <li>Explain: Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence, drug and alcohol abuse.</li> </ul>	<p>Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, Roundworm through permanent slides or specimens. Comment on symptoms of disease that they cause.</p>	<p>Curiosity and exploration Academic and career readiness: Preparation for STEM careers</p> <p>Cognitive skills: Critical thinking, problem solving, observation and analysis, research skills Practical and</p>	<p>Oral Test/ Class test/ Quizzes / lab activity</p>

<p><b>Unit 4 (Oct)</b></p>	<p><b>Microbes in human welfare:</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Explain : In household food processing,</li> <li>● Categorize: industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers. Antibiotics; production and judicious use.</li> </ul> <p><b>Biotechnology: Principles and processes of biotechnology:</b> Students will be able to :</p> <ul style="list-style-type: none"> <li>● Explain-Genetic Engineering (Recombinant DNA Technology).</li> </ul> <p><b>Biotechnology and Its Applications:</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Illustrate Application of biotechnology in health and agriculture: Human insulin and vaccine production, stem cell technology, gene therapy;</li> <li>● Categorize; genetically modified organisms - Bt crops; transgenic animals; biosafety issues, biopiracy and patents.</li> </ul>	<p>Visit to STP</p> <p>Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.</p>	<p>technical skills: Experimentation Communication skills: Scientific communication, Team work, listening and interpretation Emotional and social development: Curiosity and exploration, responsibility and ethics , patience and perseverance</p> <p>Academic and career readiness: Interdisciplinary learning, preparation for STEM careers.</p>	<p>Oral Test/ Class test/ Quizzes / lab activity</p>
<p><b>Unit 5 (Nov)</b></p>	<p><b>Ecology and Environment Organism and population:</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Define Organisms and environment, Habitat and niche.</li> <li>● Categorize: population and ecological adaptations; population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution.</li> </ul> <p><b>Ecosystem:</b> Students will be able to</p> <ul style="list-style-type: none"> <li>● Classify Ecosystems: Patterns, components; productivity and decomposition; energy flow.</li> <li>● Compare pyramids of number, biomass, and energy</li> </ul>	<p>Plant population density and frequency by quadrat method</p> <p>Models specimen showing symbolic association in root modules of leguminous plants, Cuscuta on host, lichens.</p>	<p>Cognitive skills: Critical thinking, problem solving, observation and analysis, research skills Practical and technical skills: Experimentation , data collection and recording. Communication skills: Scientific communication, team work, listening and interpretation Emotional and social development: Curiosity and exploration,</p>	<p>Oral Test/ Class test/ Quizzes / lab activity</p>

	<p><b>Biodiversity and its conservation:</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>• Discuss-Concept of biodiversity.</li> <li>• Categorize-patterns of biodiversity; importance of biodiversity; loss of biodiversity; biodiversity conservation.</li> <li>• Define hotspots, endangered organisms, extinction.</li> <li>• Describe Red Data Book, biosphere reserves, national parks, sanctuaries and Ramsar sites.</li> </ul>		<p>responsibility and ethics, patience and perseverance Academic and career readiness: Preparation for STEM careers</p>	
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### PRACTICALS

**Time: 03 Hours**

**Max. Marks: 30**

Evaluation Scheme		Marks
One Major Experiment		<b>5</b>
One Minor Experiment		<b>4</b>
Slide Preparation		<b>5</b>
Spotting		<b>7</b>
Practical Record + Viva Voce	(Credit to the students' work over the academic session may be given)	<b>4</b>
Investigatory Project and its Project Record + Viva Voce		<b>5</b>
<b>Total</b>		<b>30</b>