Curriculum
Subject: Biology (044)
Class: XII
Session: 2024-25

EVALUATION SCHEME		
Theory		
Units	**Title**	**Marks**
VI	Reproduction: Chapter - 2, 3 and 4	16
VII	Genetics and Evolution: Chapter – 5,6 and 7	20
VIII	Biology and Human Welfare: Chapter – 8 and 10	12
IX	Biotechnology and its Applications: Chapter – 11 and 12	12
X	Ecology and Environment: Chapter – 13,14 and 15	10
Total		**70**

Unit/ Month	Name of the chapter	Practical and Competency Skill Based Activities/ Experiential Learning	Skills	Assessments
Unit VI: (April-May)	**Reproduction** **Reproduction in organisms: Sexual reproduction in flowering plants:** Students will be able to: ● Describe:- Flower structure; development of male and female gametophytes; ● Categorize:- pollination - types, agencies and examples; outbreeding devices; pollen-pistil interaction; ● Explain:- double fertilization; post fertilization events - development of endosperm and embryo, ● Analyze: - development of seed and formation of fruit; special modes - apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation. **Human Reproduction:** Students will be able to: ● Describe:- Male and female reproductive systems; microscopic anatomy of testis and ovary; ● Explain:- gametogenesis - spermatogenesis and oogenesis; menstrual cycle; fertilization, embryo development upto blastocyst formation, implantation; ● Illustrate: - pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea. **Reproductive health**: Students will be able to: Understand: Need for reproductive health and prevention of sexually transmitted diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).	● Prepare a temporary mount to observe pollen germination. ● Study/observation of following Flower adapted to pollination by different agencies (Wind/Insects/Birds) Controlled pollination - emasculation, tagging and bagging. Identification of stages of gamete development i.e. TS of testis and TS of ovary through permanent slides. Meiosis in onion bud cell or grasshopper testis through permanent slide TS of blastula through permanent slides **Visit to Gynecologist**	Knowledge, Understanding, Application, Analysis and Evaluation	Oral Test/ Class test/ Quizzes / Lab activity

Unit VII (June-July)	**Genetics and Evolution** Students will be able to: ● 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; ● 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; ● Analyze: Mendelian disorders in humans - Thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes. **Molecular basis of inheritance:** Students will be able to: Understand-Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Explain-Central dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; genome and human and rice genome projects; DNA fingerprinting. **Evolution** Student will able to: Understand Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, . Categorize, types of natural selection; .Explain, Gene flow and genetic drift; Hardy - Weinberg's principle; adaptive radiation; human evolution.	● Prepare a pedigree chart of any one of the genetic trades such as rolling of tongue, blood groups, ear lobes, widows peak and colour blindness. ● Mendelian inheritance using seeds of different colour/sizes of any plant. ● Prepare a temporary mount of onion root tip to study mitosis Flash cards models showing examples of homologous and analogous organs.	Knowledge, Understanding, Application, Analysis and Evaluation	Oral Test/ Class test/ Quizzes / Lab activity
Unit VIII (Aug-Sep)	**Biology and Human Welfare** **Human health and disease** Students will be able to: ● Understand: Health and disease: Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ringworm) and their control; ● Explain: Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence, drug and alcohol abuse. **Microbes in human welfare**: Students will be able to: Explain : In household food processing, ● Categorize: industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers. Antibiotics; production and judicious use. **Biotechnology: Principles and processes of biotechnology:** Students will be able to : Explain-Genetic Engineering (Recombinant DNA Technology).	● Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, and Roundworm through permanent slides or specimens. Comment on symptoms of disease that they cause. **Field trip to Water Sewage Treatment Plant** **Field trip to Fermenta Biotech**	Knowledge, Understanding, Application, Analysis and Evaluation	Oral Test/ Class test/ Quizzes / Lab activity
Unit IX (Oct)	**Biotechnology and Its Applications:** Students will be able to: Application of biotechnology in health and agriculture: Human insulin and vaccine production, stem cell technology, gene therapy; ● Categorize; genetically modified organisms - Bt crops; transgenic animals; biosafety issues, biopiracy and patents.	Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.	Knowledge, Understanding, Application, Analysis and Evaluation	Oral Test/ Class test/ Quizzes / Lab activity

Unit X (Nov)	**Ecology and Environment** **Organism and population** Students will be able to: ● Understand: Organisms and environment: Habitat and niche, ● Categorize: population and ecological adaptations; population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution. **Ecosystem** Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy (Topics excluded: Ecological Succession and Nutrient Cycles) **Biodiversity and its conservation**: Students will be able to: Understand-Concept of biodiversity; Categorize-patterns of biodiversity; importance of biodiversity; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, national parks, sanctuaries and Ramsar sites.	• Plant population density and frequency by quadrat method • Models specimen showing symbolic association in root modules of leguminous plants, Cuscuta on host, lichens. **Field trip to Great Himalayan National Park**	Knowledge, Understanding, Application, Analysis and Evaluation	Oral Test/ Class test/ Quizzes / Lab activity

PRACTICAL

Sr. No.	Evaluation Scheme		Marks
1	One Major Experiment		**5**
2	One Minor Experiment		**4**
3	Slide Preparation		**5**
4	Spotting		**7**
5	Practical Record + Viva Voce	(Credit to the students' work over the academic session may be given)	**4**
6	Investigatory Project and its Project Record + Viva Voce		**5**
	Total		**30**

Sr. No.	Book	Publisher
1	Text Book of Biology	NCERT
2	Lab Manual	Evergreen