

# NBSE Class 12 Biology Syllabus

## CLASS - XII BIOLOGY (Theory)

Unit-wise weightage

Theory Paper

Time: 3 Hrs.

Marks: 70

Unit	Marks
I. Reproduction	14
II. Genetic and Evolution	20
III. Biology and Human Welfare	12
IV. Biotechnology and Its Applications	10
V. Ecology and Environment	14
<b>Total</b>	<b>70</b>

**Part – A: External**

**Unit 1. Reproduction**

**35 Periods/14marks**

**Section A:**

**17 Periods/7 marks**

*Reproduction in organisms:* Reproduction, a characteristic feature of all organisms for continuation of species; Modes of reproduction- Asexual and sexual; Asexual reproduction; Modes- Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants.

Sexual reproduction in flowering plants: Flower structure; Development of male and female gametophytes; Pollination- types, agencies and examples; Outbreedings devices; Pollen- Pistil interaction; Double fertilization; Post fertilization events- Development of endosperm and embryo, Development of seed and formation of fruit; Special modes- apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation.

**Section B:**

**18 Periods/7 marks**

*Human Reproduction:* Male and female reproductive system; Microscopic anatomy of testis and ovary; Gametogenesis- spermatogenesis & oogenesis; Menstrual cycle; Fertilization, embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (elementary idea); Lactation (Elementary idea).

*Reproductive health:* Need for reproductive health and prevention of sexually transmitted diseases (STD); 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).

**Unit II. Genetics and Evolution**

**45 Periods/20marks**

**Section A:**

**15 Periods/9 marks**

*Molecular Basis of Inheritance:* Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central dogma; Transcription, genetic code, translation; Gene expression and regulation- Lac Operon.

**Section B:**

**30 Periods/11 marks**

*Heredity and variation:* Mendelian Inheritance; Deviations from Mendelism- Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy; Elementary idea of polygenic inheritance; Chromosome theory of inheritance; Chromosomes and genes; Sex determination- In humans, birds, honeybee; Linkage and crossing over; Sex linked inheritance- Haemophilia, Colour blindness; Mendelian

disorders in humans- Thalassemia; Chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes. Genome and human genome project; DNA finger printing.

*Evolution:* Origin of life; Biological evolution and evidences for biological evolution (Paleontological, comparative anatomy, embryology and molecular evidence); Darwin's contribution, Modern Synthetic theory of Evolution; Mechanism of evolution- Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection; Gene flow and genetic drift; Hardy-Weinberg's Principle; Adaptive Radiation; Human evolution.

**Unit III. Biology and Human Welfare**

**35 Periods/12 marks**

**Section A:**

**10 Periods/4 marks**

*Improvement in food production:* Plant breeding, tissue culture, single cell protein, Biofortification;

**Section B:**

**25 Periods/8 marks**

*Health and Disease:* Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concept of immunology- vaccines, Cancer, HIV and AIDS, Adolescence, drug and alcohol abuse.

*Microbes in human welfare:* In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers. Apiculture and Animal husbandry.

**Unit IV. Biotechnology and Its Applications**

**30 Periods/10 marks**

**Section A:**

**10 Periods/5 marks**

*Principles and process of Biotechnology:* Genetic engineering (Recombinant DNA technology), Bt crops.

**Section B:**

**20 Periods/5 marks**

*Application of Biotechnology in health and agriculture:* Human insulin and vaccine production, gene therapy; Genetically modified organisms- Transgenic Animals; Biosafety issues- Biopiracy and patents.

**Unit V. Ecology and environment**

**35 Periods/14 marks**

**Section A:**

**27 Periods/10 marks**

*Ecosystems:* Patterns, components, productivity and decomposition; Energy flow; Pyramids of number, biomass, energy; Nutrient cycling (carbon and phosphorous); Ecological succession; Ecological Services- Carbon fixation, pollination, oxygen release.

*Biodiversity and its conservation:* Concept of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation; Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries.

*Environmental issues:* Air pollution and its control; Water pollution and its control; Agrochemicals and their effects; Solid waste management; Radioactive waste management, Greenhouse effect and global warming; Ozone depletion; Deforestation; Any three case studies as success stories addressing environmental issues.

**Section B:**

**8 Periods/4 marks**

*Organisms and environment:* Habitat and niche; Population and ecological adaptations; Population interactions- mutualism, competition, predation, parasitism; Population attributes- growth, birth rate and death rate, age distribution.

**Part – B: Internal (Practical)**

<b>Unit-wise weightage</b>		<b>Time: 3 Hrs.</b>	<b>Marks: 30</b>
<b>Unit</b>			<b>Marks</b>
I.	Two experiments		4+4=8
II.	Slide preparation		5
III.	Spotting		7
IV.	Investigatory project and viva based on the project		5
V.	Record and viva based on the experiment		5
<b>Total</b>			<b>30</b>

**PRACTICALS****List of Experiments****60 Periods**

1. Study pollen germination on a slide.
2. Collect and study soil from at least two different sites and study them for texture, moisture content, pH and water holding capacity of soil. Correlate with the kinds of plants found in them.
3. Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organisms.
4. Study the presence of suspended particulate matter in air at the two widely different sites.
5. Study of plant population density by quadrat method.
6. Study of plant population frequency by quadrat method.
7. Prepare a temporary mount of onion root tip to study mitosis.
8. To study the effect of the different temperatures and three different pH on the activity of salivary amylase on starch.

**Study/observation of the following (Spotting)**

1. Flowers adapted to pollination by different agencies (wind, insect).
2. Pollen germination on stigma through a permanent slide.
3. Identification of stages of gamete development i.e. T.S. testis and T.S. ovary through permanent slides (from any mammal).
4. Meiosis in onion bud cell or grasshopper testis through permanent slides.
5. T.S. of blastula through permanent slides.
6. Mendelian inheritance using seeds of different colour/size of any plant.
7. Prepared pedigree charts of genetic traits such as rolling of tongue, blood groups, widow's peak, colour blindness.
8. Exercise on controlled pollination- Emasculation, tagging and bagging.
9. Identification of common disease causing organisms like Ascaris, Entamoeba, Plasmodium, ringworm through permanent slides or specimens. Comment on symptoms of diseases that they cause.
10. Two plants and two animals found in xerophytic conditions. Comment upon their morphological adaptations.
11. Plants and animals found in aquatic conditions. Comments upon their morphological adaptations.

**Prescribed text book:**

1. *Biology Class- XII* by *Veer Bala Rastogi*, - *Srijan Publishers Private Limited*  
*Plot No.10, 1<sup>st</sup> Floor, Vishal Market Commercial Complex,*  
*West Mukherjee Nagar, Delhi – 110 009*
2. *Biology Laboratory Manual Class - XII* - *Academic Publishers, Kohima – 797001,*  
*Nagaland*