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Class 12th - Biology

1. Reproduction in Organisms

- Asexual reproduction
- Sexual reproduction
  - Pre-fertilisation event
  - Fertilisation
  - Post-fertilisation events

2. Sexual Reproduction in Flowering Plants

- Flower – a fascinating organ of angiosperms
- Pre-fertilisation: structures and events
  - Stamen, Microsporangium and Pollen Grain
  - The Pistil, Megasporangium(ovule) and Embryo sac
  - Pollination
- Double fertilisation
- Post-fertilisation : structures and events
  - Endosperm
  - Embryo
  - Seed
- Apomixis and polyembryony

3. Human Reproduction

- THE MALE REPRODUCTIVE SYSTEM
- THE FEMALE REPRODUCTIVE SYSTEM
- GAMETOGENESIS
- MENSTRUAL CYCLE

- FERTILISATION AND IMPLANTATION
- PREGNANCY AND EMBRYONIC DEVELOPMENT
- PARTURITION AND LACTATION

4. Reproductive Health

- REPRODUCTIVE HEALTH – PROBLEMS AND
- STRATEGIES
- POPULATION STABILISATION AND BIRTH CONTROL
- MEDICAL TERMINATION OF PREGNANCY (MTP)
- SEXUALLY TRANSMITTED INFECTIONS (STIS)
- INFERTILITY

5. Principles of Inheritance and Variation

- Mendel's laws of inheritance
- Inheritance of one gene
    - Law of Dominance
    - Law of Segregation
- Inheritance of two genes
    - Law of Independent Assortment
    - Law of Independent Assortment
    - Linkage and Recombination
- Polygenic inheritance
- Pleiotropy
- Sex determination
    - Sex Determination in Humans
    - Sex Determination in Honey Bee
- Mutation
- Genetic disorders

- Pedigree Analysis
- Mendelian Disorders
- Chromosomal Disorders

6. Molecular Basis of Inheritance

- THE DNA
  - Structure of Polynucleotide Chain
  - Packaging of DNA Helix
- The search for genetic material
  - The Genetic Material is DNA
  - Properties of Genetic Material (DNA versus RNA)
- RNA world
- Replication
  - The Experimental Proof
  - The Machinery and the Enzymes
- Transcription
  - Transcription Unit
  - Transcription Unit and the Gene
  - Types of RNA and the process of Transcription
- Genetic code
  - Mutations and Genetic Code
  - TRNA– the Adapter Molecule
- Translation
- Regulation of gene expression
  - The Lac operon
- Human genome project
  - Salient Features of Human Genome
  - Applications and Future Challenges

- DNA fingerprinting

7. Evolution

- Origin of life
- Evolution of life forms – a theory
- What are the evidences for evolution?
- What is adaptive radiation?
- Biological evolution
- Mechanism of evolution
- Hardy- weinberg principle
- A brief account of evolution
- Origin and evolution of man

8. Human Health and Disease

- Common diseases in humans
- Immunity
    - Innate Immunity
    - Acquired Immunity
    - Active and Passive Immunity
    - Vaccination and Immunisation
    - Allergies
    - Auto Immunity
    - Immune System in the Body
- Aids
- Cancer
- Drugs and alcohol abuse
    - Adolescence and Drug/Alcohol Abuse
    - Addiction and Dependence

- Effects of Drug/Alcohol Abuse
- Prevention and Control

9. STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION

- Animal husbandry
  - Management of Farms and Farm Animals
  - Animal Breeding
  - Bee-keeping
  - Fisheries
- Plant breeding
  - What is Plant Breeding?
  - Plant Breeding for Disease Resistance
  - Plant Breeding for Developing Resistance
  - to Insect Pests
  - Plant Breeding for Improved Food Quality
- Single cell protein (SCP)
- Tissue culture

10. Microbes in Human Welfare

- Microbes in household products
- Microbes in industrial products
  - Fermented Beverages
  - Antibiotics
  - Chemicals, Enzymes and other Bioactive Molecules
  - Microbes in sewage treatment
  - Microbes in production of biogas
  - Microbes as biocontrol agents
  - Microbes as biofertilisers

11. Biotechnology: Principles and Processes

- Principles of biotechnology
- Tools of recombinant DNA technology
    - Restriction enzymes
    - Cloning Vectors
    - Competent Host (For Transformation with
    - Recombinant DNA)
- PROCESSES OF RECOMBINANT DNA TECHNOLOGY
    - Isolation of the Genetic Material (DNA)
    - Cutting of DNA at Specific Locations
    - Amplification of Gene of Interest using PCR
    - Insertion of Recombinant DNA into the Host
    - Cell/Organism
    - Obtaining the Foreign Gene Product
    - Downstream Processing

12. Biotechnology and its Applications

- Biotechnological applications in
- Agriculture
- Biotechnological applications in medicine
    - Genetically Engineered Insulin
    - Gene Therapy
    - Molecular Diagnosis
- Transgenic animals
- Ethical issues

13. Organisms and Populations

- Organism and its environment
    - Major Abiotic Factors
    - Responses to Abiotic Factors

    - Adaptations
- Populations
    - Population Attributes
    - Population Growth
    - Life History Variation
    - Population Interactions

14. Ecosystem

- Ecosystem – structure and function
- Productivity
- Decomposition
- Energy flow
- Ecological pyramids
- Ecological pyramids
    - Succession of Plants
- Nutrient cycling
    - Ecosystem – Carbon Cycle
    - Ecosystem – Phosphorus Cycle
- Ecosystem services

15. Biodiversity and Conservation

- BIODIVERSITY
    - How Many Species are there on Earth and How Many in India?
    - Patterns of Biodiversity
    - The importance of Species Diversity to the Ecosystem
    - Loss of Biodiversity
- BIODIVERSITY CONSERVATION
    - Why Should We Conserve Biodiversity?

- How do we conserve Biodiversity?

16. Environmental Issues

- AIR POLLUTION AND ITS CONTROL
  - Controlling Vehicular Air Pollution: A Case Study of Delhi
- WATER POLLUTION AND ITS CONTROL
  - Domestic Sewage and Industrial Effluents
  - A Case Study of Integrated Waste Water Treatment
- SOLID WASTES
  - Case Study of Remedy for Plastic Waste
- AGRO-CHEMICALS AND THEIR EFFECTS
  - Case Study of Organic Farming
- RADIOACTIVE WASTES
- GREENHOUSE EFFECT AND GLOBAL WARMING
- OZONE DEPLETION IN THE STRATOSPHERE
- DEGRADATION BY IMPROPER RESOURCE UTILISATION
- AND MAINTENANCE
- DEFORESTATION
  - Case Study of People's Participation in Conservation of Forests