



J. NATURAL SCIENCE

80 Questions

1 Living world

Characteristics of living things - Classification - Binomial nomenclature - Taxonomical aids

2. Biological Classification

History - Two kingdom classification - Five Kingdom Classification - Different Kingdoms- Characteristics, Examples -Lichens and Viruses

3. Plant Kingdom

Algae - Bryophytes - Pteridophytes - Gymnosperms - Angiosperms - Life Cycle-types

4. Animal Kingdom

Non chordates - Chordates

5. Morphology of Angiosperms

Root System- Structure, Function and Modifications with examples -Shoot system - Structure, function and modification with examples - Leaf - Arrangement, Modifications - Flower - Inflorescence - Fruits and seeds

6. Cell and Cell Division

Cell - Structure and functions of different organanelles - Mitosis, Meiosis and significance.

7. Anatomy of plants

Cell, tissues, types of tissues and function - Anatomy of stem, Root and leaf - 2o thickening in Dicotplants.

8. Human Physiology

Nutrition in human and other organism, eg: Hydra, Amoeba, Tapeworm - Human digestion and absorption - Human Respiratory system - Human Respiratory pathway CO₂ elimination, Respiration in other organisms, eg: Earthworm, Cockroach - Circulatory system - Open and closed system - Human heart - Human circulatory system - Human blood - Lymph - Human cardio vascular disorders - Excretory system and excretion - Excretion in lower organisms - Body structure and movement - Human skeletal system - Exo skeletan and endo skeleton - Joints - Locomotion in lower forms of organisms - Flight adaptation of birds - Aquatic adaptations of fishes - Human Nervous systems - Central and peripheral nervous system - Reflex action - Sense organs and functions - Nervous disorders - Nervous system of lower groups organisms - Reproductive system - Sexual and asexual reproduction - Human reproductive system - Gametogenesis - Fertilisation - Embryogenesis - Hormones in reproduction - Reproduction in lower group organisms - Infertility - Assisted reproductive techniques - Chemical Co-ordination - Hormones, Pheromones.

9. Reproductive Health

Population Explosion - Contraceptive - Assisted Reproductive techniques - Sexually transmitted diseases.



10. Human Health and diseases

Common diseases in humans - Transmission of diseases - Physical, mental and social health - Importance of balanced diet - Deficiency disorders - Life style diseases - Malnutrition, Food adulteration - Different diagnostic techniques - Antibiotics - First Aid - Blood Donation - Immunity - Vaccination - Immune disorders - Different systems of treatment - Cancer - Drugs and Alcohol Abuse.

11. Reproduction in Plants

Life span - Asexual reproduction - examples - Sexual Reproduction - stages.

12. Reproduction in Angiosperms

Flower parts - Micro sporogenesis - Megasporogenesis - Pollination - Fertilization - Fruit development- Seed development - Parthenocarpy and Apomixis.

13. Transport in plants

Physical phenomenon like Osmosis, Diffusion, Imbibition - Ascent of sap- Different theories - Transpiration and Guttation.

14. Mineral Nutrition

Mineral and Non mineral nutrients - Essential and Non essential nutrients - Source and functions of essential nutrients - Deficiency symptoms - Hydroponics and Aeroponics - N₂ metabolism in plants - Biological N₂ Fixation.

15. Photosynthesis

Chloroplasts and chlorophyll - structure and function - Light phase Reaction - Dark phase Reaction - C₃ and C₄ plants.

16. Respiration in Plants

aerobic, anaerobic - Glycolysis, Krebs cycle, Electron transport system - Respiration as an amphibolic pathway.

17. Growth and Development

Plant hormones - Various types of plant movements - Vernalisation and Photoperiodism.

18. Inheritance and variations

Mendelian laws - Monohybrid cross - Dihybrid Cross - Test cross - Co-dominance - Multiple allelism - Genetic disorders.

19. Molecular basis of Inheritance

Structure of DNA - DNA replication - Transcription - Translation - Genetic code - Mutation - Sex determination in humans - Human genome project - DNA finger printing.

20. Strategies in enhancement of food production

Animal husbandry - Poultry, Pisciculture, Sericulture - Animal breeding - Plant breeding - Tissue culture - Breeding for disease resistance, pest resistance.

21. Bio technology - Principles, applications

Genetic engineering - DNA technology - steps and procedure - Vectors- types and examples - Bio reactors - types and uses - Down streaming - Applications in Agriculture - Applications in pest resistance - Applications in insulin formation - Gene therapy - Genetically modified organisms (GMOs) - Transgenic plants and Animals.



23. Microbes in Human welfare

Growth of micro organisms - Microbes in sewage treatment - Microbes as bio-control agents - Microbes as bio-fertilisers.

24. Organisms, population and Eco system

Species, population, community concepts - Abiotic factors- soil, water, light and temperature - Biotic factors - producer, consumer and decomposers - Food chain, food web, ecological pyramids - Ecological interactions - Bio geo chemical cycles - Ecological successions.

25. Environmental Issues

Pollution - Water, air, soil, sound and radio active - Causes, effects and control measures - Green house effect - Global warming- causes, effect and control.

26. Evolution

Origin of life Theories of evolution - Evidences of evolution - Geological time scale - Mechanism of evolution - Origin and evolution of man

27. Bio Diversity and conservation

Bio Diversity - Conservation of Bio Diversity.

PEDAGOGY

1. UNESCO - 4 pillars of education

a. Learning to learn, b. Learning to do, c. Learning to live together, d. Learning to be.

2. Broad national goals of teaching biological sciences

Broad national goals - objectives of science teaching as envisaged in NCF - 2005.

3. Mc Cormick and Yager-Taxonomy of teaching science

a. Knowledge domain, b. Process domain, c. Creativity domain, d. Attitudinal domain, e. Application domain.

4. Nature of science

Science as a process and product - Process skills in science.

5. Science curriculum

Concentric curriculum - Spiral curriculum - Principles of curriculum construction - Difference between curriculum and syllabus.

6. Planning for instruction

Classroom implications of constructivism and critical pedagogy - Meaning of pedagogic analysis - Importance of pedagogic analysis - Year planning, unit planning, lesson planning.

7. Methods of Teaching Natural science

Lecture method - Lecture cum Demonstration - Project method - Experimental method - Heuristic method - Dalton plan - Biography method - Inductive method - Deductive method.

8. Audio-Visual aids and other support materials

Importance of using teaching -learning aids - Multisensory approach - Science lab and importance of practical work - Science library - Science fair - Field trips - Science textbook - Teachers handbook - VICTERS - IT@school project.

**9. Evaluation**

Construction of achievement test - Continuous and comprehensive evaluation (CCE, CE & TE) - Grading.

10. Agencies for quality assurance

NCTE - NCERT - SCERT - Programmes for the professional development of teachers.