

BIOLOGY**1. Cell structure and functions**

- 1.1 Typical cell
 - 1.1.1 Comparing Plant and Animal cell
 - 1.1.2 Cell membrane (Plasma membrane)
 - Cell wall
 - Nucleus
 - Eukaryotic cell
 - Prokaryotic cell
 - Cytoplasm
 - 1.1.3 Protoplasm – Cytoplasm
 - 1.1.4 Cell organells – Endoplasmic Reticulum
 - Ribosomes
 - Lysosomes
 - Golgi complex
 - Mitochondria
 - Vacuoles
- 1.2 Plastids – Chloroplasts
- 1.3 Are cell flat?
- 1.4 Where do cells form from?

2. Plant tissues

- 2.1 Parts of the plants – their functions
 - 2.1.1 observing the cells in leaf and onion peels
 - 2.1.2 Observing the cells in root tip
 - 2.1.3 Observing growing roots in onion
- 2.2 Plants – Tissues
 - Meristematic tissues
 - Dermal tissue
 - Ground tissue
 - Vascular tissue
 - 2.2.1 Meristematic tissues
 - Apical meristem
 - Lateral meristem
 - Intercalary meristem
- 2.3 Observing the tissues in transverse section of a dicot stem
- 2.4 Dermal tissue – observing epidermal cells in Rheo leaf
- 2.5 Ground tissue – Parenchyma, Sclerenchyma, collenchymas
 - 2.5.1 Parenchyma – Chlorenchyma, Aerenchyma, Storage tissue
- 2.6 vascular Tissue – Xylem, Phloem (Vascular Bundles)

3. Animal Tissues

- 3.1 Organ systems – functions
 - 3.1.1 Observing tissues
 - 3.1.2 Observing the cells in the blood sample
- 3.2 Different types of Animal tissues
 - Epithelial Tissues
 - Connective tissues
 - Muscular Tissues
 - Nervous tissues
- 3.3 Epithelial tissue – Columnar, Cuboidal, Squamous Epithelial tissue – characteristics.
- 3.4 Connective tissue – Aereolar Adipose, Skeletal tissue
 - Bone, Cartilage, Ligament, Tendon
- 3.5 Blood Tissue
 - 3.5.1 Blood tissue – Red Blood Cells, White Blood Cells, Blood – Platelets
White Blood Cells – Granulocytes (Nutrophil, Basophile, Esinophile)
– Agranulocytes (Lymphocytes, monocytes)
 - 3.5.2 Blood Flow, Blood clotting
- 3.6 Blood Groups – Universal Acceptors, universal donors, Blood grouping – Testing.
- 3.7 Nervous tissue

4. Movement of materials across the cell membrane

- 4.1 the Substance that get into and go out of the cell
 - 4.1.1 Solutions and their concentration (Sugar solution)
 - 4.1.2 Observing the changes of kishmish when placed in sugar solution and tap water.
- 4.2 Osmosis – the flow of liquids through selectively permeable membrane
 - 4.2.1 Filtration
 - 4.2.2 Functions of Plasma membrane
 - 4.2.3 Flow of substance through Plasma membrane
 - 4.2.4 Importance of Osmosis in living organism
- 4.3 Diffusion

5. Diversity in living organisms

- 5.1 Observing diversity in plants
 - 5.1.1 Identifying the plants based on selected characters/features
 - 5.1.2 Observing the seeds
 - 5.1.3 Observing the characters of monot and dicot plants
- 5.2 Diversity in animals
 - 5.2.1 Observing external characters in Insects

- 5.2.2 Variations / Diversity in Human beings, Diversity in plants (based on selected characters)
- 5.3 Classification – the concept, its need – evolution of life
 - 5.3.1 Classification – its Historic elements; binomial nomenclature
 - 5.3.2 Method of classification – the five kingdom classification proposed by Whittaker
 - Monera
 - Protista
 - Plantae
 - Fungi
 - Animalia
- 5.4 Classification of Plant Kingdom
- 5.5 Classification of Animal Kingdom

- 6. Sense Organs**
 - 6.1 Sense organs – Opinions of our ancestors
 - 6.2 What do our senses do? / How do sense organs help us?
 - 6.2.1 Stimulus – Response
 - 6.3 Eye-its structure, cells and tissue / structure of the eye-cells and tissues in the eye
 - 6.3.1 Functioning of the eye
 - 6.3.2 Eye and Illusions
 - 6.3.3 Taking care of our eyes, diseases and defects of the Eye – An understand
 - 6.4 Ear-its external and internal structure
 - 6.4.1 Ear-the hearing /auditory sensation
 - 6.4.2 Functions of the ear, caring for the ears
 - 6.5 Structure of the Nose
 - 6.5.1 The smell or olfactory sense – How do we know the sense of smell
 - 6.5.2 Taking care of nose
 - 6.6 Structure of the Tongue
 - 6.6.1 How do we know the taste?
 - 6.6.2 Taking care of the Tongue
 - 6.7 Structure of the skin
 - 6.7.1 How does the skin convey the sense of touch?
 - 6.7.2 Skin disease, taking care of skin

- 7. Animal behaviour**
 - 7.1 Animal behave in different ways/ or Animals exhibit different behaviour
 - 7.2 Different types of Animal behaviour
 - Instinct
 - Imprinting
 - Conditioning

- Imitation
- 7.3 Pavlov Experiments on conditioning
- 7.4 Human behaviour: Instinct, imitation, conditioning
- 7.4.1 Investigating behaviour in the field, laboratory
- 7.4.2 Investigation in the field – tagging
- 7.5 Animals – and their intelligence

8. Challenges in improving agricultural products

- 8.1 Relationship between growth of population and the need for food
- 8.1.1 Need of improving agriculture produce
- 8.2 How to increase the food production?
- High yielding varieties
 - Irrigation facilities
- 8.2.1 Relations between water and crop yield.
- 8.2.2 Plant nutrients / or nutrients needed by the plants
- 8.2.3 Crop Rotation
- 8.2.4 Cultivating mixed crops
- 8.2.5 Organic manure
- 8.2.6 Chemical Fertilizers
- 8.3 Soil testing
- 8.4 Conventional manures
- Vermi compost
 - Panchagavya
- 8.5 Organic farming
- 8.5.1 the long-term effect of chemical fertilizers on the yield of the crop
- 8.6 Crop protection
- 8.6.1 weeds
- 8.6.2 plant-Diseases-Prevention (Pesticides)

9. Adaptations in different Ecosystems

- 9.1 Ecosystem
- 9.1.1 Ecosystems – Adaptations in Plants
- 9.2 Desert Ecosystem-Adaptations in plants and animals
- 9.3 Aquatic Ecosystems - Adaptations in plants and animals
- 9.3.1 Marine Ecosystem - Adaptations in plants and animals
- 9.3.2 Aquatic organism – The secrets of swimming
- 9.3.3 The zones in the marine ecosystem on the basis of availability of light at different depths
- Euphotic zone
 - Bathyal zone
 - Abyssal zone
- 9.3.4 Zones in the fresh water Ecosystem
- Littoral zone

- Limnetic zone
 - Profundal zone
- 9.4 Water salinity – Adaptations
- 9.5 Adaptations to temperature in plants, animals
- Hibernation and Aestivation
 - Symbiosis (Lichens)
- 9.6 Adaptations – Evolutions (story of Darwin’s Finches)

10. Soil Pollution

- 10.1 What is soil?
- 10.1.1 What is soil?
 - 10.1.2 Soil properties – Physical, Chemical and Biological properties of the soil
- 10.2 Soil fertility
- 10.3 Soil pollution
- 10.3.1 Fertility of soil due to decompositions of wastes
 - 10.3.2 Soil pollution – Wastes
 - Biodegradable wastes
 - Non-biodegradable wastes
- 10.4 Causes of land pollution
- 10.4.1 Manures and Chemicals
 - 10.4.2 Biomagnification
 - 10.4.3 Solid wastes
 - 10.4.4 Deforestation
 - 10.4.5 Urbanization
 - 10.4.6 Pollution of underground soil
- 10.5 Effects of soil pollution on Environment
- 10.6 Control measures of soil pollution
- 10.6.1 Bioremediation, soil conservation

11. Biogeochemical cycles

- 11.1 Pollution, concept of biogeochemical cycles in relation to the ecosystems – an understanding
- 11.2 Water cycle
- 11.3 Nitrogen cycle
- 11.3.1 Nitrogen fixation
 - 11.3.2 Nitrification
 - 11.3.3 Assimilation
 - 11.3.4 Ammonification
 - 11.3.5 Denitrification
 - 11.3.6 Nitrogen cycle and human intervention

- 11.4 Carbon cycle
 - 11.4.1 Photosynthesis - Carbon - Fixation
 - 11.4.2 Carbondioxide cycling and storage
 - 11.4.3 Carbon cycle - Human intervention
 - Global warming
 - The green house effect
- 11.5 Oxygen cycle
 - 11.5.1 Oxygen cycle
 - 11.5.2 Ozone layer and its effect