

BIOLOGY - SYLLABUS

9th CLASS

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 organelles - Endoplasmic Reticulum

- Ribosomes
- Lysosomes
- Golgi complex
- Mitochondria
- Vacuoles

1.2 Plastids - Chloroplasts

1.3 Are cells 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, Collenchyma

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
- Muscular Tissues
- Connective tissue
- Nervous tissue

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 (Neutrophile,
Basophile, Eosinophile
- 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 Substances 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 substances through Plasma membrane

4.2.4 Importance of Osmosis in living organisms

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 sense do ? / How do sense organs help us ?

6.2.1 Stimulus - Response

6.3 Eye-its structure, cells and tissues / 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 understanding

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 diseases, taking care of skin

7. Animal behaviour

7.1 Animals 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

8.2.1 Need of improving agricultural produce

8.2 How to increase the food production ?

- High yielding varieties
- Irrigation facilities

8.2.1 Relationship 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 Ecosystems

9.1.1 Ecosystems - Adaptations in Plants

9.2 Desert Ecosystem - Adaptations in plants and animals

9.3 Aquatic Ecosystem - Adaptations in plants and animals

9.3.1 Marine Ecosystem - Adaptations in plants and animals

9.3.2 Aquatic organisms - 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 - Evolution (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 decomposition 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