MANYAM FRANCHISE
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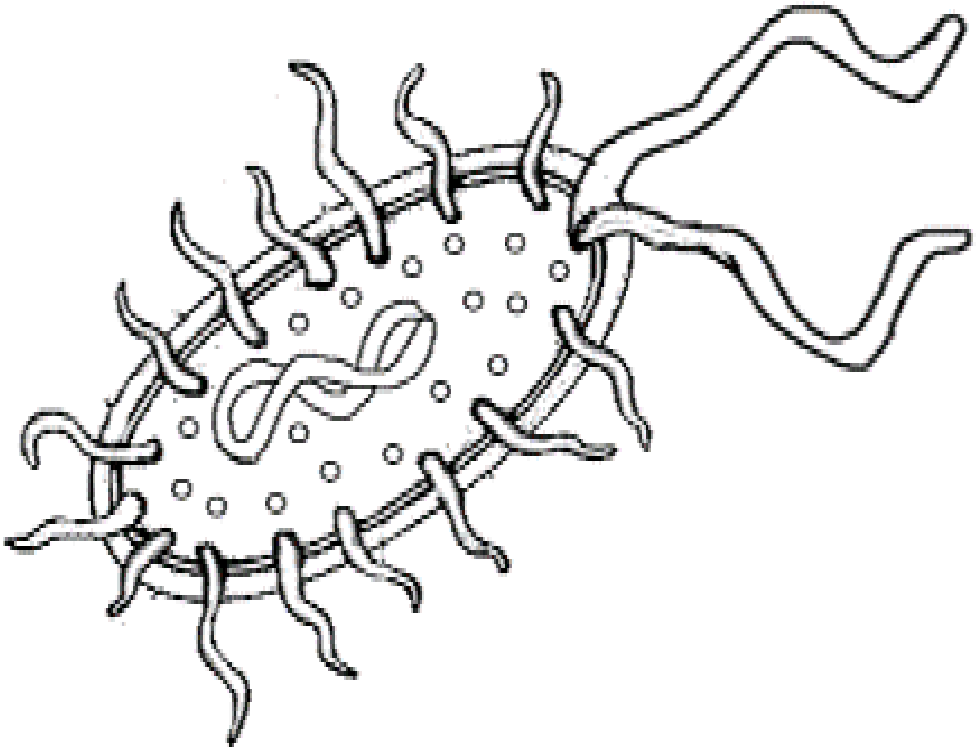
KCSE BIOLOGY NOTES

TOPIC 1: INTRODUCTION TO BIOLOGY



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MANYAM FRANCHISE
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Contents

Topic Objectives

By the end of the topic, the learner should be able to:

1. Define biology
2. List branches of biology
3. Explain the importance of biology
4. State the characteristics of living organisms
5. State the main differences between plants and animals.

Introduction to Biology

Biology derived from Greek words-BIOS meaning LIFE and LOGOS meaning STUDY or KNOWLEDGE.

Biology means "life knowledge".

It is the study of living things/organisms.

Branches of Biology

- **Botany** - study of plants.
- **Zoology** - study of animals.
- **Microbiology** - study' of microscopic organisms.
- **Morphology** - study of external structure of organisms.
- **Anatomy** - study of internal structure of organisms.
- **Physiology** - study of the functioning or working of the cells or body.
- **Biochemistry** - study of the chemistry of materials in living organisms.
- **Cytology** - study of cells.
- **Genetics** - study of inheritance.
- **Ecology**- study of the relationship between organisms and their environment.
- **Taxonomy** - sorting out of organisms into groups.
- **Histology** - study of fine structure of tissues.
- **Virology** - study of viruses.
- **Bacteriology** - study of bacteria.
- **Entomology** - study of insects.
- **Ichthyology** - study of fish.

Importance of Biology

- One learns about the functioning of the human body.
- One understands the developmental changes that take place in the body.
- It contributes immensely to improved life.
- It enables one to enter careers such as:
  - ✓ Medicine,
  - ✓ Nutrition,
  - ✓ Public Health,
  - ✓ Dentistry,
  - ✓ Agriculture
  - ✓ Environmental Studies.
  - ✓ Teaching

Characteristics of Living Things

Life defined through observations of activities carried out by living things;

Nutrition

Nutrition is the processes by which food/nutrients are acquired/made and utilized by living organisms.

Green plants and certain bacteria make their own food.

All other organisms feed on complex organic materials.

Respiration

This is the breakdown of food to provide energy.

The energy released is used for various activities in the organism.

Gaseous Exchange

Process throw which respiratory gases (CO_2 & O_2) are taken in and out through a respiratory surface.

Excretion

Excretion is the removal of metabolic wastes from the body.

Substances like urea, carbon dioxide (Carbon (IV) oxide).

These substances are poisonous if allowed to accumulate in the body.

Growth and Development

Growth means irreversible change in size.

All organisms increase in size that is, they grow.

Development is irreversible change in complexity.

As they do so, they also become differentiated in form.

Reproduction

Reproduction is the formation of new individuals of a species to ensure continued existence of a species and growth of its population.

Irritability

The ability of organisms to detect and respond to changes in the environment. This is of great survival value to the organism.

Movement

This the progressive change in position from one place to another.

Some organisms are sessile (i.e. fixed to the substratum).

The majority of plants move only certain parts.

Collection and Observation of Organisms

Biology as a practical subject is learnt through humane handling of organisms.

Materials needed for collection of organisms:-

- Knives to cut portions of plant stem/root or uproot.
- Polythene bags to put the collected plant or specimens.
- Insect collecting jars.
- Insect killing jars.
- Hand gloves.
- Sweep nets
- Pooters
- Traps

Observation of Organisms

- Observe the plant/animal in its natural habitat before collecting.
- Identify the exact place -on surface, under rock, on tree trunk, on branches.
- What does it feed on?
- How does it interact with other animals and the environment?
- How many of that kind of plant or animal are in a particular place?
- Plant specimens placed on the bench and sorted out into;- ***seeds/stems/roots/leaves/fruits.***

- Animal specimens may be left inside polythene bags if transparent.
- Others (killed ones) are put in petri dishes.
- Use hand lens to observe the external features of small animals.

Presenting the Results of Observations

Organisms are observed and important features noted down: colour, texture hard or soft; if hairy or not. Size is measured or estimated.

Biological Drawings

It is necessary to draw some of the organisms.

In making a biological drawing, magnification (enlargement) is noted.

Indicate the magnification of your drawing, i.e. how many times the drawing is larger/smaller than the actual specimen MG=length of drawing/length specimen

How to Draw

- Several drawings of one organism may be necessary to represent all features observed, e.g.
- Anterior view of grasshopper shows all mouth parts properly, but not all limbs.
- Lateral (side) view shows all the legs.

Collection, Observation and Recording of Organisms

Collection

Plants and animals collected from the environment, near school or within school compound using nets, bottles and gloves.

Animals collected include:-arthropods, earthworms and small vertebrates like lizards/chameleons/ rodents.

Place in polythene bags and take to the laboratory.

Stinging/poisonous insects killed using ether.

Other animals are observed live and returned to their natural habitat.

Plant specimen collected include: - leaves, flowers and whole plants.

Observations are made to show the following:-

Plants have roots, stems, leaves and flowers.

Animals have legs, hair, hard outer covering, feathers, eyes, mouth, limbs and other appendages,

The differences between animals and plants collected.

Comparison between Plants and Animals

PLANTS	ANIMALS
1. **Plants are fixed in a position**	1. Most animals move in search of food
2. **Respond slowly to stimuli**	2. Respond quickly to stimuli
3. **Cells have cellulose walls**	3. Cells have no cell walls
4. **Plants make their own food from materials such as CO2 and water using light energy**	4. Animals feed on already made food