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Classification I

Introduction

Classification is putting organisms into groups.

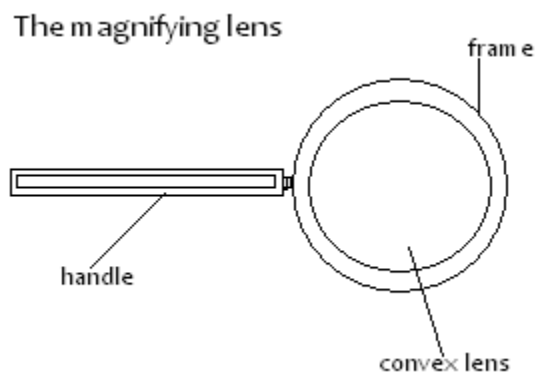
Classification is based on the study of external characteristics of organisms.

It involves detailed observation of structure and functions of organisms.

Organisms with similar characteristics are put in one group.

Differences in structure are used to distinguish one group from another.

The magnifying lens is an instrument that assists in the observation of fine structure e.g. hairs by enlarging them.



Using a Magnifying Lens

A specimen is placed on the bench or held by hand,

Then the magnifying lens is moved towards the eye until the object is clearly focused and an enlarged image is seen.

The magnification can be worked out as follows:

$$\text{Length of the drawing} \times \text{Magnification} = \text{length of the specimen}$$

Note: *magnification has no units.*

Necessity/need for Classification

To be able to identify organisms into their taxonomic groups.

To enable easier and systematic study of organisms.

To show evolutionary relationships in organisms.



Major Units of Classification (Taxonomic Groups)

Taxonomy is the study of the characteristics of organisms for the purpose of classifying them.

The groups are Taxa (singular Taxon).

The taxonomic groups include:

Species: This is the smallest unit of classification. Organisms of the same species resemble each other. The number of chromosomes in their cells is the same. Members of a species interbreed to produce fertile offspring.

Genus (plural genera): A genus is made up of a number of species that share several characteristics. Members of a genus cannot interbreed and if they do, the offspring are infertile.

Family: A family is made up of a number of genera that share several characteristics.

Order: A number of families with common characteristics make an order.

Class: Orders that share a number of characteristics make up a class.

Phylum/Division: A number of classes with similar characteristics make up a phylum (plural phyla) in animals. In plants this is called a division.

Kingdom: This is made up of several phyla (in animals) or divisions (in plants). It is the largest taxonomic unit in classification.

Kingdoms

Living organisms are classified into five kingdoms namely;

- a) Monera,
- b) Protocista,
- c) Fungi,
- d) Plantae
- e) Animalia.

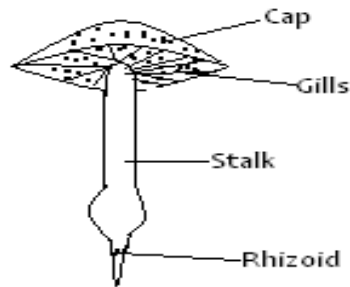
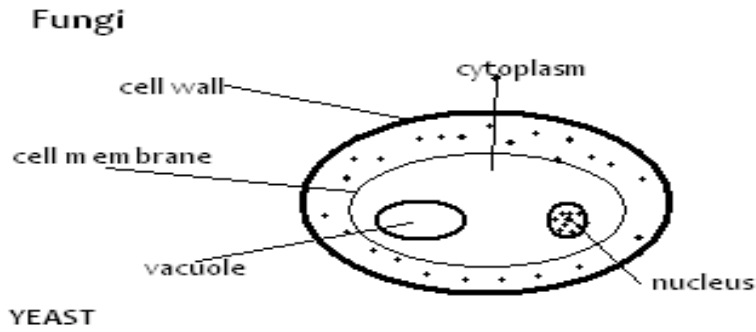
Kingdom Fungi

Some are unicellular while others are multicellular.

They have no chlorophyll.

Most are saprophytic e.g. yeasts, moulds and mushrooms.

A few are parasitic e.g. *Puccinia gramineae*.



mushroom (*Agaricus* spp.)

Kingdom Monera (Prokaryota)

These are very small unicellular organisms.

They lack a nuclear membrane

do not have any bound membrane organelles.

Hence the name Prokaryota.

They are mainly bacteria, e.g. *Vibrio cholerae*.

Kingdom Protocista

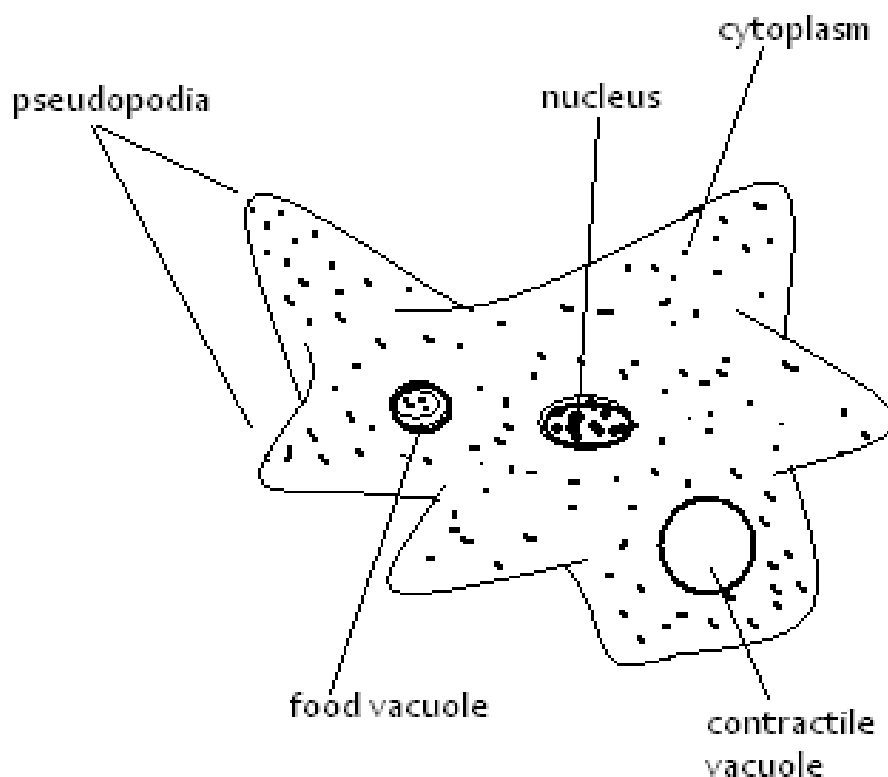
They are unicellular organisms.

Their nucleus and organelles are surrounded by membranes (eukaryotic).

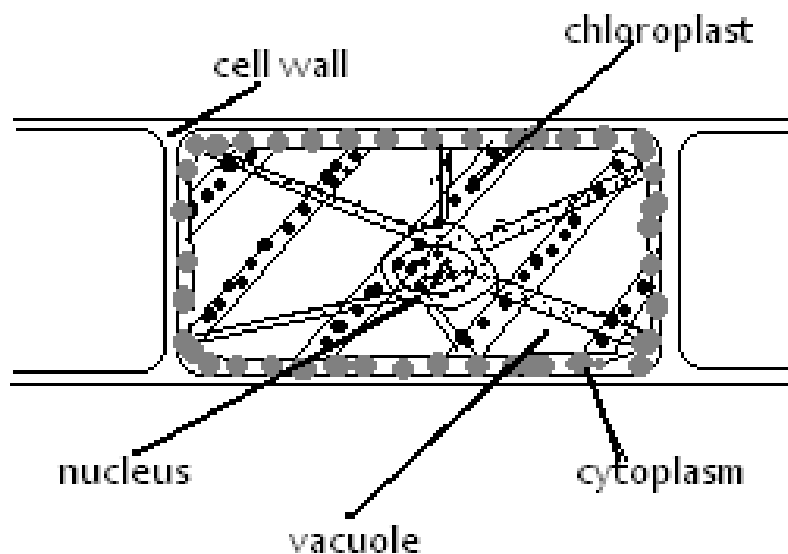
They include algae, slime moulds - fungi-like and protozoa



Amoeba-a protozoan(Protoctist)



Spyrogyra-filamentous green algae





Kingdom Plantae

They are all multicellular.

They contain chlorophyll and are all autotrophic.

They include; Bryophyta (mossplant), Pteridophyta (ferns) and Spermatophyta (seed bearing plants).

Kingdom Animalia

These are all multicellular and heterotrophic.

Examples are annelida (earthworms), mollusca (snails),arthropoda, chordata .

Example of Arthropods are ticks, butterflies.

Members of Chordata are fish, frogs and humans.

External Features of Organisms

In plants we should look for:-

Spore capsule and rhizoids in moss plants.

Sori and fronds in ferns.

Stem, leaves, roots, flowers, fruits and seeds in plants.

In animals, some important features to look for are:

Segmentation, presence of limbs and, number of body parts, presence and number of antennae. These are found in phylum arthropoda:

Visceral clefts, notochord, nerve tube, fur or hair, scales, fins, mammary glands, feathers and wings.

These are found in chordata.

Binomial Nomenclature

Organisms are known by their local names.

Scientists use scientific names to be able to communicate easily among themselves.

This method of naming uses two names, and is called Binomial nomenclature.

The first name is the name of the genus: (generic name) which starts with a capital letter.

The second name is the name of the species (specific name) which starts with a small letter.



The two names are underlined or written in italics.

Man belongs to the genus Homo, and the species, sapiens.

The scientific name of man is therefore Homo sapiens.

Maize belongs to the genus Zea, and the species mays.

The scientific name of maize is Zea mays.

Practical Activities

Use of Collecting Nets, Cutting Instruments and Hand Lens.

Forceps are used to collect crawling and slow moving animals.

Sweep nets are used to catch flying insects.

Cutting instrument like scapel is used to cut specimen e.g. making sections.

Hand lens is used to magnify small plants and animals.

Drawing of the magnified organism are made and the linear magnification of each calculated.

Collection and Detailed Observation of Small Plants and Animals

E.g. moss, ferns, bean.

Look for the following:

Moss plants: Rhizoids and spore capsules.

Fern plants: Rhizomes with adventitious roots; large leaves (fronds) with Sori (clusters of sporangia).

Seed plants: Tree/shrub (woody) or non-woody (herbs) e.g. bean.

Root system - fibrous, adventitious and tap root.

Stem - position and length of internodes.

Type of leaves - simple or compound; arranged as alternate, opposite or whorled.

Flower - colour, number of parts, size and relative position of each:

Fruits - fleshy or dry; edible or not edible.

Seeds - monocotyledonous or dicotyledonous.

Small animals e.g. earthworms, tick, grasshopper, butterfly, beetles.



Observe these animals to see:

- a) Number of legs.
- b) Presence or absence of wings.
- c) Number of antennae.
- d) Body covering.
- e) Body parts.