

Topic 04

Botany

Learning Objectives

At the end of this module, students will be able to:

- Describe botany in terms of the life sciences.
- List two organelles specific to plants.
- Contrast continuous growth & permanent tissue.
- Recognize (not memorize) several new key words.

Outline

- a. Botany overview
- b. Plant cell organelles
- c. Shoots & roots
- d. Biosphere hierarchy

Definition

Organism

In biology, an organism is an entity capable of carrying on life functions. All organisms are composed of cells.

Organisms are classified by **taxonomy** into groups such as multicellular animals, plants, and fungi; or unicellular microorganisms such as protists, bacteria, and archaea

Plants are organisms.

Definition

Botany

Botany is the science of plants and plant life. It is a branch of the life sciences. An introduction to botany is part of high school biology classes. Lower grades introduce some basic concepts of botany.

Scientists who study plants are called botanists. Botanists study over 400,000 species (types) of plants.

04.a

Botany overview

During most of the 1900's botany studies included the study of plants, fungi and algae.

During 1980s-90s molecular analysis showed different "kingdoms" – big groups of organisms that are similar.

Because of this new knowledge, there are three separate but similar disciplines: Botanists (plants), Mycologists (fungi), and Phycologists (algae).

04.a

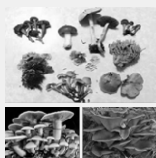
Botany overview

During 1980s-90s molecular analysis showed different "kingdoms" – big groups of organisms that are similar.

**Botanists
(plants)**



**Mycologists
(fungi)**



**Phycologists
(algae)**



04.a

Botany overview

Today, botanists study the role of plants in the global cycling of energy, oxygen, phosphorus, carbon, nitrogen & hydrogen.


Biology students are introduced to these important cycles.

Botanists study issues like conservation, human food security, invasive organisms, CO₂ sequestration, and sustainability.


04.a Botany overview

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
Oxygen




Phosphorus




Carbon



Nitrogen




Hydrogen



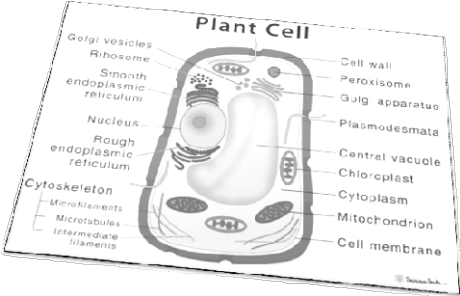
PLANTS

04.a Botany overview

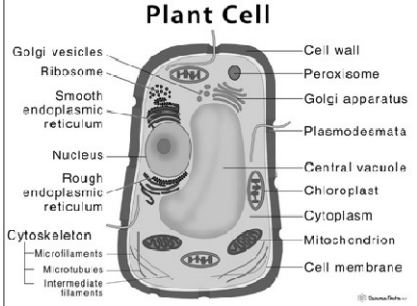
Botanists study issues like food security conservation, sustainability, invasive species, and CO₂ sequestration,

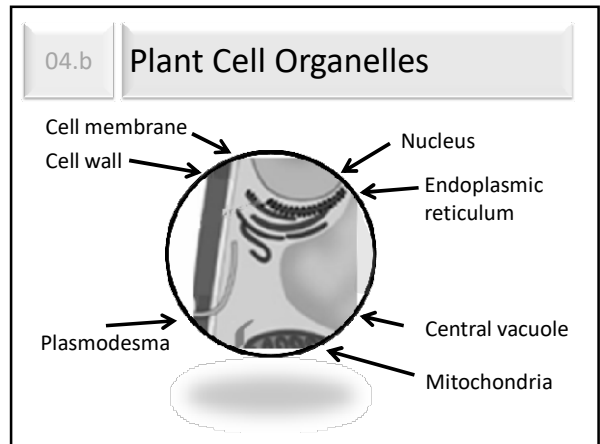
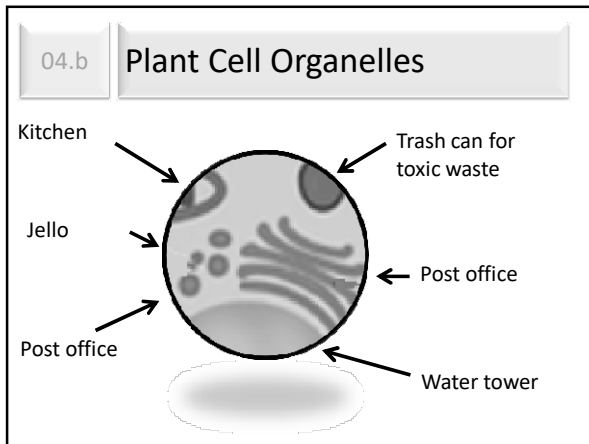
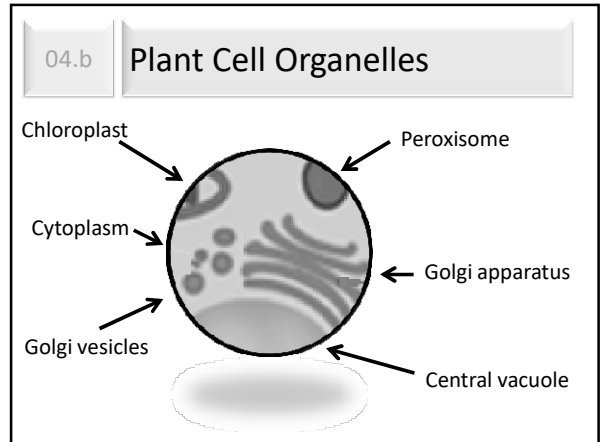
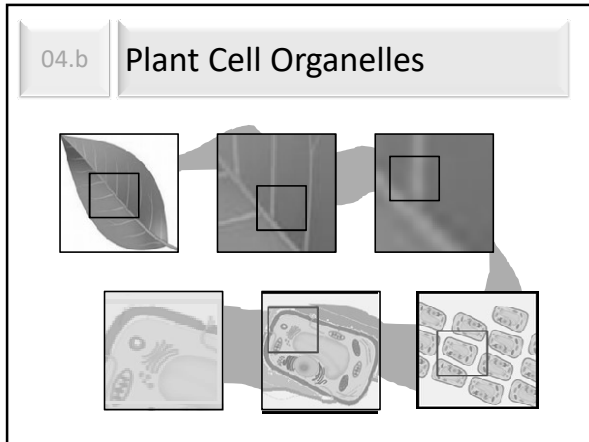


04.b Plant Cell Organelles



04.b Plant Cell Organelles





04.b Plant Cell Organelles

Fence & gate
 Cinder blocks
 Computer room
 Delivery truck
 Tunnel
 Water tower
 Power house

04.b Plant Cell Organelles

Chloroplast

Photosynthesis is a process used by plants and other organisms to convert light energy into chemical energy used in cellular respiration.

photosynthesis glucose & water
 $6 \text{CO}_2 + 6 \text{H}_2\text{O} + \text{light} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$

04.c Shoots & Roots

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Roots and shoots have the same "type" of tissue.

Meristematic

Continuous growth tissue is called "meristematic" tissue.

This type of tissue increases the length, breadth and connections.

They have continuous growth and permanent growth tissue.

These are called the cortex, endodermis, & xylem/phloem.

04.c **Shoots & Roots**

Roots and shoots have the same “type” of tissue.

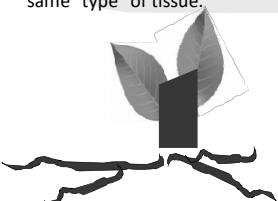
Permanent

Permanent tissue is derived from meristem tissue.

This tissue takes on specific roles – cells in this tissue lose their ability to divide further.

Main types are dermal, vascular, and ground tissue.

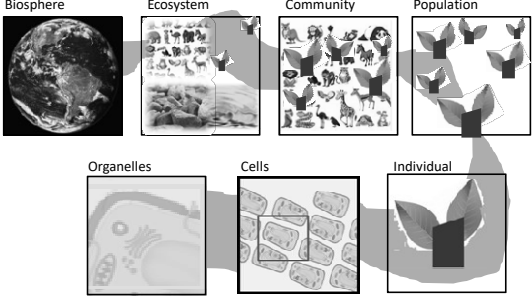
They have continuous growth and permanent growth tissue.



04.d **Biosphere to Organelles**

Biosphere Ecosystem Community Population

Organelles Cells Individual



Summary

Botany overview

Plants Fungus Algae

Cycles

Expertise and Global Issues

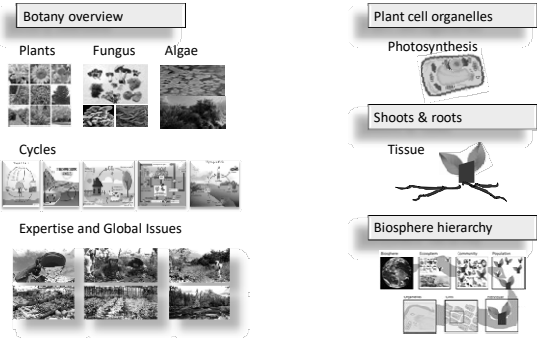
Plant cell organelles

Photosynthesis

Shoots & roots

Tissue

Biosphere hierarchy



Check

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