INTRODUCTION TO BOTANY

Abdulrahman Mahmoud Dogara

Introduction to Botany (Bio 112)

LEARNING OUTCOMES

- Students will be able to define
- 1. Define Botany
- 2. understand characteristics of organism
- 3. Distinguish plant and animal
- 4. Why plants are green

WHAT IS BOTANY?

Botany is one of the main branches of Biology

It is the systematic and scientific study of plants.

Botany is a branch of biology that deals with the study of plants, including their structure, properties, and biochemical processes.

IMPORTANCE OF BOTANY

1. Botany deals with the study of different kinds of plants, its uses and characteristics to influence the fields of science, medicine and cosmetics.

2. Botany is the key to the development of biofuels such as biomass and methane gas that are used as alternatives to fossil fuels.

3. Botany is important in the area of economic productivity because it is involved in the study of crops and ideal growing techniques that helps farmers increase crop yield.

4. The study of plants is also important in environment protection. The Botanists list the different types of plants present on earth and can sense when the plant populations start declining.

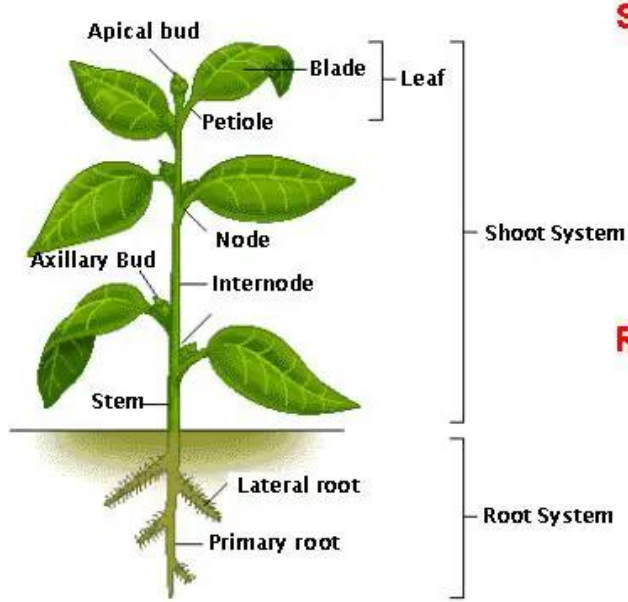
What is Plant?

Plants are multicellular organisms with eukaryotic cells.

Plants are multicellular organisms in the kingdom Plantae that use photosynthesis to make their own food.

General Plant Anatomy

The Plant Body Consists of the Shoot System and the Root System



Shoot System - Functions

- Photosynthesis
- Reproduction
- Storage
- Transport
- Hormones

Root System - Function

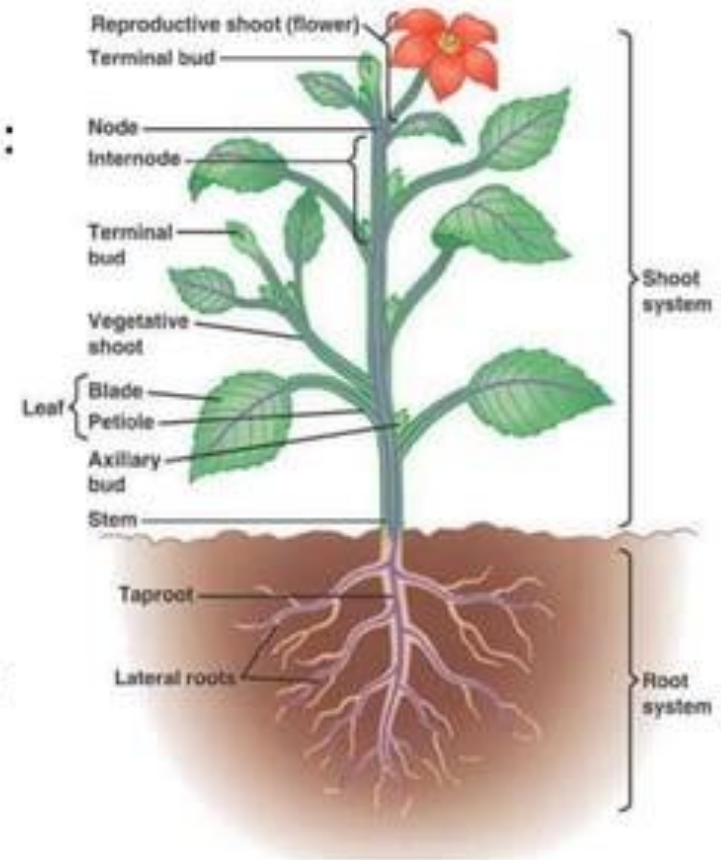
- Anchorage
- Absorption
- Storage
- Transport
- Hormones

PLANT ORGANS

- The body of a typical plant can be described as having two connecting system: a **root system** and a **shoot system**

- The root system consists of all the roots, which are usually below the ground

- The shoot system consists of all the **stems**, **leaves**, and **reproductive structures**, which are usually aboveground



Essential Terms of Botany

ANNUAL: Is a plant that completes its life-cycle in one year. After which the entire plant (including its roots and stems) die completely. ***Example*** watermelon, corn, lettuce wheat,

Corn

Watermelon

PERENNIAL: Are plants that live for more than two years.

Canna Plant

Tropical Milkweed

BIENNIAL: complete a full life-cycle (seed to flower to seed again) in two years.

Carrots

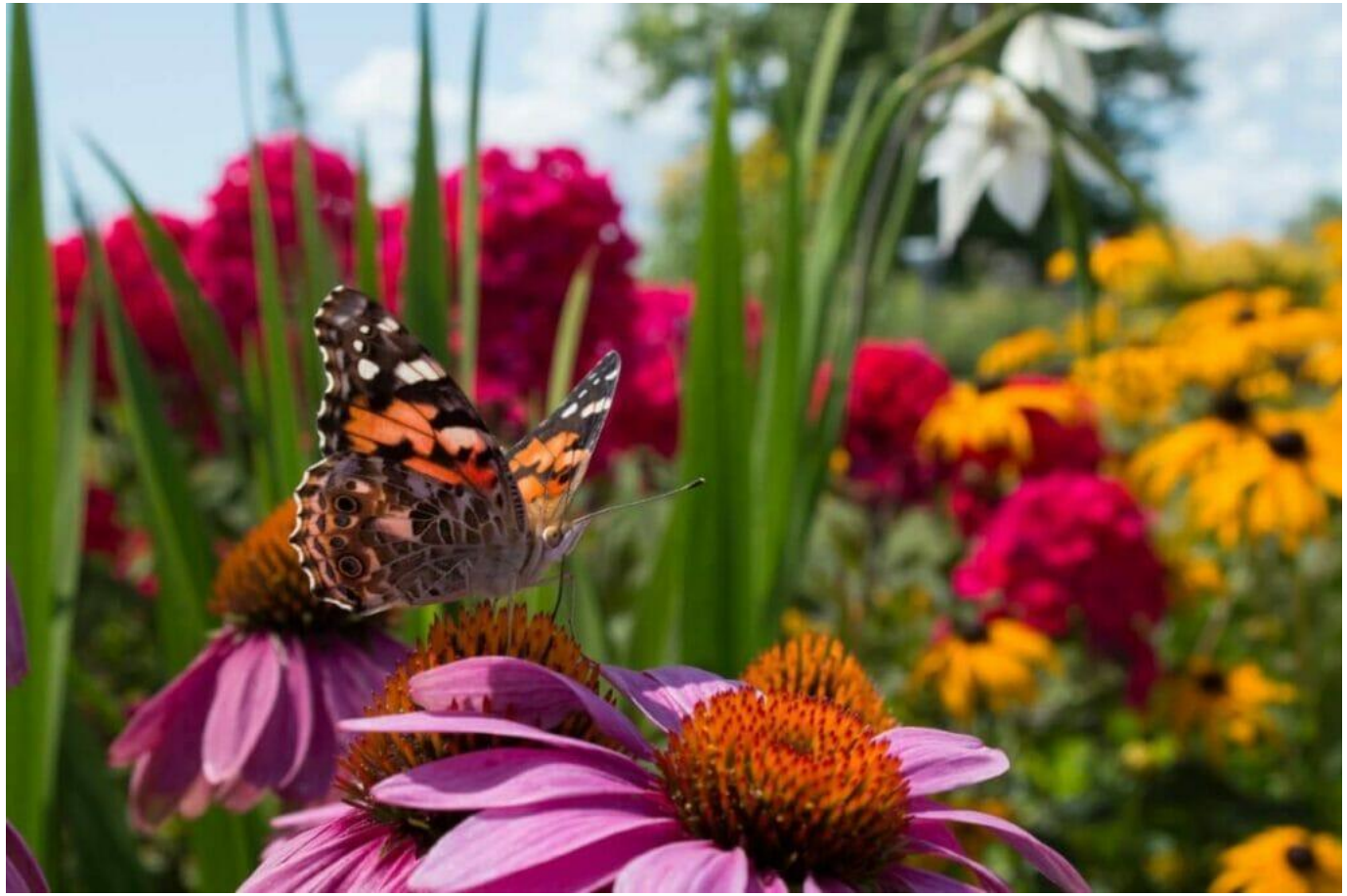
Cabbage

EVERGREENS: Evergreens are the trees that don’t shed leaves seasonally and instead stay green throughout all seasons of the year.

Pines

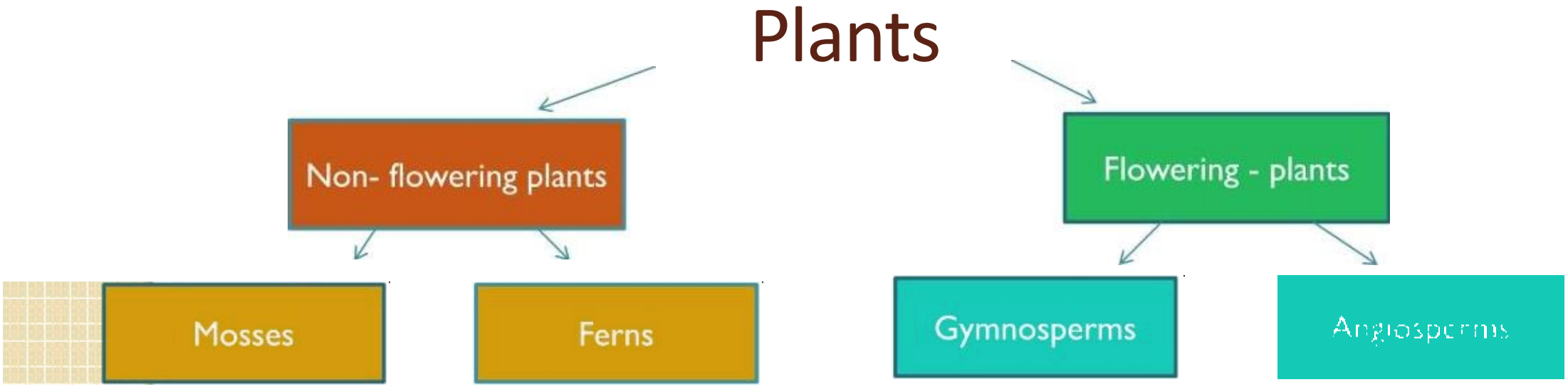
Redwoods

POLLINATION: Pollination is defined as the transfer of pollen from one flower's stamen to another flower's stigma (the upper portion of the pistil, which is the feminine part of the plant).



FERTILIZATION: Is the fusion of the male gametes (pollen) with the female gametes (ovum) to form a diploid zygote.

Plant classification



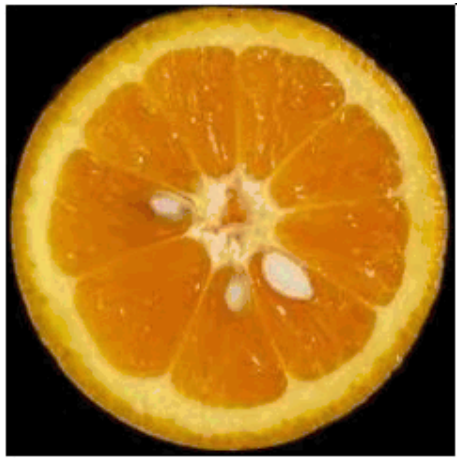
Gymnosperms

- They have small, simple flowers.

- They don't produce fruit.
- Their seeds are grouped together in cones.
- They are perennials /evergreen
  (they have leaves all year round)

Angiosperms

- They have large, beautiful flowers.
- They produce fruit with seeds inside.
- They could be deciduous or perennial.
  (they lose their leaves in autumn)
- Most plants we eat are angiosperm.



Characteristics of Organisms

1- Are composed of cells, the smallest units able to conduct the functions of living.

2- Are made principally of four elements:

carbon, hydrogen, oxygen, nitrogen.

3- Need energy to conduct their metabolism (all of the chemical processes occurring within their bodies).

4- Require materials from the environment to both build and maintain their bodies.

5- Are structurally organized.

7- React to stimuli and respond, thereby adapting to their environment.

8- Grow (increase in size or weight).

9- Reproduce.

Characteristics of Plants

1- Plants can photosynthesize.

2- Plants are multicellular.

3- Plants have indeterminate growth.

4- Plant respond to stimuli

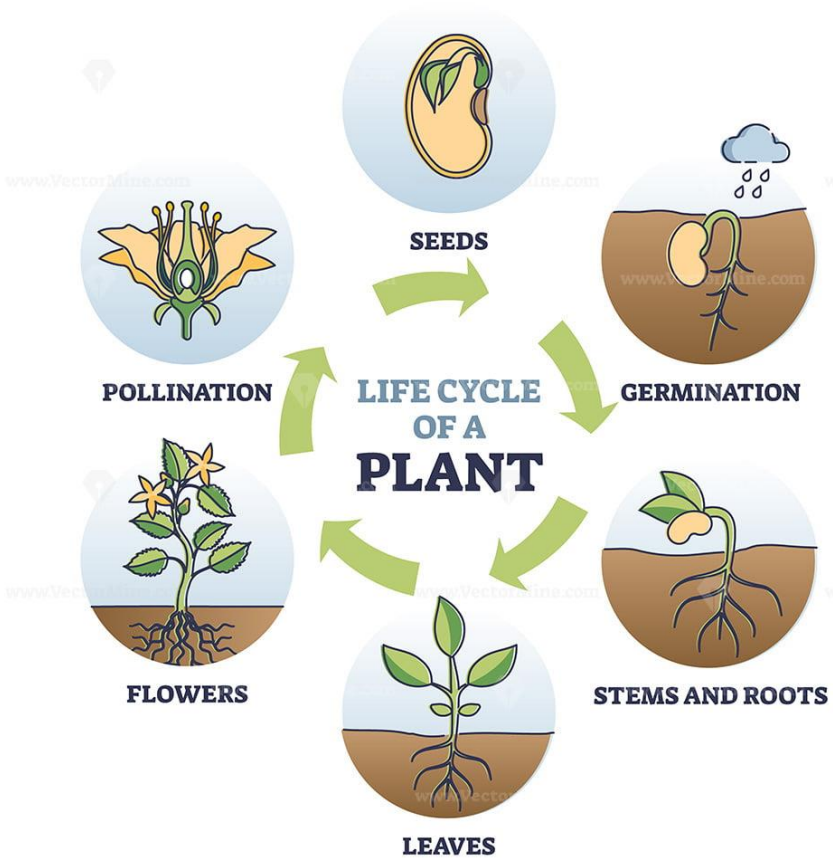
5- They produce secondary metabolites.

WHY ARE PLANTS GREEN

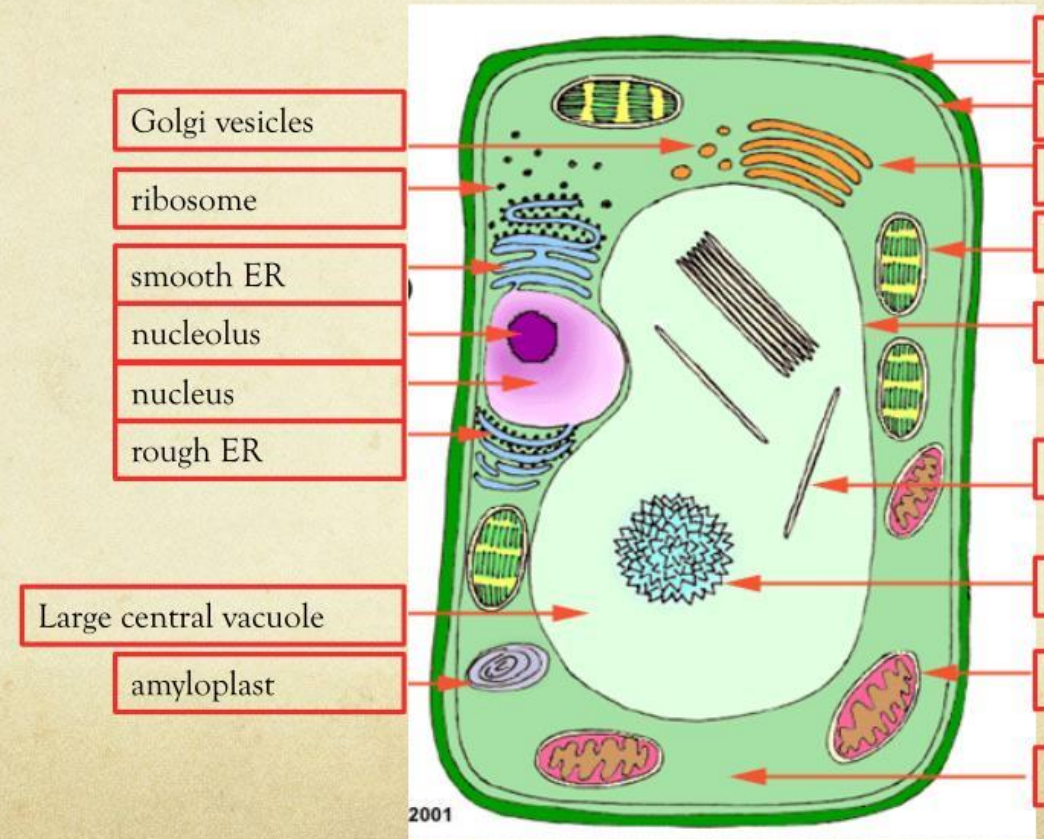
Why are plants green?

- They have **chloroplasts.**
- Chloroplasts contain a green pigment calles **chlorophyll.**
- Chlorophyll **absorbs energy from sunlight.**
- The plant uses this energy to make **Glucose.**
- This process is called **photosynthesis.**

General Plant Cycle



Parts of a Plant Cell



Question

Plant Cell Structure & Function

How do plant cells differ from animal cells?

What are the functions of chloroplasts, cell walls, and vacuoles in plant cells?

Stages of Plant life cycle

Characteristics of plants

Why Plant are green

Define five essential terms in Botany

Reference

1. Keegstra K. Plant cell walls. Plant physiology. 2010;154(2):483-6.
2. Esau K. Plant anatomy: LWW; 1953.
3. Beck CB. An introduction to plant structure and development: plant anatomy for the twenty- first century: Cambridge University Press; 2010.
4. Lopez F, Barclay G. Plant anatomy and physiology. Pharmacognosy: Elsevier; 2017. p. 45-60.