



Leaf Anatomy

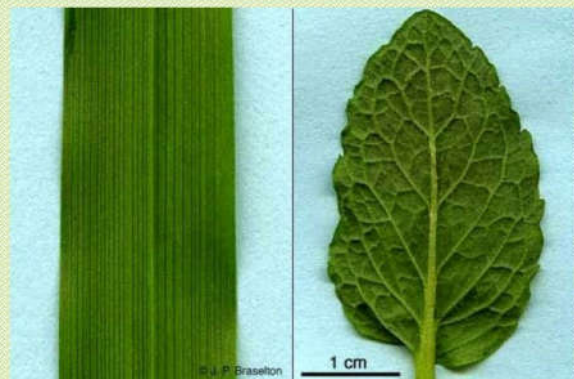
DICOT and MONOCOT Leaf

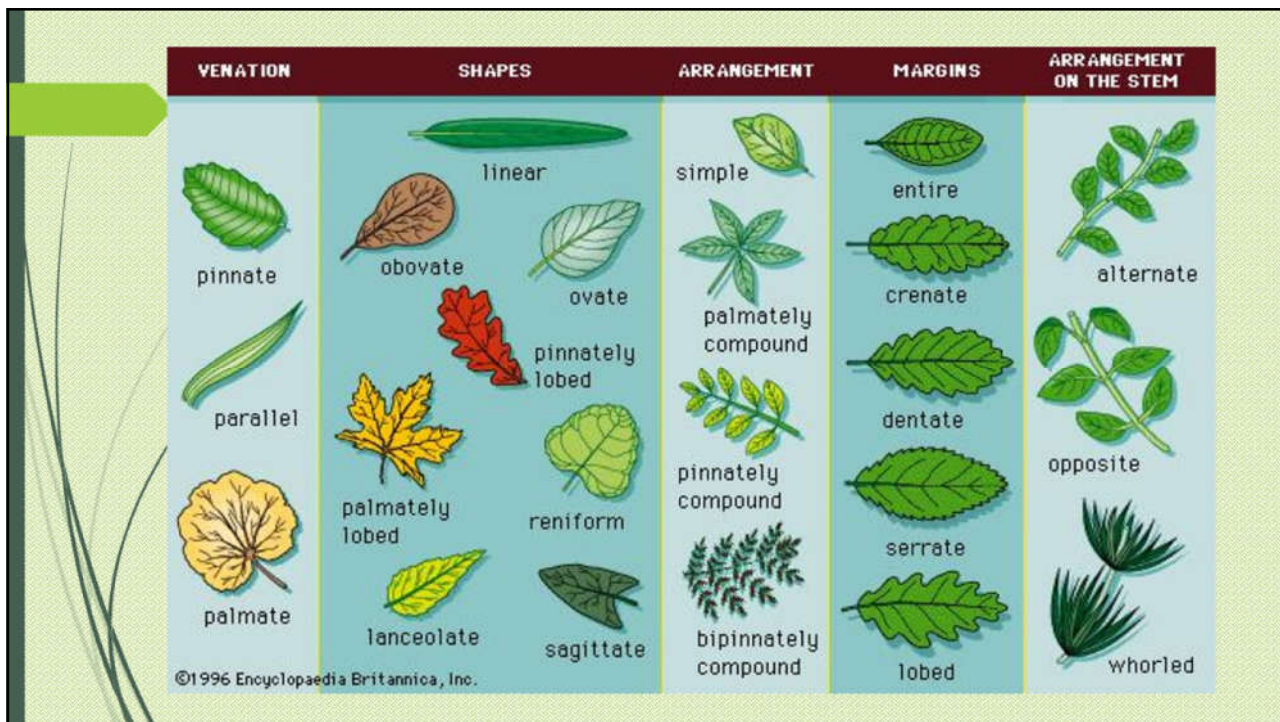
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Aydan ACAR
Ergin ŞAHİN

Leaf structure

Leaf is any usually flattened green outgrowth from the **stem** of a **vascular plant**.

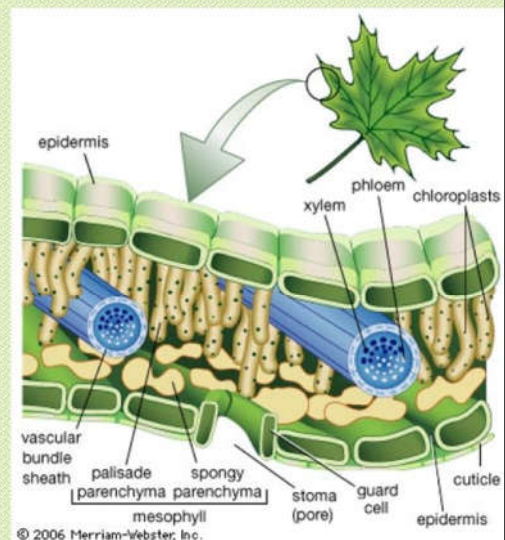
- ❖ Typically, a leaf consists of a broad, expanded blade (the **lamina**), attached to the **plant** stem by a stalklike **petiole**.
- ❖ Leaves are, however, quite **diverse** in size, shape, and various other characteristics, including the nature of the blade margin and the type of venation (arrangement of **veins**).
- ❖ Veins, which support the lamina and transport materials to and from the leaf tissues, radiate through the lamina from the petiole. The types of venation are characteristic of different kinds of plants: for example, **dicotyledons** have **netlike venation** (=irregularly scattered, **reticulate venation**) and usually free vein endings; **monocotyledons** have **parallel venation** and rarely free vein endings.
- ❖ The leaf may be simple—with a single blade—or compound—with separate leaflets; it may also be reduced to a spine or scale.





Functions of the leaf

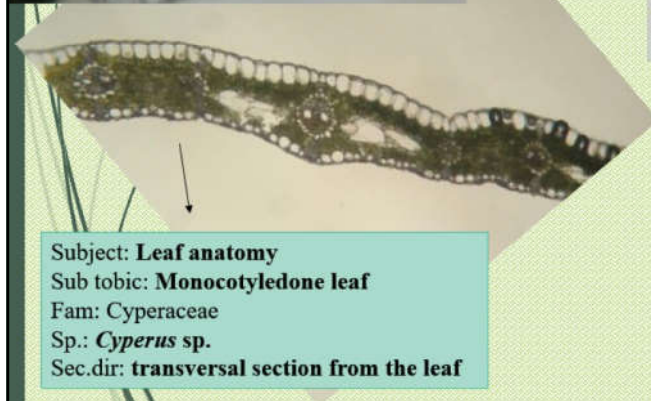
The main function of a leaf is to produce food for the plant by **photosynthesis**. (Other functions are respiration and sweating) Chlorophyll, the substance that gives plants their characteristic green colour, absorbs **light energy**. The internal structure of the leaf is protected by the leaf **epidermis**, which is continuous with the stem epidermis. The central leaf, or **mesophyll**, consists of soft-walled, unspecialized cells of the type known as **parenchyma**. As much as one-fifth of the mesophyll is composed of chlorophyll-containing chloroplasts, which absorb **sunlight** and, in conjunction with certain enzymes, use the **radiant energy** in decomposing **water** into its elements, hydrogen and **oxygen**. The oxygen liberated from green leaves replaces the oxygen removed from the atmosphere by plant and **animal** respiration and by combustion. The hydrogen obtained from water is combined with **carbon dioxide** in the enzymatic processes of photosynthesis to form the sugars that are the basis of both plant and animal life. Oxygen is passed into the atmosphere through stomates—pores in the leaf surface.



Monocot leaf vs. Dicot leaf

Characters	Dicot leaf	Monocot leaf
1. Nature of orientation	Typically dorsio-ventral	Typically iso-bilateral
2. Stomata	Hypostomatic	Amphistomatic
3. Motor cells	Absent	Present in the upper epidermis
4. Mesophyll	Differentiated into palisade and spongy parenchyma	Undifferentiated
5. Veins	Irregularly scattered	Parallelly arranged
6. Xylem vessels	Many protoxylem and metaxylem vessels in each bundle	Two protoxylem and two metaxylem vessels in each bundle
7. Bundle sheath extensions	Made up of collenchyma	Made up of sclerenchyma

Having stomata on both abaxial and adaxial surface



Subject: **Leaf anatomy**
 Sub topic: **Monocotyledone leaf**
 Fam: **Cyperaceae**
 Sp.: ***Cyperus sp.***
 Sec.dir: **transversal section from the leaf**



Subject: **Primary stem anatomy**
 Sub topic: **Dicotyledone leaf**
 Fam: **Araliaceae**
 Sp.: ***Hedera helix***
 Sec.dir: **Transversal section from the leaf**