Leaves – V2 Teacher

Four Functions of Leaves

1. Trap light energy for photosynthesis and produce glucose for cellular respiration
2. Exchange of gases - CO_2 and O_2
3. Water lost from leaves by transpiration helps pull more water up from roots.
4. Provide food, shade, habitat and oxygen for many organisms.

Formula for photosynthesis

$$6\ CO_2 + 6\ H_20 \xrightarrow[\text{chlorophyll}]{\text{sunlight}} C_6H_{12}O_6 + 6\ O_2$$

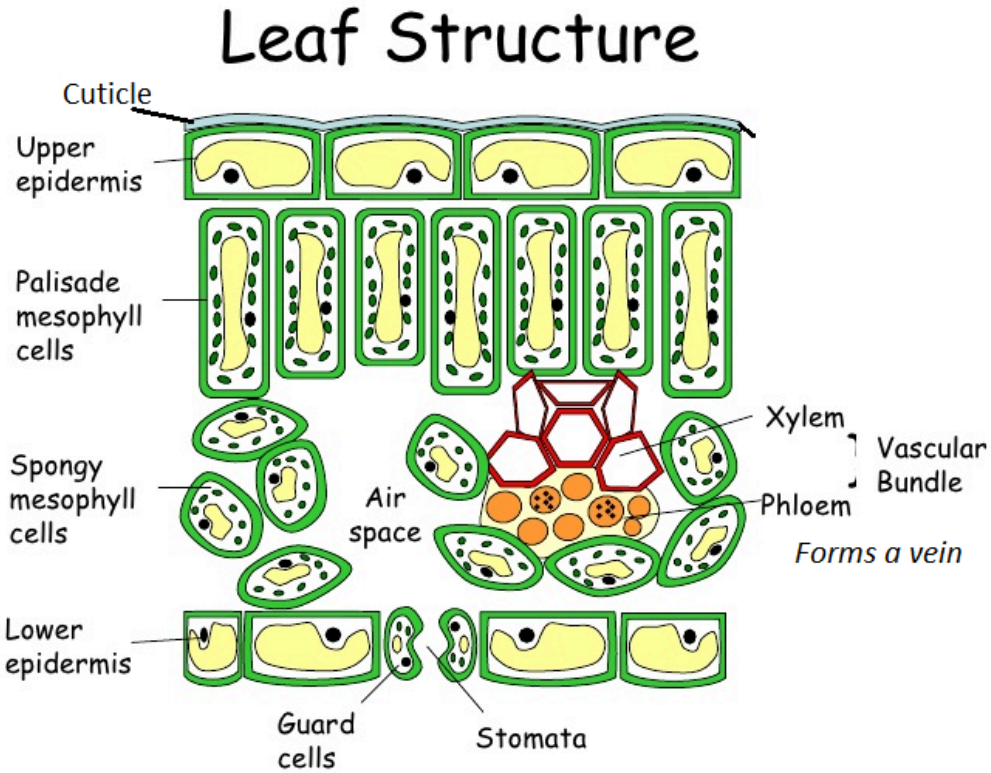
Deciduous Leaves versus Needles

Deciduous leaves are:

- wide to capture more light energy
- flat to increase surface area for gas exchange by diffusion

Needles are advantageous because:

- the thick waxy coating saves water and makes them tough to eat
- needles can photosynthesize all year
- needles have low wind resistance and survive ice and snow



Cuticle and Epidermis

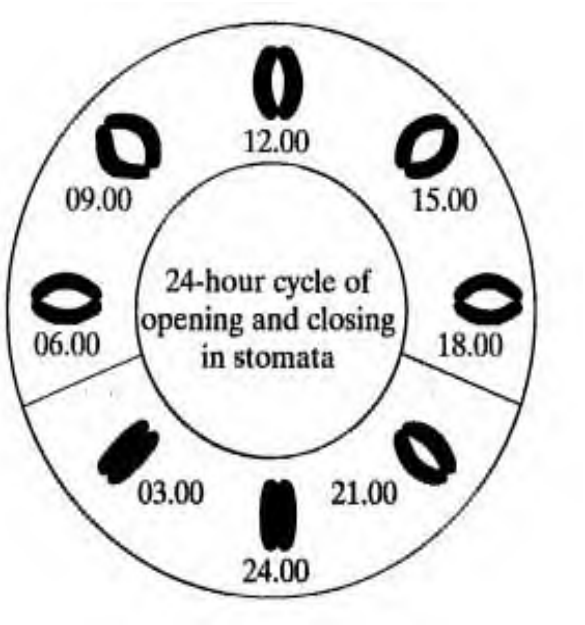
1. Cuticle – a waxy layer to protect leaf and reduce water and gas loss.

2. Epidermis – provide mechanical strength to the leaf
   - are transparent for sunlight to enter
   - lower epidermis has stomata and guard cells

Palisade Cells
- found just under upper epidermis
- contain large numbers of chloroplasts with chlorophyll
- main site of photosynthesis
- long box like structures allows light to enter at the top and gases to diffuse in and out at the bottom of the cell

Stomata and Guard Cells
Leaves have small holes called stomata (plural, singular is stoma) on the bottom surface.
- designed for gas exchange, carbon dioxide in and oxygen out
- water vapour also transpires out

Each hole is opened and closed by 2 guard cells. See p 537!!
Stomata open and close at different times of the day.
When it is light the plant needs CO_2 for photosynthesis so the stoma open.
Even in the light sometimes the stoma partly close to prevent water loss.
At night (darkness) they close.



Spongy Mesophyll
These are loosely packed cells near the bottom of the leaf that have large air spaces for gases to diffuse in and out of the leaf.
Water vapour molecules move into the spaces between the spongy cells and escape through the stomata in a process called transpiration.

Vascular Bundles in Veins
The xylem and phloem in their vascular bundles are found in the veins of a leaf.
- Xylem carries water to all leaf cells
- Xylem carries minerals like nitrates to all leaf cells
- Phloem carries glucose from leaf out to other plant cells

Leaves – V2 Student 2023

Four Functions of Leaves

1. Trap light energy for photosynthesis and _____
2. Exchange of gases - _____
3. Water lost from leaves by_____ helps pull more water up from _____
4. Provide food, shade, habitat and _____for many organisms.

Formula for photosynthesis

sunlight
⟶
chlorophyll

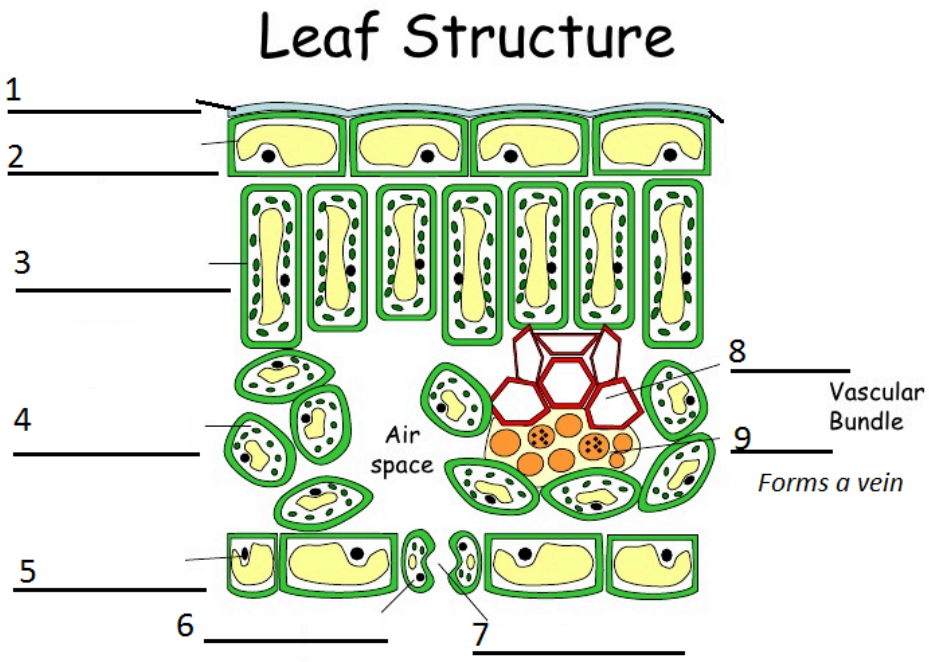
Deciduous Leaves versus Needles

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- _____ to increase surface area for gas exchange by diffusion

Needles are advantageous because:

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- needles can _____ all year
- needles have low _____ and survive ice and snow



Cuticle and Epidermis

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4. Epidermis – provide _____ strength to the leaf
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Palisade Cells

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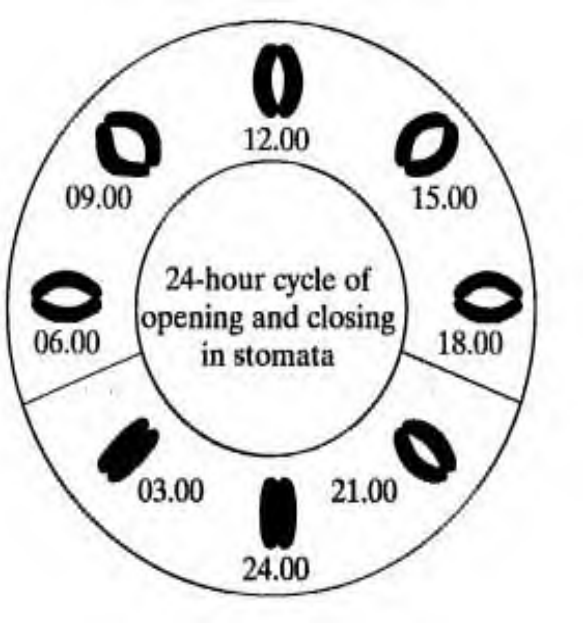
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