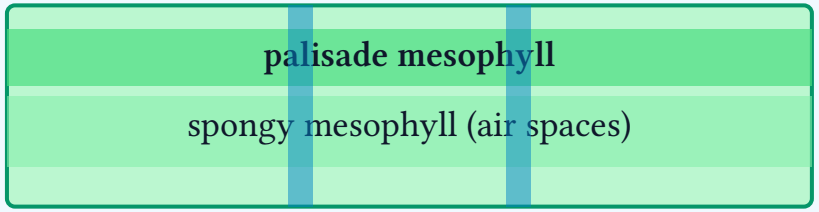
Science 10

Unit C: Cycling of matter in living systems

Plant specialization and leaf systems

Leaf layers

- Palisade cells near the upper surface contain many chloroplasts for light capture.
- Spongy mesophyll contains air spaces that support gas movement to and from cells.



Vascular bundles (xylem/phloem) run through the leaf

Leaf tissue functions

- Palisade tissue receives strong light; spongy air spaces shorten gas-diffusion paths; vascular tissue connects transport.
- Leaf tissues contain specialized cells with structures suited to different functions.
- Name the tissue first, then the job it does for light, gases, or transport.

Key terms

palisade mesophyll

Closely packed, chloroplast-rich leaf tissue specialized for photosynthesis.

spongy mesophyll

Leaf tissue with air spaces that support gas exchange.

vascular bundle

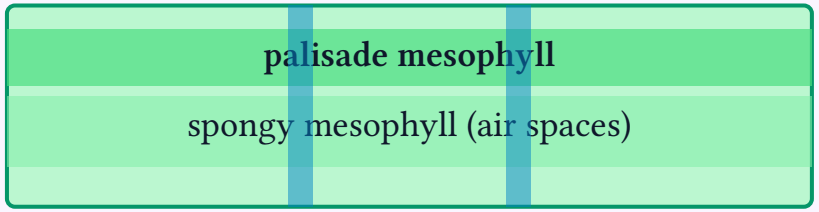
Leaf xylem and phloem that transport water, minerals, and sugars.

specialization

Structural adaptation of a cell or tissue for a particular function.

Multicellular organisms

- A plant needs many cells to share all its jobs.
- Root hairs take in water. Xylem carries it. Phloem carries sugars. Leaves handle light and gases.
- Those tissues depend on each other.
- Specialization answers the size problem, and it creates interdependence.



Vascular bundles (xylem/phloem) run through the leaf

Leaf system

- The epidermis lets light through and protects the leaf.
- Palisade cells pack chloroplasts near the top surface.
- Spongy tissue leaves air spaces so gases can diffuse.
- Xylem brings water in. Phloem carries sugars out. Guard cells set the stomata.



Labelling with reasons

- Label a leaf cross-section and give one structure-function link for each tissue.
- A complete answer puts each tissue in the right place and gives a cause-and-effect link between structure and function.

Image credits

Bioham, Mesophytic leaf micrograph, CC BY-SA 4.0