Mission Assignment: Describe the structure of a leaf

KS3-16-05

In this experiment you will be investigating the gas produced through photosynthesis.

Method:

1. Pick a fresh flat leaf and paint a small section on the top and bottom of the leaf, with nail varnish then leave to dry.
2. Once the varnish is dry, place a piece of sticky tape over the varnish and peel it off.
3. Stick the tape directly over the microscope slide
4. Place the slide on the microscope to examine it.

Draw what you observe in the appropriate space below. Label any key structures you notice.

Equipment

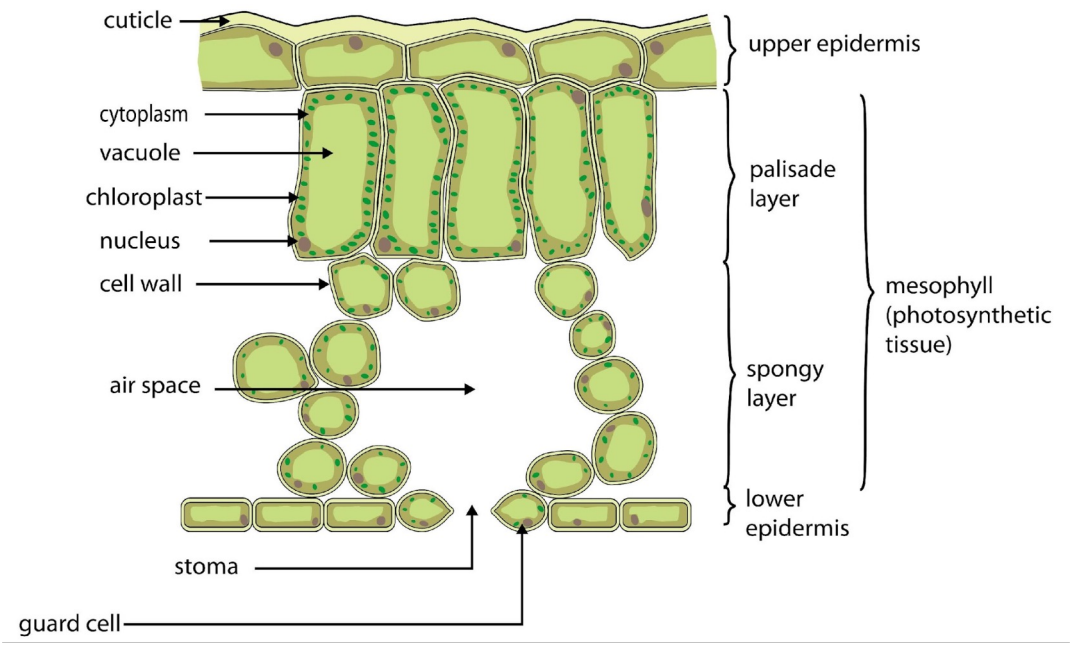
- Clear nail varnish
- Clear sticky tape
- Deciduous leaves
- Microscope
- Microscope slides

Top of leaf
Underside of lead

Describe how the top and underside of a leaf differs in its structure.

Layers of the leaf

The diagram below shows a cross section of a leaf.



The top layer of the leaf (upper epidermis) contains translucent cells topped with a waxy layer called the cuticle. Explain the role of the waxy cuticle.

The second layer (palisade layer) contains plant cells that are full of chloroplasts. Explain what the main role of the palisade layer is.

The third layer (spongy layer) contains a lot of air space. Explain why it is important for this layer to contain a lot of air space.

The underside of the leaf (lower epidermis) contains stomata (singular - stoma). These are openings that open and close at different times of the day. Explain why it is important that stomata don't remain open all the time.

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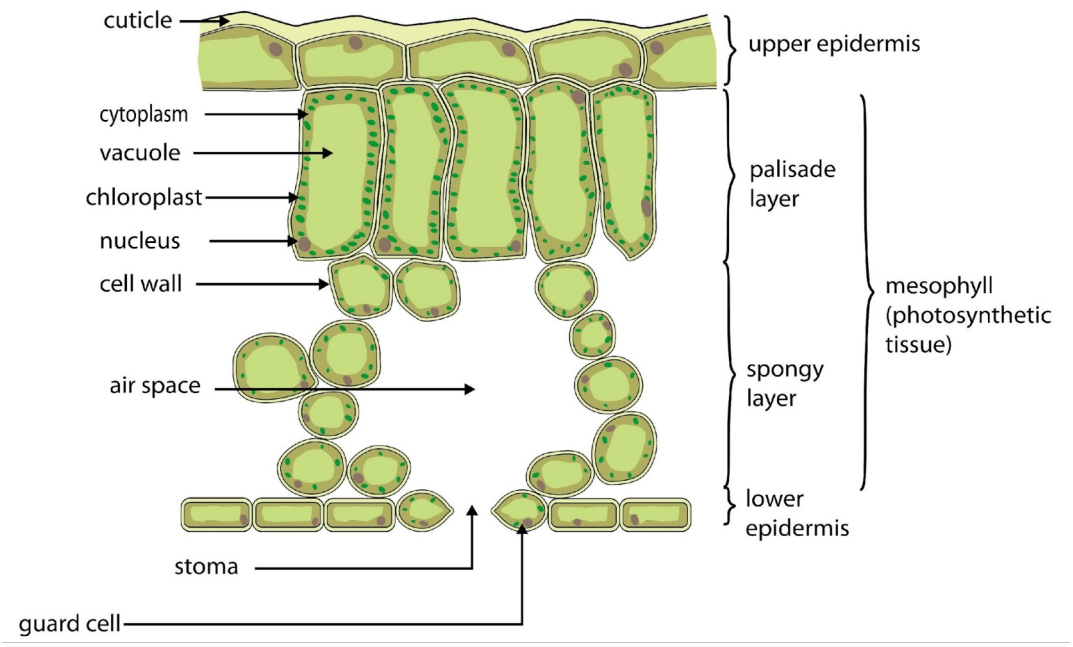
Top of leaf
Underside of lead

Describe how the top and underside of a leaf differs in its structure.

The top of the leaf will appear smooth due to the waxy cuticle. The underside of the leaf has many structures including stomata that open and close to allow gases in and out; midrib, which helps to give the leaf strength to stand out rather than flop; veins, which bring water and nutrients to the leaves and take glucose produced in photosynthesis to other parts of the plant.

Layers of the leaf

The diagram below shows a cross section of a leaf.



The top layer of the leaf (upper epidermis) contains translucent cells topped with a waxy layer called the cuticle. Explain the role of the waxy cuticle.

Has to be transparent to allow light through to the palisade layer. It is waxy to prevent water loss from the epidermis as water is needed for photosynthesis.

The second layer (palisade layer) contains plant cells that are full of chloroplasts. Explain what the main role of the palisade layer is.

The palisade layer is where the majority of photosynthesis takes place.

The third layer (spongy layer) contains a lot of air space. Explain why it is important for this layer to contain a lot of air space.

The plant needs to take in carbon dioxide, through the stomata, for photosynthesis. The air spaces are where it collects before being used up.

The underside of the leaf (lower epidermis) contains stomata (singular - stoma). These are openings that open and close at different times of the day. Explain why it is important that stomata don't remain open all the time.

Stomata allow air in and out of the leaf. If they were open all of the time, water could be lost from the leaf by transpiration. Plants don't photosynthesise at night, so the stomata do not need to be open to take in carbon dioxide.