WJEC Wales Biology A Level

SP 2.2c: Scientific drawing of low power plan of a prepared slide of T.S. leaf

Practical notes

Introduction

Dicotyledons are flowering plants that grow **two** primary leaves.

A **light microscope** can be used to observe a prepared slide of a dicotyledonous leaf.

Equipment

- Light microscope
- Slide of T.S. dicot leaf
- Eyepiece graticule
- Stage micrometer

Risk assessment

Hazard	Risk	Precaution	Emergency
Broken glass	Cuts	Keep glassware away from the edge of the desk; handle microscope slides carefully	Dispose of broken glassware carefully; elevate cuts; do not remove glass from cuts; seek medical assistance

Method

1. **Calibrate** the microscope for all three objective lens magnifications (see 'Calibration of a light microscope' practical).
2. Place the microscope slide of the **T.S. dicot leaf** under the clips on the microscope stage.
3. Turn the **lowest power objective lens** (×4) on the nose piece.
4. Turn the **coarse adjustment knob** to move the stage closer to the lens.
5. Look down the microscope and turn the **coarse adjustment knob** to **focus** the image.
6. Turn the **fine adjustment knob** until the best image is obtained.
7. Rotate to the medium power objective lens (×10) and focus using the **fine adjustment knob.**

8. Draw a rough **sketch** of the **outline** of the leaf.

9. Select a region of the slide (that includes the **central midrib**) to draw a low power plan. Mark this region on the rough sketch.

10. Draw a **low power plan** to show the distribution of tissues but **not** individual cells. *The high power objective lens (×40) can be used to aid in the identification of the different tissue layers.*

11. Label the following structures: **cuticle**; **upper epidermis**; **lower epidermis**; **palisade mesophyll layer**; **spongy mesophyll layer**; **xylem**; **phloem**; **collenchyma**; **sclerenchyma** and **guard cells**. *Collenchyma tissue consists of elongated cells with abnormally thickened cell walls. It is often found under the epidermis and in the veins. Sclerenchyma tissue is made up of cells with lignified walls. It is mainly found in the cortex and is often stained red.*

12. Using the **eyepiece graticule**, draw two lines on the low power plan, measured in **eyepiece units.**

13. Calculate the actual size of the low power plan and hence the **magnification** of the drawing.

Tips for biological drawings

- Drawing should fill at least half of the provided space
- Only draw what you can see
- Use a **sharp pencil**
- Ensure lines are **single**, **complete** and **non-overlapping**
- Do **not** use shading or colour
- Create **straight lines** for labels using a ruler
- Label lines should **not** have arrow heads
- Label lines should **not** intersect
- Include a scale in terms of **eyepiece units**
- Include a title and objective lens power
- Include a **magnification**

Magnification of drawings

$$\text{magnification} = \frac{\text{size of image}}{\text{size of object}}$$

Example diagram

T.S. Leaf of *Ligustrum* Low power plan (×200)