

Edexcel A Biology A-Level

Core Practical 6

Identify sclerenchyma fibres, phloem sieve tubes and xylem vessels and their location within stems through a light microscope.



Microscopy is used to increase **magnification and resolution** of an object. Microscopes can be **optical** or **electron**, and electron microscopes can be **transmission** or **scanning**. Magnification can be calculated by dividing the **size of the image** by the **size of the actual object**.

Equipment

- Plant stem
- Acidified phloroglucinol in ethanol
- Optical microscope
- Microscope slides and coverslips
- Scalpel
- Razor blade
- Paintbrush
- White tile
- Watch glass
- Pipette
- Wax crayon

Method

1. **Calibrate the eyepiece graticule** by placing both on the stage and lining up the divisions of the **stage micrometer** (which have a known length) with the divisions of the eyepiece graticule (for which the length is unknown) to calculate the length of one division of the graticule.
2. Cut **transverse** sections of the plant stem (on the white tile using a razor, wet to reduce friction) as thinly as possible. Select the thinnest sections.
3. Place one section on a microscope slide. Draw a **line in wax crayon** from top to bottom of the slide either side of the specimen to prevent the dye from spreading. Add a few drops of **concentrated phloroglucinol** and lower the cover slip down carefully onto the slide. Make sure there are **no air bubbles** in the slide which may distort the image.
4. Place under a microscope and set the **objective lens** on the lowest magnification, then use the **coarse adjustment knob** to move the lens down to just above the slide.
5. Use the **fine adjustment knob** to carefully re-adjust the focus until the image is clear (can use a higher magnification if needed).
6. Observe and draw the stem.
7. Measure the size of the **stem diameter** and **vascular bundle** using the calibrated eyepiece graticule.



Tips for Biological Drawings

- Use an **HB pencil** and a white, unlined sheet of paper.
- Draw in the centre of the page, and have the drawing take up at least half of the paper.
- **Label** the diagram, also in pencil.
- Use a **ruler** for straight lines and for labelling.
- Use **clear lines** - don't smudge or feather them.
- Only draw what you can see.
- Do an **outline** first.
- Do not use shading or colour.
- Write the **lens power** that has been used somewhere on the diagram.

Risk Assessment

Hazard	Risk	Safety Precaution	In emergency	Risk Level
Acidified phloroglucinol	Corrosive and highly flammable	Wear eye protection; avoid contact with skin	Wash off skin immediately; flood eye/cuts with cold water	Low
Razor	Cuts from sharp object	Cut away from fingers; use forceps to hold sample whilst cutting, keep away from edge of desk	Elevate cuts; apply pressure; seek medical assistance	Low
Broken glass	Cuts from sharp object	Take care when handling slides and coverslips; keep glassware away from edge of desk	Elevate cuts; apply pressure; do not remove glass from wound; seek medical assistance	Low
Ethanol	Irritant/ flammable	Wear eye protection; keep away from naked flames, keep away from edge of desk	Wash eyes and skin with cold water	Low

