

Edexcel B Biology A-Level

Core Practical 2

Use a light microscope to observe and measure biological samples



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
- Optical microscope
- Eyepiece graticule
- Stage micrometer
- Toluidine Blue O stain
- Microscope slides and coverslips
- Razor blade
- Paintbrush
- White tile
- Watch glass
- Pipette
- Mounted needle
- Lens tissue
- Paper towels

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 plant stem (on the white tile using a razor, wet to reduce friction) as thinly as possible. Select the **two thinnest** sections.
3. Mount one section in water on a microscope slide. 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. Add toluidine blue O stain to the other and leave for three minutes, then mount in water on another microscope slide and add the cover slip.
5. 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.
6. Use the **fine adjustment knob** to carefully re-adjust the focus until the image is clear (can use a higher magnification if needed).
7. Observe and draw the stem.
8. 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
Toluidine blue O stain	May cause harm/irritation to eyes or in cuts	Keep away from a naked flame; wear eye protection; avoid contact with skin	Put out fire, seek assistance ;wash off skin immediately; flood eye/cuts with cold water	Medium
Razor/scalpel	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

