

Organisation of the Organism

Practical 2A

Working with a Light Microscope

Skills

You will practise how to:

- use a light microscope;
- state the magnification used on a light microscope.

Objectives:

- To identify the different parts of a light microscope
- To use a light microscope to observe a given specimen

Materials:

- light microscope
- scissors
- cut-out of a small letter (e.g. letter "e") from a newspaper or magazine
- clean glass slide
- dropper
- water
- coverslip
- mounted needle
- filter paper

Procedure and Observations:

- 1 Your teacher will explain the functions of the different parts of a light microscope and demonstrate the proper use of each part.

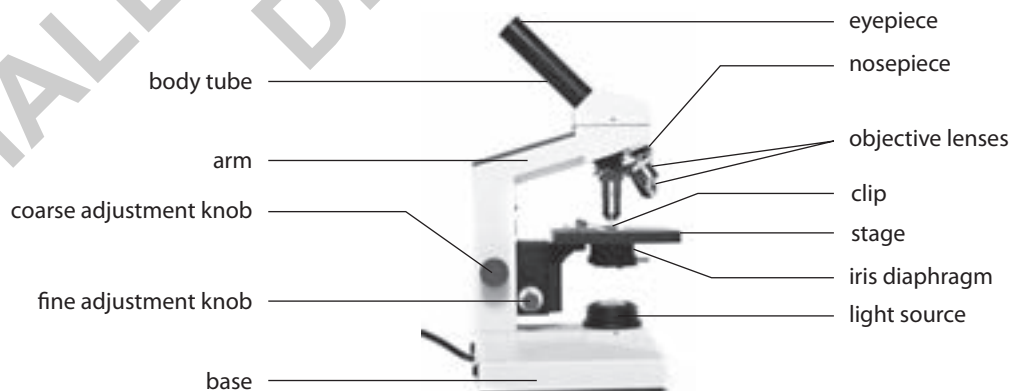


Figure A

- 2 Now, place a light microscope on the laboratory bench with its arm towards you and the stage away from you.



Always carry the microscope with both hands. Use one hand to hold the arm of the microscope and the other hand to support the base of the microscope.



Always lower the microscope gently onto the laboratory bench.

- 3 Rotate the nosepiece of the microscope until the low-power objective lens (10×) clicks into position. The objective lens should lie just above the hole in the stage.
 - ⚠ Always start with the scanning power objective (4×) before moving on to the low-power objective (10×), and then the high-power objective (40×).
 - ⚠ Never wet the lenses or touch them with your fingers. The lenses should be cleaned with lens paper.
- 4 Place the cut-out of a small letter (e.g. "e") on a glass slide. Using a dropper, place a drop of water over the letter "e". Using a mounted needle, carefully lower a coverslip at an angle over the glass slide (Figure B). Use a piece of filter paper to remove excess water (Figure C).

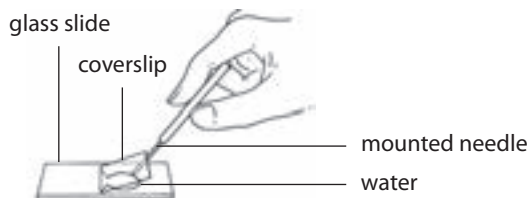


Figure B



Figure C

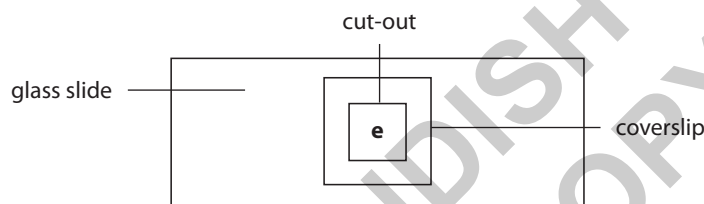


Figure D

- ⚠ Glass slides and coverslips are fragile. Handle them by the edges to prevent breaking and smudging.
 - ⚠ Always keep the microscope dry and clean.
- 5 Place the glass slide on the stage, with the letter "e" the right way up, directly below the objective lens. Make sure the glass slide is held firmly by the clips.
 - 6 Using the coarse adjustment knob, raise the stage until the objective lens is about 3–5 mm from the slide.
 - 7 Look through the eyepiece (Figure E). Slowly adjust the coarse adjustment knob to move the stage away from the objective lens. You should see the letter "e" coming into focus.
 - ⚠ Try to keep both of your eyes open as you look through the microscope. This may help to reduce the strain on your eyes.



Figure E

- 8 Adjust the fine adjustment knob until you obtain a sharp image of the letter "e".

Practical 2C

Examining Plant Cells

Skills**You will practise how to:**

- prepare slides of fresh material using an appropriate staining technique;
- make observations of cells under a light microscope;
- present data in the form of biological drawings.

Objective: To examine plant cells using a light microscope

Materials:

- piece of fleshy scale from an onion bulb
- forceps
- clean glass slide (3)
- dilute iodine solution or methylene blue solution
- coverslip (3)
- mounted needle
- filter paper
- microscope
- scalpel
- hydrilla shoot
- dropper

Procedure and Observations:

- 1 Obtain a fleshy scale leaf from an onion bulb. Cut the leaf into two pieces.
- 2 Bend the leaf to break it but ensure that the two halves are still attached. Then, gently pull the two halves apart. You should observe a thin membrane-like material called the epidermis.

⚠ *Bend and tear the fleshy scale leaf at an approximate angle of 45°.*

- 3 Use a pair of forceps to gently peel off the epidermis (skin) from the inner surface of the leaf.
- 4 Cut a small piece of the epidermis. Place it on a clean glass slide (Figure A).



Figure A

⚠ *Make sure the piece of epidermis is smaller than the coverslip.*

- 5 Spread the epidermis on the slide, making sure that no parts of the epidermis fold or overlap.

6 Add a drop of iodine or methylene blue solution to the slide. Cover the preparation with a coverslip (Figure B).

- ⚠ *Cover the piece of epidermis completely with the iodine or methylene blue solution.*
- ⚠ *Be careful not to introduce any bubbles to your slide preparation. Refer to Practical 2B for instructions on how to remove air bubbles from the slide preparation.*
- ⚠ *Make sure that the epidermis is completely covered by the coverslip.*

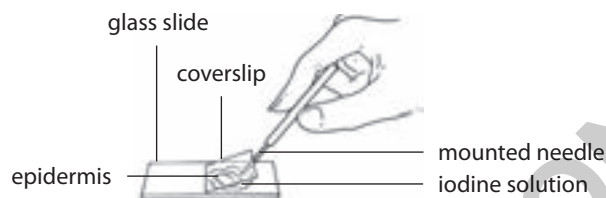


Figure B

7 Examine the epidermis under the microscope.

8 Draw and label one epidermal cell.

Title: _____

9 Remove a hydrilla leaf from the shoot. Place it on a clean glass slide.

10 Add two drops of water to the slide and cover the leaf with a coverslip.

11 Examine the leaf under the microscope, and focus until you can see individual cells clearly.

12 Draw and label one leaf cell.

Title: _____

Analysis:

1 State **one** way in which the cell from the hydrilla leaf differs from the onion epidermal cell.
