2 The cell as the basic unit of life

Practical 2.1

OUP web Video 2.1

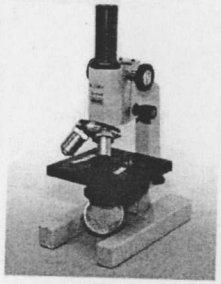
Observation with a light microscope

Objective

To use a light microscope for observing a prepared slide of cells.

Background information

The light microscope is an important tool in biological studies. It makes use of visible light and a system of lenses to produce magnified images of specimens.



❶ Light microscope

Apparatus and materials

per group of four:

1 light microscope

1 prepared slide of cells

Procedure

A Observation at low power magnification

1 Place the microscope on the bench with good illumination (照明).

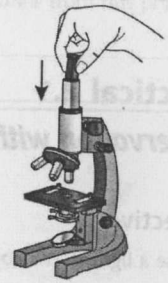
Caution

To carry the microscope, hold its arm in one hand and support the base by the other hand.

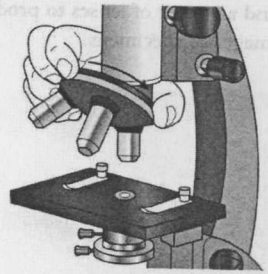
Caution

Always start with the lowest power.

2 Insert a low power eyepiece (e.g. 5X) into the body tube.



3 Select a low power objective (e.g. 4X) by rotating the nosepiece.



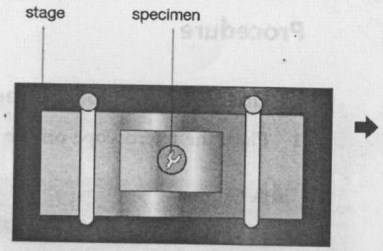
Caution

Never use direct sunlight! It will hurt your eyes.

4 Look through the eyepiece. Adjust the angle of the mirror to reflect light towards the stage.

5 Adjust the condenser and the diaphragm until the light is sufficient and even.

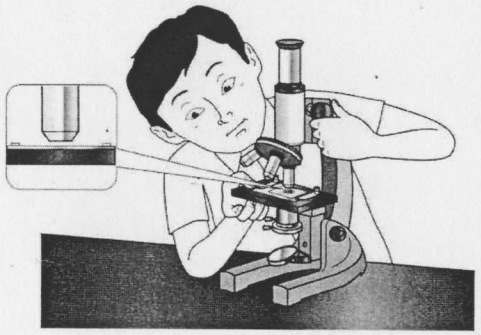
6 Clip a prepared slide on the stage. Make sure the specimen is located at the centre of the hole on the stage.



Caution

Watch the stage from the side to prevent the slide from being jammed against and broken by the objective.

7 Watch the stage from the side and lower the body tube (or raise the stage) by using the coarse adjustment knob until the objective nearly touches the slide.



Caution

Do not lower the body tube with the coarse adjustment knob when looking through the eyepiece. It may crash the slide with the objective.

8 Look through the eyepiece again. Slowly raise the body tube (or lower the stage) using the coarse adjustment knob until the image of the specimen becomes clear.

9 Turn the fine adjustment knob until the image is in focus.

B Observation at high power magnification

1 Focus the specimen with a low power objective first (repeat steps **1** to **9** in part **A**).

2 Move the part of the specimen you want to observe in detail to the centre of view.

Caution

Watch the stage from the side when rotating the nosepiece to avoid the objective touching the slide.

3 Rotate the nosepiece to select a high power objective (e.g. 40X). Focus with the fine adjustment knob.

4 Adjust the diaphragm to brighten the view if necessary.

5 If you cannot get a clear image, follow the steps **a** and **b** below:

a Keep watching the stage from the side. Lower the body tube by turning the coarse adjustment knob until the objective almost touches the cover slip.

b Look through the eyepiece. Focus the image by turning the fine adjustment knob. Adjust the diaphragm to brighten the view if necessary.

SBA note

Raise the body tube and remove the slide from the stage after use. Click the low power objective into position.

Practical 2.1

Results

Draw a labelled high power diagram to show the individual cells in the space below. Write down the title of the diagram and the magnification of the cells.

Questions

1 Why do we need to adjust the diaphragm?

_____

_____

2 When using the high power objective for observation, we should not focus with the coarse adjustment knob. Why?

_____

_____

_____

_____

3 Complete the table below to show the differences between observations at low power and high power magnifications under a microscope.

	Low power	High power
Area of specimen observed (small / large)		
Details of specimen (more / less)		
Brightness of image (bright / dim)		

4 Suppose you are observing a freshwater flatworm with a microscope and it moves to the right so that you cannot see it. In which direction should you move the slide on the stage in order to bring it back to the view? Why?

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_____

Related exercise in textbook

Book 1A Ch 2

p. 31 Q9

p. 31 Q10 (HKCEE Biology 1996 II Q2)

p. 31 Q11 (HKCEE Biology 2004 II Q13)

p. 33 Q19 (SQA General Biology 2006 Q9)