Name Required practical 1: Looking at cells

GCSE Student practical

AQA Biology

Aiming for 4

Specification references:

- Required practical activity 1: Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.
- B1.1.2 Animal and plant cells •
- MS 1b, 1d, 3a •
- WS 1.2 •
- AT 1 Use appropriate apparatus to record length and area •
- AT 7 Use a microscope to make observations of biological specimens and • produce labelled scientific drawings

Aims

In this practical you will use a light microscope to observe plant and animal cells under the microscope. You will make your own drawings of the cells and calculate total magnification.

Learning outcomes

After completing this required practical, you should be able to:

- use a light microscope to observe cells •
- identify the main sub-cellular structures in a cell
- calculate the total magnification •
- prepare a microscope slide. •

Safety

- Take care when handling glass slides as they are very fragile. •
- Avoid getting iodine solution on your skin.
- Wear eye protection. •
- Take care not to break the slide by moving the objective lens too far • downwards.

Equipment

- light microscope with low and high power objective lenses
- microscope slide and cover slip •
- selection of samples: onion, Elodea, filamentous algae •
- dilute iodine solution •
- dropper pipette •

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- scalpel, scissors, forceps
- mounted needle
- blotting paper or filter paper
- range of prepared animal cells including cheek cells and red blood cells
- range of prepared plant cells including onion epidermal cells and leaf palisade cells

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Setting the scene

Refer to Chapter 1, *Cell structure and transport* in the student book for information on using a microscope to look at animal and plant cells.

Method

Preparing your slide

- 1 Collect a sample of the cell you want to observe.
- 2 Remove the inner skin of a layer of onion using forceps, or a thin layer or *Elodea* or filamentous algae using the scalpel.
- 3 Place the thin slice onto a clean glass slide. Use your forceps to keep the onion skin flat on the glass slide.
- 4 Using a pipette, add one or two drops of dilute iodine solution on top of the onion skin or slice of algae or plant.



- 5 Hold the coverslip by its side and lay one edge of the cover slip onto the microscope slide near the specimen.
- 6 Lower the cover slip slowly so that the liquid spreads out.

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Setting up your microscope

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Before you can look at the cells on the slide, you will need to set up your microscope.

Most microscopes have a built-in light source, but if the one you are using does not then you need to arrange the mirror found underneath the stage so that light is directed through the lens system.

- 1 Move the stage to its lowest position.
- 2 Place a prepared slide on the centre of the stage and fix it in place using the clips.
- 3 Select the objective lens with the lowest magnification.
- 4 Look through the eyepiece and turn the coarse focus adjustment until the cells on the slide come into view.
- **5** Turn the fine focus adjustment to sharpen the focus so the cells can be clearly seen.
- 6 If you wish to view the object at greater magnification to see more detail, repeat the above steps using a higher magnification lens.

Results

For each slide that you observe you will need to produce a labelled diagram of the cells you see.

Choose one cell or a small group of cells you wish to draw. You do not need to draw every cell that you can see. Make an accurate drawing of this cell in pencil, ensuring it is large enough to include any structures visible within the cell. Use a ruler to add label lines, identifying the key features of the cell such as the nucleus and cell membrane.

You will need to include the total magnification you were using to observe the cells. This can be calculated using the formula:

Total magnification = Eyepiece lens magnification × Objective lens magnification

How many times bigger the object appears down the microscope is called the magnification. To find the total magnification you used, multiply the magnification of the eyepiece lens (normally $\times 10$ – this means it makes the object look 10 times bigger) by the magnification of the objective lens.

For example, if the objective lens is ×40:

Total magnification = Eyepiece lens magnification × Objective lens magnification

Total magnification = 10×40

Total magnification = $\times 400$

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Questions

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1 Complete the following table using a (✓) to identify the sub-cellular components present within the cells you studied.

	Sub-cellular component	Leaf cell	Cheek cell	Red blood cell	Onion cell		
	nucleus						
	cytoplasm						
	chloroplast						
	cell membrane						
	permanent vacuole						
	cell wall						
D a	Describe what the following parts of a microscope do: a Lens						
b	b Stage						
c Focusing knobs						(1 mark)	
						(1 mark)	
Complete the steps in the calculation below to calculate the magnification of an onion slice seen using an eyepiece lens of $\times 10$ and an objective lens of $\times 50$? Total magnification = Eyepiece lens magnification \times Objective lens magnification							

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Student follow up

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1 a Below is an image of an animal cheek cell.



i Identify parts A–C.

		(3 marks)
	ii State the function of part B.	
		(1 mark)
b	A stain is often added to a slide of cells before it is observed, explain why.	
		(1 mark)
с	A student observed a slide of cheek cells under a light microscope using an eyepiece lens of $\times 10$ and an objective lens of $\times 20$. Calculate the magnification used to observe the cell.	
		(1 mark)

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