
Unit 4 Worksheets

Unit Name: Cells and Molecules		Unit Number: Unit 4
Cover Sheet Title: The Structure of the Cell		
Date Set:	Due Date:	
Assessment Objective(s): AO1, AO2, AO3		
Brief: <p>In these tasks you will investigate the structures found within cells and find out what role each plays in the successful functioning of the cell. You will produce and use prepared slides of cellular tissue and observe them using a light microscope. Some cellular structures are too small to be seen using a light microscope. You will consider the similarities and differences in the ways that light and electron microscopes work.</p>		
Tasks: Task 1 Produce a temporary mount of an onion scale leaf and a sample taken from a yeast culture for observation using a light microscope. Task 2 Make labelled drawings as a record of the observations made in Task 1. Task 3 Produce a report on the structure of plant and animal cells and the function of the cellular organelles. Task 4 Design and produce a pamphlet which describes and explains the similarities and differences in the way light and electron microscopes function. Your target audience is Year 12 non-scientists.		
Resources:		

Worksheet 1

Unit Name: Cells and Molecules		Unit Number: Unit 4
Worksheet Title: The structure of the cell		Worksheet Number: 4.1
Date Set:	Due Date:	
Assessment Objective(s): AO1, AO2		
Brief: It is possible to observe cells in a temporary mount using a light microscope. A temporary mount involves presenting the specimen on a microscope slide in a drop of water or glycerine. The specimen is covered by a cover slip and may be stained. Pencil drawings of the cells are used as a record of any observations made.		
Task: Produce temporary mounts of (i) an onion scale leaf and (ii) a sample taken from a yeast culture. Make labelled drawings as a record of the observations made. In this task you are required to: <ul style="list-style-type: none">• Identify hazards and carry out a risk assessment• Follow set procedures• Record your observations		
Resources: <ul style="list-style-type: none">• Slides• Cover slips• Optical microscope• Light source• Mounted needle• Pipette • Iodine solution• Lactophenol • Red onion• Yeast suspension		

This task is for use in preparation for the external examination for Unit 4 and **does not** form part of a portfolio.

4.1 The Structure of the Cell

TASK

Produce temporary mounts of: (i) onion scale leaf and (ii) a sample taken from a yeast culture. Make labelled drawings as a record of the observations made.

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PRACTICAL INSTRUCTIONS

AO3a, b

(i) Onion scale leaf

1. Cut a wedge from the onion.
2. Pull off a piece of the inner scale leaf. Use the most coloured part of the onion.
3. Mount the tissue in iodine solution on a clean microscope.
4. Cover the tissue with a cover slip (try not to trap air bubbles under the cover slip).
5. Observe the tissue under low power.
6. Choose a cell which appears to be coloured.
7. Observe the cell under high power.
8. Draw the cell including as many structures as you can see.
9. Label the nucleus, nuclear membrane, nucleoplasm, granular cytoplasm, cell vacuole vacuolar membrane and the cell wall.

(ii) Yeast cells

1. Place a small drop of yeast suspension onto a clean microscope slide.
2. Add a drop of iodine solution.
3. Cover with a cover slip.
4. Place a small drop of yeast suspension onto a second clean microscope slide.
5. Add a drop of lactophenol.
6. Observe both slides under high power.
7. Using information from both slides (and what you learnt from the onion cell) draw a yeast cell, labelling as many structures as you can.

Worksheet 2

Unit Name: Cells and Molecules		Unit Number: Unit 4
Worksheet Title: The structure of plant and animal cells and their organelles.		Worksheet Number: 4.2
Date Set:	Due Date:	
Assessment Objective(s): AO1, AO2		
Brief: Using a variety of sources, produce a detailed set of notes and illustrations to describe the structure and function of plant and animal cells as seen by light and electron microscopy.		
Task: Your report should include: <ul style="list-style-type: none">• labelled drawings, photomicrographs and electron micrographs of plant and animal cells;• a list of the structures visible in an electron micrograph that are not visible using a light microscope;• some reference to the size of cellular organelles;• reference to the roles of named structures found in plant and animal cells;• a table comparing the structure of plant and animal cells.		
Resources:		

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Worksheet 3

Unit Name: Cells and Molecules		Unit Number: Unit 4
Worksheet Title: Light and electron microscopy		Worksheet Number: 4.3
Date Set:	Due Date:	
Assessment Objective(s): AO1, AO2		
Brief: Design and produce a pamphlet which describes the basic layout of light and electron microscopes and the way they function. Summarise the similarities and differences between them. Target audience is Year 12 non-scientists.		
Task: Your pamphlet should include: <ul style="list-style-type: none">• basic principles of light and electron microscopy;• a drawing of light microscope in vertical section to show position of specimen on stage, light source, position of lenses and the pathway taken by light;• a drawing of an electron microscope in vertical section to show position of specimen, electromagnets, screen, optical lenses, pathway taken by the electrons;• function of the parts shown in the drawings;• a table, summarising differences between light and electron microscopy.		
Resources:		

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