
Teaching Plan

Unit 4: Cells and Molecules

The following plan is based on 12 weeks at 5 hours per week (4 hours contact time + 1 hour directed study). This unit is assessed by a 45 minute written paper and a pre-prepared plan for an investigation. Candidates will **not** be expected to carry out their plan.

The learning activities are suggestions only. Teachers may wish to develop alternative strategies.

Week number	Specification Unit Reference	Suggested Learning Activity	Resources
1	<p>4.2.2: The structure of the cell</p> <ul style="list-style-type: none">• Produce a slide of a cellular tissue and describe the structures observed within the cell using a light microscope;• Describe the additional structures observed using an electron microscope;• Explain the functional differences between a light microscope and an electron microscope;• Explain the role of the cellular organelles found in both animal and plant cells.	<p>Task 1 and 2: Practical: Produce slides</p> <p>Task 3: Research: Extra structures and the roles of the cellular organelles found in both animal and plant cells</p> <p>Task 4: Research: Produce a pamphlet to explain differences (target audience Year 12 non-scientists)</p>	<p>Teacher generated: 'Need to know sheet'. Should include the principles, facts etc. likely to be assessed based on the specification references.</p> <p>In this support pack: Unit 4 Worksheets1-3</p>

Week number	Specification Unit Reference	Suggested Learning Activity	Resources
2	<p>4.2.3: Some molecules found within the cell</p> <ul style="list-style-type: none"> Understand the importance of carbon in biological molecules; Carry out tests for: reducing sugar, non-reducing sugar, starch, lipids and proteins; Understand the structure of carbohydrates to include the glycosidic bond, condensation and hydrolysis reactions; Understand the structure of lipids and phospholipids, to include the ester bond, saturated and unsaturated fats; Describe the role of phospholipids in the structure of the cell membrane, to include the fluid mosaic model; Understand the structure of proteins to include the peptide bond, alpha helix and beta pleated sheets, primary, secondary and tertiary structures and the formation of globular proteins. 	<p>Task 1: Teacher led instruction Task 2: Practical – food tests</p> <p>Task 3: Candidate research based</p>	<p>Teacher generated: 'Need to know sheet'. Should include the principles, facts etc. likely to be assessed based on the specification references.</p> <p>Worksheets for candidate tasks</p>

Week number	Specification Unit Reference	Suggested Learning Activity	Resources
3	<p>4.2.3: Some molecules found within the cell</p> <ul style="list-style-type: none"> Understand the function and importance of water as a biological molecule; Describe the process of osmosis and explain how cells maintain their correct water balance; Explain the role of enzymes within the cell; Explain the structure and function of DNA. 	<p>Task 1: Teacher led</p> <p>Task 2: Practical</p> <p>Task 3: Candidate research</p> <p>Task 4: Candidate research. Produce a pamphlet to explain structure and function of DNA (target audience Year 12 non-scientists).</p>	<p>Teacher generated: 'Need to know sheet'. Should include the principles, facts etc. likely to be assessed based on the specification references.</p> <p>Worksheets for candidate tasks</p>
4	<p>4.2.4: Investigation of cells and cell types, measurement of them and counting cell numbers</p> <ul style="list-style-type: none"> Use an eyepiece graticule to determine the relative sizes of different cells or tissue structures; Use a stage micrometer to determine actual dimensions of cells; Use a haemocytometer to determine the number of cells in a specific volume of liquid; Explain how and why the brewing industry and pathology laboratories use Coulter counters; Explain how and why scientists in biomedical research and pathology laboratories study cells, cell counts and manifestations of cell changes. 	<p>Task 1: Practical</p> <p>Task 2: Practical</p> <p>Task 3: Practical</p> <p>Task 4: Candidate research</p> <p>Task 5: Case study</p>	<p>Teacher generated: 'Need to know sheet'. Should include the principles, facts etc. likely to be assessed based on the specification references.</p> <p>Worksheets for candidate tasks</p>

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5	<p>4.2.5: Investigation of the work of molecular biologists in cellular research</p> <ul style="list-style-type: none"> Find out how cell counts can be used in the investigation of anaemia and leukaemia; Find out how cervical smear tests are analysed in a hospital pathology laboratory for positive and negative results; Explain the diagnostic tests, to include the use of monoclonal antibodies, that can be used to identify genetic diseases; Discuss the moral and ethical implications of diagnostic testing for genetic diseases 	<p>Task 1: Research: Cell counts in diagnosis and treatment of anaemia and leukaemia. Cervical smear test for cancer. Produce a report.</p> <p>Task 2: Case Study</p> <p>Task 3: Research: Produce a pamphlet outlining the moral and ethical issues associated with diagnostic testing for genetic diseases. Include arguments for and against.</p>	<p>Teacher generated: 'Need to know sheet'. Should include the principles, facts etc. likely to be assessed based on the specification references.</p> <p>Worksheets for candidate tasks</p>
6	<p>4.2.5: Investigation of the work of molecular biologists in cellular research</p> <ul style="list-style-type: none"> Describe the clinical symptoms of cystic fibrosis and Huntington's chorea, as examples of genetic disease, and their effect on the individual 	<p>Task 1: Case study assignment.</p> <p>Task 2: Put together and deliver a presentation (OHP or PowerPoint) on the chosen genetic disease. Your presentation must include the following points: (i) etc.</p>	<p>Teacher generated: 'Need to know sheet'. Should include the principles, facts etc. likely to be assessed based on the specification references.</p> <p>Worksheets for candidate tasks</p>

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7	Assessment	<p>Teacher led.</p> <p>Task 1 Specification review.</p> <p>Identify areas covered, revise essential content. Identify weaknesses, omissions.</p> <p>Task 2 Exam technique</p> <p>Task 3 Model questions</p> <p>Task 3 Peer assessment</p>	<p>Teacher generated:</p> <p>Worksheets for candidate tasks</p> <p>Photocopies of examination questions</p>
8-12	4.2.1: Planning an investigation	<p>Teacher led</p> <p>Task 1: Marking criterion A</p> <p>Task 2: Marking criteria B –C</p> <p>Task 3: Marking criterion D</p> <p>Task 4: Marking criteria H - I</p> <p>Task 5: Marking criteria L – M</p> <p>Task 6: Marking criteria N – P</p> <p>Task 7: Marking criteria Q –R</p> <p>Task 8: Marking criteria S –T</p> <p>Task 9: Marking criteria U</p> <p>Task 10: Marking criteria V –X</p> <p>Task 11: Peer Assessment.</p> <p>Mark a pre-prepared plan.</p>	<p>Teacher generated:</p> <p>Background info sheets:</p> <ul style="list-style-type: none"> General principles of planning an investigation. What do the marking criteria mean in terms of writing the plan? <p>List of possible investigation titles to use in Week 8 activities.</p> <p>From these support materials:</p> <ul style="list-style-type: none"> Photocopies of G623/INST, G623/PLAN and G623/INSERT from specimen assessment materials. (ASci SAMs all.pdf) Photocopy of the unmarked exemplar plan (ASci unit4 example unmark.pdf)
9-12	4.2.1: Planning an investigation		

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