

Year 12: Teacher B

All numbers refer to specification points

| Timing | Unit Title | Key Question | Knowledge | Assessing understanding |
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| Autumn | 3.2 Cells | The incredible world of cells. | <ul style="list-style-type: none"> All life on Earth exists as cells. These have basic features in common. Differences between cells are due to the addition of extra features. This provides indirect evidence for evolution. All cells arise from other cells, by binary fission in prokaryotic cells and by mitosis and meiosis in eukaryotic cells. All cells have a cell-surface membrane and, in addition, eukaryotic cells have internal membranes. The basic structure of these plasma membranes is the same and enables control of the passage of substances across exchange surfaces by passive or active transport. Cell-surface membranes contain embedded proteins. Some of these are involved in cell signalling – communication between cells. Others act as antigens, allowing recognition of ‘self’ and ‘foreign’ cells by the immune system. Interactions between different types of cell are involved in disease, recovery from disease and prevention of symptoms occurring at a later date if exposed to the same antigen, or antigen-bearing pathogen. <p>Specification reference: 3.2.1- 3.2.4</p> | <p>How understanding is assessed</p> <p>Students will be assessed on their ability to:</p> <ul style="list-style-type: none"> Recall the knowledge covered Explain the Biological processes covered. Interpret graphical and experimental data, Make connections between different areas of understanding. <p>Skills</p> <ul style="list-style-type: none"> Description Explanation Evaluation Comparison Planning and carrying out investigations Carrying out statistical tests and applying maths formulae <p>Assessment will take the form of written questions in a test.</p> <p>Students will also be assessed on their ability to effectively carry out the following:</p> <p><u>Required practical 2:</u> Preparation of stained squashes of cells from plant root tips; set-up and use of an optical microscope to identify the stages of mitosis in these stained squashes and calculation of a mitotic index.</p> |

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| | | | | <p><u>Required practical 3:</u> Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue.</p> <p><u>Required practical 4:</u> Investigation into the effect of a named variable on the permeability of cell-surface membranes.</p> |
| Spring and summer | 3. Organisms exchange substances with their environment | How are organisms adapted for exchange? | <ul style="list-style-type: none"> The internal environment of a cell or organism is different from its external environment. The exchange of substances between the internal and external environments takes place at exchange surfaces. To truly enter or leave an organism, most substances must cross cell plasma membranes. In large multicellular organisms, the immediate environment of cells is some form of tissue fluid. Most cells are too far away from exchange surfaces, and from each other, for simple diffusion alone to maintain the composition of tissue fluid within a suitable metabolic range. In large organisms, exchange surfaces are associated with mass transport systems that carry substances between the exchange surfaces and the rest of the body and between parts of the body. Mass transport maintains the final diffusion gradients that bring substances to and from the cell membranes of individual cells. It also helps to maintain the relatively stable environment that is tissue fluid. <p>Specification reference: 3.3.1/3.3.2/3.3.4</p> <p><i>Beyond spec - role of cytoplasmic and cell wall space routes for transpiration and translocation</i></p> | <p>How understanding is assessed</p> <p>Students will be assessed on their ability to:</p> <ul style="list-style-type: none"> Recall the knowledge covered Explain the Biological processes covered. Interpret graphical and experimental data, Make connections between different areas of understanding. <p>Skills</p> <ul style="list-style-type: none"> Description Explanation Evaluation Comparison Planning and carrying out investigations Carrying out statistical tests and applying maths formulae <p>Assessment will take the form of written questions in a test.</p> <p>Students will also be assessed on their ability to effectively carry out the following: Required practical 5: Dissection of animal or plant gas exchange system or mass transport system or of organ within such a system.</p> |

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| Post exam summer term | 3.7.4 Populations in ecosystems | How do populations in ecosystems interact and change? | <p>Understanding of:</p> <ul style="list-style-type: none"> • Populations • Ecosystems and habitats • Factors which affect population size • Methods for estimating populations size • Succession • Conservation and management of succession | <p>Students will be assessed on their ability to:</p> <ul style="list-style-type: none"> • Recall the knowledge covered • Explain the Biological processes covered. • Interpret graphical and experimental data, • Make connections between different areas of understanding. <p>Skills</p> <ul style="list-style-type: none"> • Description • Explanation • Evaluation • Comparison • Planning and carrying out investigations • Carrying out statistical tests and applying maths formulae <p>Assessment will take the form of written questions in a test.</p> <p>Students will also be assessed on their ability to effectively carry out the following: Required practical 12: Investigation into the effect of a named environmental factor on the distribution of a given species.</p> |