



**Subject: Biology**

**Stage: KS4**

NB:

-Bold indicates separate science Biology content only

-Topics vary in length and may be delivered over multiple half terms, please see curriculum maps.

| <b>KS4:<br/>Yr 10 &amp; 11</b> | <b>4.1 Cell Biology</b>                                                                                                     | <b>4.2 Organisation</b>                                                                                        | <b>4.3 Infection &amp; Response</b>                                                                                                        | <b>4.4 Bioenergetics</b>                                                                                               | <b>4.5 Homeostasis and Response</b>                                                           | <b>4.6 Inheritance, variation and evolution</b>                                                                      | <b>4.7 Ecology</b>                                                                                                     |
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| <b>Yr 9</b>                    | <i>Year 9 transition unit</i>                                                                                               |                                                                                                                |                                                                                                                                            |                                                                                                                        |                                                                                               |                                                                                                                      |                                                                                                                        |
| <b>Yr 10</b>                   |                                                                                                                             | <i>Yr 10 unit 1</i>                                                                                            | <i>Yr 10 unit 2</i>                                                                                                                        | <i>Yr 10 unit 3</i>                                                                                                    | <i>Year 10 unit 4</i>                                                                         |                                                                                                                      |                                                                                                                        |
| <b>Yr 11</b>                   |                                                                                                                             |                                                                                                                |                                                                                                                                            |                                                                                                                        | <i>Year 11 unit 1</i>                                                                         | <i>Year 11 unit 2</i>                                                                                                | <i>Year 11 unit 2</i>                                                                                                  |
| <b>Aim of Unit</b>             | The aim of this topic is to build on the Organisms-Cells topic from KS3 and further develop the knowledge and understanding | The aim of this topic is to build on the Organisms-Breathing and Digestion topics from KS3 and further develop | The aim of this topic is to build on knowledge from KS3 and further develop the knowledge and understanding of our body's immune-response. | The aim of this topic is to build on the topic Ecosystems from KS3 and further develop the knowledge and understanding | The aim of this topic is to build on knowledge from KS3 and further develop the knowledge and | The aim of this topic is to build on the Evolution and Inheritance topics from KS3 and further develop the knowledge | The aim of this topic is to build on the Ecosystems topic from KS3 and further develop the knowledge and understanding |

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|                                                                                                       | around cells in organisms. It will also prepare pupils for the required disciplinary knowledge through the required practical activities. | the knowledge and understanding around Organisation. It will also prepare pupils for the required disciplinary knowledge through the required practical activities. | It will also prepare pupils for the required disciplinary knowledge through the required practical activities. | around Respiration and Photosynthesis. It will also prepare pupils for the required disciplinary knowledge through the required practical activities. | understanding around our body's response to internal and external changes. It will also prepare pupils for the required disciplinary knowledge through the required practical activities. | and understanding around how evolution takes place, how we inherit characteristics and how variation occurs. It will also prepare pupils for the required disciplinary knowledge through the required practical activities. | around interdependence between humans and other organisms. It will also prepare pupils for the required disciplinary knowledge through the required practical activities. |
| <b>Composite Knowledge</b><br><br><i>(a task that requires several building blocks or components)</i> | Pupils will extend their understanding of key points and applications relating to Cells.                                                  | Pupils will extend their understanding of key points and applications relating to Organisation.                                                                     | Pupils will extend their understanding of key points and applications relating to Infection and Response.      | Pupils will extend their understanding of key points and applications relating to Bioenergetics.                                                      | Pupils will extend their understanding of key points and applications relating to Homeostasis and Response.                                                                               | Pupils will extend their understanding of key points and applications relating to Inheritance, Variation and Evolution.                                                                                                     | Pupils will extend their understanding of key points and applications relating to Ecology                                                                                 |
| <b>Component Knowledge</b><br><br><i>(the building blocks that together, when known, allow</i>        | 4.1.1.1 Eukaryotes and prokaryotes<br>4.1.1.2 Animal and plant cells                                                                      | 4.2.1 Principles of organisation<br>4.2.2.1 The human                                                                                                               | 4.3.1.1 Communicable (infectious) diseases<br>4.3.1.2 Viral diseases                                           | 4.4.1.1 Photosynthetic reaction<br>4.4.1.2 Rate of photosynthesis                                                                                     | 4.5.1 Homeostasis<br>4.5.2 The human nervous system<br>4.5.2.1                                                                                                                            | 4.6.1.1 Sexual and asexual reproduction<br>4.6.1.2 Meiosis<br><b>4.6.1.3 Advantages</b>                                                                                                                                     | 4.7.1.1 Communities<br>4.7.1.2 Abiotic factors<br>4.7.1.3 Biotic factors                                                                                                  |

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| <i>successful performance of a complex task)</i> | 4.1.1.3 Cell specialisation<br>4.1.1.4 Cell differentiation<br>4.1.1.5 Microscopy<br><b>4.1.1.6 Culturing microorganisms</b> (separates only)<br>4.1.2.1 Chromosomes<br>4.1.2.2 Mitosis and the cell cycle<br>4.1.2.3 Stem cells<br>4.1.3.1 Diffusion<br>4.1.3.2 Osmosis<br>4.1.3.3 Active transport | digestive system<br>4.2.2.2 The heart and blood vessels<br>4.2.2.3 Blood<br>4.2.2.4 Coronary heart disease: a non-communicable disease<br>4.2.2.5 Health issues<br>4.2.2.6 The effect of lifestyle on some non-communicable diseases<br>4.2.2.7 Cancer<br>4.2.3.2 Plant organ system<br>4.2.3.1 Plant tissues<br>4.2.3.2 Plant organ system | 4.3.1.3 Bacterial diseases<br>4.3.1.4 Fungal diseases<br>4.3.1.5 Protist diseases<br>4.3.1.6 Human defence systems<br>4.3.1.7 Vaccination<br>4.3.1.8 Antibiotics and painkillers<br>4.3.1.9 Discovery and development of drugs<br><b>4.3.2.1 Producing monoclonal antibodies (HT only)</b><br><b>4.3.2.2 Uses of monoclonal antibodies (HT only)</b><br><b>4.3.3 Plant disease (biology only)</b><br><b>4.3.3.1 Detection and identification of plant diseases</b><br><b>4.3.3.2 Plant defence responses</b> | 4.4.2.1 Aerobic and anaerobic respiration<br>4.4.2.2 Response to exercise<br>4.4.2.3 Metabolism | Structure and function<br><b>4.5.2.2 The brain</b><br><b>4.5.2.3 The eye</b><br><b>4.5.2.4 Control of body temperature</b><br>4.5.3.1 Human endocrine system<br>4.5.3.2 Control of blood glucose concentration<br><b>4.5.3.3 Maintaining water and nitrogen balance in the body</b><br>4.5.3.4 Hormones in human reproduction<br>4.5.3.5 Contraception<br>4.5.3.6 The use of hormones to treat infertility (HT only)<br>4.5.3.7 Negative | <b>and disadvantages of sexual and asexual reproduction</b><br>4.6.1.4 DNA and the genome<br><b>4.6.1.5 DNA structure</b><br>4.6.1.6 Genetic inheritance<br>4.6.1.7 Inherited disorders<br>4.6.1.8 Sex determination<br>4.6.2.1 Variation<br>4.6.2.2 Evolution<br>4.6.2.3 Selective breeding<br>4.6.2.4 Genetic engineering<br><b>4.6.2.5 Cloning</b><br><b>4.6.3.1 Theory of evolution (biology only)</b><br><b>4.6.3.2 Speciation</b> | 4.7.1.4 Adaptations<br>4.7.2.1 Levels of organisation<br>4.7.2.1 Required practical 9: Field investigations<br>4.7.2.2 How materials are cycled<br>4.7.2.3 Decomposition<br><b>4.7.2.3 Required practical 10: Decay</b><br><b>4.7.2.4 Impact of environmental change (HT only)</b><br>4.7.3.1 Biodiversity<br>4.7.3.2 Waste management<br>4.7.3.3 Land use<br>4.7.3.4 Deforestation<br>4.7.3.5 Global warming<br>4.7.3.6 Maintaining biodiversity<br><b>4.7.4.1 Trophic levels</b> |
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|                                                                   |                                                                                                                                                                                                 |                                                                                                                                                                                                                                   |                                                                                                                                                                                                             |                                                                                                                                                                                                                                               | feedback (HT only) 4.5.4 Plant hormones<br><b>4.5.4.1 Control and coordination</b><br><b>4.5.4.2 Use of plant hormones (HT only)</b>                                                                             | <b>4.6.3.3 The understanding of genetics</b><br>4.6.3.4 Evidence for evolution<br>4.6.3.5 Fossils<br>4.6.3.6 Extinction<br>4.6.3.7 Resistant bacteria<br>4.6.4 Classification of living organisms                                       | <b>4.7.4.2 Pyramids of biomass</b><br><b>4.7.4.3 Transfer of biomass</b><br><b>4.7.5.1 Factors affecting food security</b><br><b>4.7.5.2 Farming techniques</b><br><b>4.7.5.3 Sustainable fisheries</b><br><b>4.7.5.4 Role of biotechnology</b>      |
| <b>Rationale (why?):<br/>Links to prior &amp; future learning</b> | Builds on KS3 in Organisation 1 and 2. This unit prepares pupils for continuing energy at KS5 in A level units such as 'Cell'. It offers opportunities to explore Stem careers in Cell biology. | Builds on KS3 in Organisation 1 and 2. This unit prepares pupils for continuing energy at KS5 in A level units such as 'Organisms'-exchange substances with their environment. It offers opportunities to explore Stem careers in | Builds on KS3 in Organisation 1 and 2. This unit prepares pupils for continuing energy at KS5 in A level units such as 'Cells'. It offers opportunities to explore Stem careers in Virology and Immunology. | Builds on KS3 in Ecosystems 1 and 2. This unit prepares pupils for continuing energy at KS5 in A level units such as 'Energy transfers in and between organisms'. It also offers opportunities to explore Stem careers such as Physiotherapy. | Builds on KS3 in Organisation 1 and 2. This unit prepares pupils for continuing energy at KS5 in A level units such as 'Organisms respond to their environment'. It offers opportunities to explore Stem careers | Builds on KS3 in Organisation 1 and 2. This unit prepares pupils for continuing energy at KS5 in A level units such as 'The control of gene' expression. It offers opportunities to explore Stem careers in climate change and Zoology. | Builds on KS3 in Organisation 1 and 2. This unit prepares pupils for continuing energy at KS5 in A level units such as 'Genetics populations, evolutions and ecosystems'. It offers opportunities to explore Stem careers in genetics and fertility. |

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|                        |                                                                                                                                                                   | Physiology and Medicine. |  |  | such as Neuroscience. |  |  |
| <b>Assessment Task</b> | Embedded formative assessment throughout. End of topic assessment. (Foundation or Higher). H/W quiz on Sparx every week to retain knowledge                       |                          |  |  |                       |  |  |
| <b>Enrichment</b>      | Practical lessons applied to everyday scenarios.<br>Utilising Sparx and other online providers to facilitate enrichment.<br>Careers link identified with in units |                          |  |  |                       |  |  |