

## Curriculum Overview – Biology

|                | Year 7   | Year 8  | Year 9   | Year 10   | Year 11   |
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| <b>Cells</b>   | Students learn about movement and cells. They learn about how the skeleton functions and how joints work. They learn how the cell is structured and how simple cells function (prokaryotes). They also will cover organisation. This will develop further in their cells topic at GCSE transition year. Learning about organisation will link with the digestion and enzymes topic in transition year. Students also develop procedural knowledge of microscopy and microscopy calculations which links to content in transition year. |   | The first unit of GCSE content is the cells topic. Students learn about how the cell is structured and the function of the organelles. They develop further on their knowledge of microscopy and how to use a microscope. Students look further into how cell transport works and how the cell contains substances from its environment. This knowledge links well with the reproduction topic in Year 11 as students then cover cellular reproduction/inheritance and Biology students cover DNA. | In Year 10 students expand on the concept of cells by looking at pathogens and how they cause communicable disease. They learn about the structure and function of bacteria, viruses, protists and fungi cells and what diseases they cause. Biologists expand further on this by learning about how plants disease and how plants can respond to potential threats. In addition, in the communicable disease topic, students learn how drugs are developed to treat infections and how vaccinations work to provide immunity. Biologists look at monoclonal antibodies and how they are being developed to tackle the spread of disease. | In Year 11 the concept of cells is delved into further by looking at cellular reproduction and inheritance, students look at the structure of DNA within cells and how DNA replication happens inside of cells and its purpose. Students look at cell division and compare mitosis with meiosis. More about bacteria cells is learnt here and links with the disease topic from Year 10.        |
| <b>Ecology</b> | Students develop their knowledge of the world around them during this topic, focusing on nature, survival, and reproduction of organisms. They will learn about food chains and food webs, reproduction in plants, how plants are adapted to reproduce and the relationship between organisms and their environment. The latter links with the ecology topic at Year 11 as students study this further.  | CURRENT – DEVELOPING NEW<br>YEAR 8 NEXT YEAR<br>Students develop their knowledge of the world around them during this topic, focusing on nature, survival, and reproduction of organisms. They will learn about food chains and food webs, reproduction in plants, how plants are adapted to reproduce and the relationship between organisms and their environment. The latter links with the ecology topic at Year 11 as students study this further. |  |   | In year 11 students look at ecosystems in more depth whilst carrying some knowledge from Year 7 food chains, bioaccumulation and expanding into sampling. Biology students go deeper by looking at pyramids of biomass, fish stocks and living more sustainably. They develop knowledge of ecosystems by looking at factors that affect food chains and how food can be produced in the future. |

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| Genes, Variation and Inheritance | In this topic, students learn about variation and classification of species, adaptations, human reproduction, and growth of a fetus. They will have previous knowledge of cells from the cells topic to aid their understanding. This topic links well with the inheritance topic in Year 11. |   |  |   | Students develop this information further in the inheritance topic. Here, students continue to learn about adaptations and variation, along with going deeper into the genetics of inheritance and alleles. They also learn more about natural selection and the theory of evolution and Biology students dig deeper into this looking at speciation and fossil records. Here, knowledge of the reproduction systems are developed further and they start to look at the hormones involved and how the endocrine system links to this process. |
| How the body works               |   | Students cover breathing, ventilation and gas exchange in this strand. This links with the exchange and transport topic they cover in Year 10. They will gain understanding of a healthy lifestyle and what an unhealthy lifestyle can lead towards including a risk factor of disease. This links with the non-communicable disease topic in Year 10 where they discuss more about lifestyle being a risk factor for disease. Students also learn about what is in our food and how to test our food for biomolecules. This is further developed in year 9 in the digestion and enzymes topic. | In Year 9 students further develop knowledge of how the body works by looking at digestion. They will obtain declarative and procedural knowledge during lessons and practicals, specifically the required practicals for food test and enzymes. Students develop their knowledge of how pH and temperature affect enzyme action and overall get a richer understanding of how the digestive system works at a molecular level than at KS3. In the exchange and transport topic at GCSE students develop their understanding of how the respiratory and cardiovascular systems work. They use their existing knowledge from KS3 to look more specifically at how the alveoli are structured and how ventilation works. They also learn about how the | In Year 10 students delve more deeply into the statistics and risk factors associated with non-communicable diseases. They learn what these factors are and how diseases like obesity, cancer, coronary heart disease along with developing their knowledge of how smoking and alcohol affects the body and their negative effects. They look at how treatments of these disease will help sufferers and how they can be prevented from developing. |  |

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|               |  |  | heart is structured, what blood is comprised of and look at the plants vascular system, looking at transpiration and exchange within the leaf. |   |  |
| Bioenergetics |  | In the life on earth topic, students learn about the biological processes of photosynthesis and respiration and explore respiration in sport. They learn the equations for photosynthesis, aerobic respiration and anaerobic respiration |  | The declarative knowledge is expanded from KS3 to look further at what the plants do with glucose and look further at limiting factors and how they can affect the rate of photosynthesis. Students look at how photosynthesis can be measured through a required practical. Respiration is also further explored here as students look at how respiration is controlled and why energy is needed for the body. They expand their knowledge by studying metabolism and the role of the liver and how this works in partnership with other body systems. |  |
| Homeostasis   |  |  |  | In Year 10 students learn about homeostasis and how the body controls levels within the body. They learn about the nervous system and how reflexes work. Biologists look at the structure of the eye and brain. Students develop knowledge of the endocrine system and how the body controls blood glucose levels, linking to diabetes and how it is treated. Biology students learn about how plants response to stimuli. They also develop knowledge on controlling body temperature, removing waste and the kidney/how dialysis works.               |  |