



CHEMISTRY KS4 CURRICULUM AND ASSESSMENT MILESTONES

AIM:

There are 7 topics (B1-B7) in the biology curriculum. The sequence of the lessons has been re-organised to guide pupils' learning over the 2 years. This process helps to ensure that foundational concepts are mastered before more complex topics are introduced. It also ensures that concepts are revisited and linked across different lessons.

YEAR 10

Topic 1: Cell Biology and Transport	Prior KS3 knowledge: cells, microscope and diffusion. Pupils learn the structure of eukaryotic and prokaryotic cells in more depth. They extend their knowledge to cell differentiation, cell division and stem cells. Pupils learn about diffusion, osmosis and active transport in more details and their significance in the human body. Required practical: Microscopes and osmosis practical
Topic 2: Organisation in animals	Prior KS3 knowledge: Respiratory system, circulatory system, digestive system and respiration. Pupils learn the process of respiration in more details – Aerobic and anaerobic respiration. They also investigate the effect of exercise and create links to respiration, breathing and heart rate. They further extend their knowledge on the different organ systems – respiratory, circulatory and digestive system. Pupils also investigate the risk factors of diseases. Required practical: Effect of pH on enzyme activity & Food tests
Topic 3: Infection and response	Prior KS3 knowledge: Unicellular organisms, Pandemic project Links to KS4 curriculum: B1 Cells and B2 Organisation Pupils review the topic of prokaryote and how bacteria divide by binary fission in more depth (B1). They will further discover how the body's defence and immune system work. They will learn in more details how a vaccine work and drug testing. They will also learn about cancer (B2). Triple science and Higher students will learn about monoclonal antibodies and their use to treat cancer. Required practical: Effect of different antibiotics on microbial growth
Topic 4: Organisation in plants	Prior KS3 knowledge: Plant cells, organisation in plants, different parts of plants, photosynthesis Links to KS4 curriculum: B1 Cells, B2 Organisation, B3 Infection and response Pupils learn the process of photosynthesis in more details, drawing on the word and chemical equations. They further investigate the cell organisation in plants and create links photosynthesis and how plants obtain the raw materials for photosynthesis. They also look at the defence system in plants and how plant diseases affect the plant growth. Required practical: Effect of light on rate of photosynthesis

YEAR 11

Topic 5: Homeostasis and response	Prior KS3 knowledge: Adolescence and the menstrual cycle, Reproduction, Pregnancy, endocrine system and diabetes. Links to KS4 curriculum: B1 Cells, B2 Organisation, B4 Plant Pupils learn about the endocrine system in more depth, regarding the role of the kidneys to control the water content in the body and the role of the pancreas to regulate the blood glucose level. They further explore another body system – the nervous system. They will learn about the brain, the eye and how vision can be corrected. Pupils further investigate the different hormones that control the menstrual cycle. They will also cover plant hormones, which link to B4 photosynthesis and growth. Required practical: Investigating reaction time and investigating the effect of light on plant growth.
Topic 6: Inheritance, variation and evolution.	Prior KS3 knowledge: DNA, Variation, Adaptation, Evolution, Fossils and Extinction Links to KS4 curriculum: B1 Cells (cell structure and mitosis), B2 Organisation (enzymes and red blood cells haemoglobin) Pupils discover in more depth the structure of DNA, how it codes for protein synthesis and what are the effects of mutations. They also explore another type of cell division - meiosis and compare it to mitosis (B1). They look at genetic diagrams and discover the work of Mendel. They probe into the world of Darwin and the concept of evolution and speciation. They further learn about important genetic processes such as genetic engineering, selective breeding and cloning.
Topic 7: Ecology	Prior KS3 knowledge: food chains, sampling, water and carbon cycle, global warming, deforestation and food security Links to KS4 curriculum: B1 Cells (bacteria), B2 Organisation in animals (respiration), B4 Organisation in plants (photosynthesis) Pupils will review the topics they have learnt in KS3 in further details. They also learn about and the cycling of materials in more details creating links to B1, B2 and B4. They further investigate the human impacts on the environment. Pupils will also explore ideas around food security. Required practical: Investigating the effect of temperature on decay and Investigation distribution using quadrats and line transects.

ASSESSMENT MILESTONES

Every biology lesson incorporates a retrieval grid that continuously links current topics to previous ones. It is compulsory that every biology lesson uses TLAC techniques to check understanding and misconceptions. It is also mandatory that every biology lesson has an exam question tailored to the ability of pupils. At the end of each topic students complete an end of topic assessment which begins with 1 knowledge recall question linked to a previous topic. Following the assessment, there is a pride lesson individualised to each pupil's ability.