

KS3 Curriculum Map – Biology:

Topic	Substantive Knowledge This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.	Disciplinary Knowledge (Skills) This is the action taken within a particular topic in order to gain substantive knowledge.	Assessment Opportunities What assessments will be used to measure student progress?
Lab safety	<ul style="list-style-type: none"> • Expectations within the Biology department. • Lab safety rules. 	<ul style="list-style-type: none"> • To provide a safe learning environment. • To identify any risks in the laboratory. • Describe lab safety rules. • Design a Risk Assessment. 	<ul style="list-style-type: none"> • Correct use of keywords. • Create a lab safety poster. • Write a risk assessment for a simple practical.
Working Scientifically	<ul style="list-style-type: none"> • Asking Scientific Questions. • Planning investigations. • Recording data. • Analysing data. • Evaluating data. 	<ul style="list-style-type: none"> • Describe how scientists develop ideas. • Identify dependent, independent and control variables. • Write a plan to carry out an investigation. • Make and record accurate observations and measurements. • Find a pattern in data using graphs or charts. • Suggest ways to improve practical investigations. 	<ul style="list-style-type: none"> • Correct use of keywords. • To give the opportunity for pupils to plan and observe a range of practical investigations. • Pupils given the opportunity to draw graphs. Interpret and analyse data.
Cells	<ul style="list-style-type: none"> • Plant and animal cell theory. • Specialised cells. • Unicellular organisms and their functions. • Movement of substances. 	<ul style="list-style-type: none"> • Label plant and animal cells. • Describe the functions of organelles. • Identify specialised cells and explain their adaptations. • Use a microscope to observe the above and draw a scientific diagram. • Investigate diffusion using agar gel and hydrochloric acid. 	<ul style="list-style-type: none"> • Correct use of keywords. • Carry out each practical safely and accurately. • End of topic test.

<p>Structure and function of body systems</p>	<ul style="list-style-type: none"> • Understanding body organisation. • Knowledge of the respiratory system and gas exchange. • Knowledge of the skeletal system and it's interaction with muscles and joints. 	<ul style="list-style-type: none"> • Link cells to organisation of body systems with the example of the lungs and skeletal system. • Identify links between diffusion and body systems e.g., gas exchange. • Carry out a practical to demonstrate how the body responds to exercise. 	<ul style="list-style-type: none"> • Correct use of keywords. • Plan practical activity. • Carry out each practical safely and accurately. • Evaluate and analyse results. • Extended writing in reference to ventilation and gas exchange.
<p>The reproductive system</p>	<ul style="list-style-type: none"> • Adolescence. • Reproductive System Structure. • Fertilisation and implantation. • Development of Foetus. • The menstrual cycle. • Pollination and germination. • Seed dispersal. 	<ul style="list-style-type: none"> • Describe changes that take place during puberty. • Label images of the male and the female reproductive systems. • Describe the structure and function of gametes. • Use diagrams to show the stages of the development of the foetus. • Describe the main stages of the menstrual cycle. • To understand how contraception and fertility treatments work. • Compare and contrast wind and insect pollinated plants. • Explain how seed are formed through the process of fertilisation. • Describe how seeds are adapted for dispersal. 	<ul style="list-style-type: none"> • Correct use of keywords. • Extended writing in terms of discussing the development of the foetus and the menstrual cycle. • Carry out flower dissection and discuss safety procedures. • Seed dispersal practical to use evaluation and mathematical skills. • Planning an investigation to ascertain the effect of rainfall on germination.
<p>Food and digestion</p>	<ul style="list-style-type: none"> • Components of a healthy diet. • Food tests. • Health issues caused by an unhealthy diet. • The structure and function of the digestive system. • The role of enzymes and bacteria in digestion. 	<ul style="list-style-type: none"> • To explain the role of each food group in the body. • To carry out each food test and describe the positive result. • Using data to describe the consequences of an unhealthy diet. • To be able to calculate the energy requirements of different people. • Correctly label the digestive system and describe the events. 	<ul style="list-style-type: none"> • Correct use of keywords. • Research nutritional label values. • Design a person specific diet. • Extended writing in terms of the pathway of food through the digestion system. • Research task of enzyme function. • Analysis and evaluation of the effect of amylase on starch.

		<ul style="list-style-type: none"> To explain the roles of enzymes and bacteria and their roles in digestion. 	<ul style="list-style-type: none"> Investigate to calculate the energy available in food.
Interdependence	<ul style="list-style-type: none"> Food chains and food webs. Disruption to food webs and food chains. Adaptations. Predator/Prey relationships. Ecosystems. Competition. 	<ul style="list-style-type: none"> To be able to explain what food chains and food webs show. To be able to combine food chains to form a food web. To explain the importance of interdependence and the effects that environmental changes can have on it. To explain the process of bioaccumulation. To describe and explain how species adapt to their environments. To be able to describe how different organisms co-exist within an ecosystem. Explain different types of competition and the effect it has on population numbers. 	<ul style="list-style-type: none"> Correct use of keywords. Students to make their own food webs. Extended writing. Flanimals competition. Design an experiment to see how different birds' beaks are adapted for food. Looking at graphical data to explain predator/prey relationships.
Variation and Classification	<ul style="list-style-type: none"> Classification keys. Variation and Species. Differences between continuous and discontinuous variation. 	<ul style="list-style-type: none"> To be able to use classification keys to sort living organisms into groups. Explain how variation occurs. Explain whether characteristics are inherited, environmental or both. Be able to use graphical data to see the relationship between continuous and discontinuous variation. Create and use simple classification key. Describe the difference between environmental and inherited variation. Investigate variation and analyse data. 	<ul style="list-style-type: none"> Correct use of keyword. Create an identification key. Extended writing using key words on variation. Practical skills – investigation into arm span giving an opportunity for maths skills. Create and use a functional classification key. Plot a bar and/or line graph to illustrate continuous and discontinuous data.

Respiration and photosynthesis	<ul style="list-style-type: none"> Describe photosynthesis and respiration. Structure of the leaf. Limiting factors of photosynthesis. Describe the role of plant minerals. Describe the difference between aerobic and anaerobic respiration and explain when and why each is needed. 	<ul style="list-style-type: none"> Recall equations for photosynthesis and respiration. Identify links between photosynthesis, respiration and food chains. Label the structure and recall functions of specialised cells in the leaf. Sketch a line graph to show how the rate of photosynthesis is affected by changing conditions. Explain changes that occur in the body during exercise. 	<ul style="list-style-type: none"> Correct use of keywords. Carry out the variegated leaf practical accurately and safely. Investigate the effect of fertilisers on the growth of seeds. Investigate the effect of exercise on breathing rate. Extended writing in reference to the body's response to exercise.
The circulatory system	<ul style="list-style-type: none"> Identify key structures of the heart and blood vessels. Describe the function of the circulatory system. Discuss the impact of diet and disease on the circulatory system. 	<ul style="list-style-type: none"> Label the heart and blood vessels and describe key features. Describe the movement of blood through the circulatory system. Identify links between the circulatory system and respiration. Research how lifestyle factors affect the circulatory system. 	<ul style="list-style-type: none"> Correct use of keywords. Presentations on lifestyle factors and their links to the cardiac cycle. Extended writing related to the movement of blood.
Inheritance	<ul style="list-style-type: none"> DNA, genes and chromosomes. Inheritance. Discovery of DNA. Mutations. Genetic engineering. 	<ul style="list-style-type: none"> Recall the definitions of the keywords: chromosome, gene and DNA and link to their function. Describe how characteristics are inherited. Determine how the number of chromosomes changes during cell division, production of sex cells, and fertilisation. Describe how scientists worked together to develop the DNA model. Explain how a change in the DNA may affect an organism and its future offspring. State how a product is produced using genetic engineering and identify advantages. 	<ul style="list-style-type: none"> Correct use of keywords. Research the discovery of the structure of DNA. Apply knowledge of inheritance and mutations using fur colour in rabbits as an example. Extended writing relating to genetic engineering.
Evolution	<ul style="list-style-type: none"> Natural selection. Biodiversity. Extinction. 	<ul style="list-style-type: none"> Describe the process of natural selection and the evidence collected by Darwin. Define biodiversity and its relationship with an ecosystem. 	<ul style="list-style-type: none"> Correct use of keywords. Evaluate whether evidence for a species changing over time supports natural selection. Extended writing task.

		<ul style="list-style-type: none"> Describe factors that may lead to extinction and techniques used to prevent it. 	
New technology	<ul style="list-style-type: none"> Relationship between genetics and inherited disorders. Selective breeding, cloning and biotechnology. Enzymes in industry. 	<ul style="list-style-type: none"> Successfully use a Punnett square to show what happens during a genetic cross. Describe what is meant by a 'genetically-inherited disorder' and calculate the probability of a person suffering from an inherited disease. Describe the process of selective breeding. Describe what is meant by a clone. Describe the process of fermentation. Describe commercial uses of enzymes. 	<ul style="list-style-type: none"> Correct use of keywords. Extended writing relating to the advantages and disadvantages of all procedures. Research task into the use of enzymes in the food and cleaning industry.
Microbes and disease	<ul style="list-style-type: none"> Types of microbes and how they grow. The effect of microbes in the body. Types of diseases. Uses of vaccines and antibiotics. 	<ul style="list-style-type: none"> Label the key features of common pathogens. Describe how microbes enter the body and how the body is adapted to help protect us from disease. Research and present information on a variety of diseases. Describe how vaccines and antibiotics can be used to prevent and treat disease. 	<ul style="list-style-type: none"> Correct use of keywords. Safely grow a culture of bacteria. Create and explain a population growth curve. Safely investigate the effectiveness of antibiotics.
Health	<ul style="list-style-type: none"> Health. Drugs. Alcohol. Smoking. 	<ul style="list-style-type: none"> Define health and the influence of drugs, alcohol and smoking on health. Identify how they affect body systems. 	<ul style="list-style-type: none"> Correct use of keywords. Safely identify unknown substances in a practical activity. Plan a practical that will allow you to investigate the effect of alcohol on reaction times. Data analysis related to health.