

**Subject Knowledge Audit - Biology**

Please decide on your ability to teach the content/skills listed below at KS3/KS4	
<b>KEY:</b>	
4	No knowledge – Currently a gap in my subject area
3	Limited knowledge – Would not feel confident to teach this content
2	Good knowledge – Confident in ability to teach with some guidance
1	Expert knowledge - Confident to teach
The completed subject audit will be used by your Mentor to create your Individual Training Plan. Your progress will be reviewed on a fortnightly basis.	
<b>You should review and record your progress at each review window below (and share this with your Mentor)</b>	

Subject Area:	Science – Biology KS3	Baseline (4 -1)	Dec. (3 -1)	May (3 -1)	Target for ECT year if applicable
<b>Structure and function of living organisms</b>					
Cells and organisation	cells as the fundamental unit of life, cell structure using a microscope				
	the functions of the chloroplast, vacuole, cell wall, cell membrane, cytoplasm, mitochondria and nucleus				
	the similarities and differences between plant and animal cells				
	the role of diffusion in the movement of materials between cells				
	structural adaptations of some unicellular organisms				
	the hierarchical organisation of multicellular organisms; cells, tissues, organs, systems				

Subject Knowledge Audit - Biology

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Skeletal and muscular system	the structure and function of the human skeleton				
	biomechanics – interaction between skeleton and muscles, including measurement of force exerted by muscles				
	the function of muscles, antagonistic muscles				
Nutrition and digestion	content of a healthy human diet and why each food group is needed				
	calculations of energy requirements in a healthy diet				
	consequences of imbalances in the diet				
	the tissues and organs in the human digestive system, including adaptations to function and how the system digests food				
	the importance of bacteria in the human digestive system				
Gas exchange systems	plants making carbohydrates by photosynthesis in leaves and gaining minerals and water via roots				
	the structure and functions of the gas exchange system in humans, including adaptations to function				
	the mechanism of breathing, using a pressure model to explain gas movement				
	the impact of exercise, asthma and smoking on				

Subject Knowledge Audit - Biology

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	the human gas exchange system				
	the role of leaf stomata in gas exchange in plants				
Reproduction	reproduction in humans, including structure and function of male and female reproductive systems, menstrual cycle, gametes, fertilisation, gestation and birth				
	reproduction in plants, including flower structure, pollination, fertilisation, seed and fruit formation and dispersal				
Health	the effects of recreational drugs on behaviour, health and life processes				
<b>Material cycles and energy</b>					
Photosynthesis	the reactants products, and equation for photosynthesis				
	the dependence of almost all life on the ability of photosynthetic organisms to build organic molecules				
	the adaptations of leaves for photosynthesis				
Cellular respiration	aerobic and anaerobic respiration, including equations				
	the differences between aerobic and anaerobic respiration				
<b>Interactions and interdependencies</b>					

Subject Knowledge Audit - Biology

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Relationships in an ecosystem	the interdependence of organisms in an ecosystem including food webs				
	the importance of plant reproduction through insect pollination in human food security				
	how organisms affect and are affected by their environment				
Genetics and evolution	heredity as the process by which genetic information is transmitted from one generation to the next				
	a simple model of chromosomes, genes and DNA in heredity				
	differences between species				
	the variation between individuals within a species being continuous or discontinuous				
	variation means some organisms compete more successfully, which can drive natural selection				
	changes in the environment may leave some less well adapted to compete successfully which may lead to extinction				
	the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material				
<b>Subject Area:</b>	<b>Science – Biology KS4</b>				

Subject Knowledge Audit - Biology

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Cell biology	<ul style="list-style-type: none"> <li>• cells as the basic structural unit of all organisms; adaptations of cells related to their functions; the main sub-cellular structures of eukaryotic and prokaryotic cells</li> </ul>				
	<ul style="list-style-type: none"> <li>• stem cells in animals and meristems in plants</li> </ul>				
	<ul style="list-style-type: none"> <li>• enzymes</li> </ul>				
	<ul style="list-style-type: none"> <li>• factors affecting the rate of enzymatic reactions</li> </ul>				
	<ul style="list-style-type: none"> <li>• the importance of cellular respiration; the processes of aerobic and anaerobic respiration</li> </ul>				
	<ul style="list-style-type: none"> <li>• carbohydrates, proteins, nucleic acids and lipids as key biological molecules.</li> </ul>				
Transport systems	<ul style="list-style-type: none"> <li>• the need for transport systems in multicellular organisms, including plants</li> </ul>				
	<ul style="list-style-type: none"> <li>• the relationship between the structure and functions of the human circulatory system.</li> </ul>				
Health, disease and the	<ul style="list-style-type: none"> <li>• the relationship between health and disease</li> </ul>				

Subject Knowledge Audit - Biology

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development of medicines	• communicable diseases including sexually transmitted infections in humans (including HIV/AIDs)				
	• non-communicable diseases				
	• bacteria, viruses and fungi as pathogens in animals and plants				
	• body defences against pathogens and the role of the immune system against disease				
	• reducing and preventing the spread of infectious diseases in animals and plants				
	• the process of discovery and development of new medicines				
	• the impact of lifestyle factors on the incidence of non-communicable diseases.				
Coordination and control	• principles of nervous coordination and control in humans				
	• the relationship between the structure and function of the human nervous system				

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	<ul style="list-style-type: none"> <li>the relationship between structure and function in a reflex arc</li> </ul>				
	<ul style="list-style-type: none"> <li>principles of hormonal coordination and control in humans</li> </ul>				
	<ul style="list-style-type: none"> <li>hormones in human reproduction, hormonal and non-hormonal methods of contraception</li> </ul>				
	<ul style="list-style-type: none"> <li>homeostasis.</li> </ul>				
Photosynthesis	<ul style="list-style-type: none"> <li>photosynthesis as the key process for food production and therefore biomass for life</li> </ul>				
	<ul style="list-style-type: none"> <li>the process of photosynthesis</li> </ul>				
	<ul style="list-style-type: none"> <li>factors affecting the rate of photosynthesis.</li> </ul>				
Ecosystems	<ul style="list-style-type: none"> <li>levels of organisation within an ecosystem</li> </ul>				
	<ul style="list-style-type: none"> <li>some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community</li> </ul>				
	<ul style="list-style-type: none"> <li>how materials cycle through abiotic and biotic components of ecosystems</li> </ul>				

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	<ul style="list-style-type: none"> <li>the role of microorganisms (decomposers) in the cycling of materials through an ecosystem</li> </ul>				
	<ul style="list-style-type: none"> <li>organisms are interdependent and are adapted to their environment</li> </ul>				
	<ul style="list-style-type: none"> <li>the importance of biodiversity</li> </ul>				
	<ul style="list-style-type: none"> <li>methods of identifying species and measuring distribution, frequency and abundance of species within a habitat</li> </ul>				
	<ul style="list-style-type: none"> <li>positive and negative human interactions with ecosystems.</li> </ul>				
Evolution, inheritance and variation	<ul style="list-style-type: none"> <li>the genome as the entire genetic material of an organism</li> </ul>				
	<ul style="list-style-type: none"> <li>how the genome, and its interaction with the environment, influence the development of the phenotype of an organism</li> </ul>				
	<ul style="list-style-type: none"> <li>the potential impact of genomics on medicine</li> </ul>				
	<ul style="list-style-type: none"> <li>most phenotypic features being the result of multiple, rather than single, genes</li> </ul>				
	<ul style="list-style-type: none"> <li>single gene inheritance and single gene crosses with</li> </ul>				



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	dominant and recessive phenotypes				
	<ul style="list-style-type: none"> <li>sex determination in humans</li> </ul>				
	<ul style="list-style-type: none"> <li>genetic variation in populations of a species</li> </ul>				
	<ul style="list-style-type: none"> <li>the process of natural selection leading to evolution</li> </ul>				
	<ul style="list-style-type: none"> <li>the evidence for evolution</li> </ul>				
	<ul style="list-style-type: none"> <li>developments in biology affecting classification</li> </ul>				
	<ul style="list-style-type: none"> <li>the importance of selective breeding of plants and animals in agriculture</li> </ul>				
	<ul style="list-style-type: none"> <li>the uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology.</li> </ul>				
<b>Science – Biology KS5</b>					
3.1 Biological Molecules	3.1.1. Monomer and polymers				
	3.1.2 Carbohydrates				
	3.1.3 Lipids				
	3.1.4 Proteins				
	3.1.5 Nucleic acids are important information-carrying molecules				

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	3.1.6 ATP				
	3.1.7 Water				
	3.1.8 Inorganic Ions				
	3.2.1 Cell Structure				
	3.2.2 All cells arise from other cells				
	3.2.3 Transport across cell membranes				
3.2 Cell	3.2.4 Cell recognition and the immune system				
	3.3.1 Surface area to volume ratio				
	3.3.2 Gas exchange				
	3.3.3 Digestion and absorption				
3.3 Organisms exchange substances with their environment	3.3.4 Mass transport				
	3.4.1 DNA, genes and chromosomes				
	3.4.2 DNA and protein synthesis				
	3.4.3 Genetic diversity can arise as a result of mutation or during meiosis				
3.4 Genetic information, variation and relationships between organisms	3.4.4 Genetic diversity and adaptation				

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	3.4.5 Species and taxonomy				
	3.4.6 Biodiversity within a community				
	3.4.7 Investigating diversity				
	3.5.1 Photosynthesis				
	3.5.2 Respiration				
	3.5.3 Energy and ecosystems				
3.5 Energy transfers in and between organisms (A-level only)	3.5.4 Nutrient cycles				
	3.6.1 Stimuli, both internal and external, are detected and lead to a response				
	3.6.2 Nervous coordination				
	3.6.3 Skeletal muscles are stimulated to contract by nerves and act as effectors				
3.6 Organisms respond to changes in their internal and external environments (A-level only)	3.6.4 Homeostasis is the maintenance of a stable internal environment				
	3.7.1 Inheritance				
	3.7.2 Populations				

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	3.7.3 Evolution may lead to speciation				
3.7 Genetics, populations, evolution and ecosystems	3.7.4 Populations in ecosystems				
	3.8.1 Alteration of the sequence of bases in DNA can alter the structure of proteins				
	3.8.2 Gene expression is controlled by a number of features				
	3.8.3 Using genome projects				
3.8 The control of gene expression	3.8.4 Gene technologies allow the study and alteration of gene function allowing a better understanding of organism function and the design of new industrial and medical processes				



**Subject Knowledge Audit - Biology**

**Evidence of subject knowledge development**

Record below the things you have **read and researched** to improve your subject knowledge in the boxes below.

Term 1	September/ October	November/ December
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Term 2	January/ February	March/ April
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Term 3	May/ June	June/ July
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Please sign this sheet off at the end of the training year:

Signed: \_\_\_\_\_ (Trainee)      Date: \_\_\_\_\_

Signed: \_\_\_\_\_ (Mentor)      Date: \_\_\_\_\_