Science Department – Year 12 Biology

	students to nurture a passion for AQA Biology A-level gives studen	Biology and lay the groundwork f	nd associations with all living thing	evelop the skills that they will need logical sciences, medicine and othe gs around us. Being such a broad to	r science related courses.	
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:
	Teacher A(4 lessons a	Teacher A(4 lessons a	Teacher A(4 lessons a	Teacher A(4 lessons a	Teacher A(4 lessons a	Teacher A(4 lessons a
	fortnight).	fortnight)	fortnight)	fortnight).	fortnight).	fortnight).
	Section 2- Cells	Section 2-Cells	Section 2-Cells	Section 2- Cells	Section 4; genetic	Section 4; genetic
	Topic 3- Cell	Practical 2:	Topic 4. Transport	Topic 5. Cell	information, variation and	information, variation a
	structure	Preparing stained	across cell	recognition and	relationship.	relationship.
	• 3.1-3.8	squashes of root	membranes.	immune system,	Topic 8. Genetic	Topic 9 . Genet
	Teacher B(6 lessons a	cells to observe mitosis	4.4-4.5Core Practical 3:	5.4-5.7.	information • 8.3-8.5	• 9.3-9.4
	fortnight.	mitosis	Practical 3 Dilution	 Section 4; genetic information, 	 Topic 9 . Genetic 	 9.5-9.4 Practical catch
	Section 1- Biological	Section 2	series to find water	variation and	diversity	Practical 6: Use
	molecules	Topic 4. Transport	potential of plant	relationship.	• 9.1-9.2	aseptic technic
500	• Topic 1. Biological	4.1-4.3	tissues	Topic 8. Genetic		to investigate
	molecules 1.1-1.6	• Core practical 4.	• Topic 5. Cell	information,	Teacher B(6 lessons a	effect of
		Effect of a named	recognition and	variation and	fortnight.	antimicrobial
Shirley High		variable on the	immune system,	Relationships	Section 3 – Organisms	substances on
		permeability of cell	5.1-5.3	between organisms	exchange substances with	microbial grow
Curriculum Map		-surface		8.1-8.2.	their environment	
		membrane.	Teacher B(6 lessons a		Topic 7: Mass	Teacher B(6 lessons a
			fortnight.	Teacher B(6 lessons a	Transport. 7.3- 7.9	fortnight.
		Teacher B(6 lessons a fortnight.	Section 1- Biological molecules.	fortnight. Section 3 – Organisms	Core Practical 5: Dissection of	Section 4; genetic information, variation a
		Ŭ				
		Section 1. Biological molecules 1.6-1.9	Topic 2- Nucleic acid 2.2-2.4.	exchange substances with their environment	animal or plant gas exchange or mass	relationship.Topic 10 : Dive
		• Core Pract.1.	Section 3 – Organisms	Topic 6 Exchange	transport system or	 10pic 10 : Dive 10.2-10.5
		Investigation into	exchange substances with	• 6.5-6.9	of organ within	Practical catch
		the effect of a	their environment	Topic 7: Mass	such a system	
		named variable on	Topic 6 Exchange	Transport.		
		enzyme-controlled	• 6.1-6.4	• 7.1-7.2	Section 4; genetic	
		reaction.			information, variation and	
		Topic 2- Nucleic			relationship.	
		acid2.1- structure of			• Topic 10 : Diversity 10.1	
		RNA.			10.1	
	Section 1	Section 1	Section 1	Section 3	Section 3	Section 3
	Biological molecules.	Biological molecules.	Biological molecules.	Organisms exchange	Organisms exchange	Organisms exchange
	We begin the course by	We begin the course by	We begin the course by	substances with their	substances with their	substances with their
	looking at biological	looking at biological	looking at biological	environment.	environment.	environment.
	molecules- the building blocks	molecules- the building blocks	molecules- the building blocks	WE build on the knowledge of	WE build on the knowledge of the cell structure in section 2	WE build on the knowled
	of all living things. This is important because all	of all living things. This is important because all	of all living things. This is important because all	the cell structure in section 2 by learning about how cells	by learning about how cells	the cell structure in section by learning about how ce
	living cells are made up of only	living cells are made up of	living cells are made up of	and all living things exchange	and all living things exchange	and all living things excha
	a few groups of molecules that	only a few groups of	only a few groups of	materials between themselves	materials between themselves	materials between thems
	react chemically with each	molecules that react	molecules that react	and their environment. WE	and their environment. WE	and their environment. W
	other in similar ways. More	chemically with each other in	chemically with each other in	look at how substances enter	look at how substances enter	look at how substances e
	importantly these molecules	similar ways. More	similar ways. More	or leave a cell through the	or leave a cell through the	or leave a cell through the
	are all based on carbon.	importantly these molecules	importantly these molecules	plasma membrane.WE also	plasma membrane.WE also	plasma membrane.WE als
	We also study water because	are all based on carbon.	are all based on carbon.	look at the effect of size on	look at the effect of size on	look at the effect of size of
	of its role in all living things. It is the most important	We also study water because	We also study water because	how efficient substances are	how efficient substances are exchanged and the various	how efficient substances exchanged and the variou
	component of cells and all life	of its role in all living things. It is the most important	of its role in all living things. It is the most important	exchanged and the various adaptations organisms have to	adaptations organisms have to	adaptations organisms ha
	as we know it relies on this	component of cells and all life	component of cells and all life	ensure efficient exchange of	ensure efficient exchange of	ensure efficient exchange
	simple molecule.	as we know it relies on this	as we know it relies on this	materials.	materials.	materials.
		simple molecule.	simple molecule.			
	Section 2			Section 4	Section 4	Section 4
Why Now?	Cell structure.	Section 2	Section 2	Genetic Information, variation,	Genetic Information,	Genetic Information,
	Alongside Biological	Cell structure.	Cell structure.	and relationships between	variation, and relationships	variation, and relationshi
	molecules, we build on the	Alongside Biological	Alongside Biological	organisms	between organisms	between organisms
	GCSE knowledge of cells, to develop more in depth	molecules, we build on the GCSE knowledge of cells, to	molecules, we build on the GCSE knowledge of cells, to	WE move on to study the variety of life around us. The	WE move on to study the variety of life around us. The	WE move on to study the variety of life around us.
	understanding of cell	develop more in depth	develop more in depth	diversity of life which is	diversity of life which is	diversity of life which is
	structure.	understanding of cell	understanding of cell	brought about primarily by the	brought about primarily by	brought about primarily l
	The cell is the fundamental	structure.	structure.	genes. We also look at the role	the genes. We also look at the	the genes. We also look a
	unit of life. All organisms	The cell is the fundamental	The cell is the fundamental	the environment plays in	role the environment plays in	role the environment play
	whatever their type or size are	unit of life. All organisms	unit of life. All organisms	modifying the characteristics	modifying the characteristics	modifying the characteris
	composed of cells. All new	whatever their type or size are	whatever their type or size are	determined by genes.	determined by genes.	determined by genes.
	cells are derived from existing	composed of cells. All new	composed of cells. All new	WE the DNA and how	WE the DNA and how	WE the DNA and how
	ones by one of the following	cells are derived from existing	cells are derived from existing	mutations in the DNA may	mutations in the DNA may	mutations in the DNA ma
	the process of binary fission,	ones by one of the following	ones by one of the following	lead to different	lead to different	lead to different
	mitosis and meiosis. Cells	the process of binary fission, mitosis and meiosis. Cells	the process of binary fission,	characteristics.	characteristics.	characteristics.
	contain the genetic meterial of		mitosis and meiosis. Cells	WE develop this idea to look	WE develop this idea to look	WE develop this idea to lo
	contain the genetic material of an organism and metabolic		contain the genetic material of		at now individuals in a	at now individuals in a
	an organism and metabolic	contain the genetic material of	contain the genetic material of an organism and metabolic	at how individuals in a population may have	at how individuals in a population may have	at how individuals in a population may have
	_	contain the genetic material of an organism and metabolic	contain the genetic material of an organism and metabolic processes take place within	ac now individuals in a population may have adaptations which help them	population may have	population may have
	an organism and metabolic processes take place within	contain the genetic material of	an organism and metabolic	population may have		population may have adaptations which help th
	an organism and metabolic processes take place within	contain the genetic material of an organism and metabolic processes take place within	an organism and metabolic processes take place within	population may have adaptations which help them	population may have adaptations which help them	population may have adaptations which help th survive. We also look at h
	an organism and metabolic processes take place within	contain the genetic material of an organism and metabolic processes take place within	an organism and metabolic processes take place within	population may have adaptations which help them survive. We also look at how	population may have adaptations which help them survive. We also look at how	

Fundamental Concepts

molecules common chemistry. This provides indirect evidence for evolution. Despite their great variety, the cells of all living organisms contain only a few groups of carbon-based compounds that interact in similar ways. Carbohydrates are commonly used by cells as respiratory substrates. They also form structural components in plasma Lipids have many uses, including the bilayer of plasma and as respiratory substrates. Proteins form many cell structures. They are also important as enzymes, chemical messengers and components of the blood.

Section 1- Biological Section 1- Biological molecules.

These have basic features in common. Differences between cells are due to the addition of extra features. This provides indirect by binary fission in prokaryotic cells and by mitosis and membrane and, in addition, eukaryotic cells have internal The basic structure of these plasma membranes is the same and enables control of the passage of substances across exchange surfaces by passive or active transport.

molecules.

Organisms exchange substances with their environment

The internal environment of a cell or organism is different The exchange of substances between the internal and external environments takes place at exchange surfaces. To truly enter or leave an organism, most substances must cross cell plasma membranes. In large multicellular organisms, the immediate environment of cells is some form of tissue fluid. Most cells are too far away from exchange surfaces, and from each other, for simple diffusion alone to maintain the composition of tissue fluid within a suitable metabolic range. In large organisms, exchange surfaces

Genetic information, variation and relationships between organisms

Biological diversity – biodiversity – is reflected in organisms, in the variation of individual characteristics within a single species and in the variation of cell types within a single multicellular organism. Differences between species reflect genetic differences. Differences between individuals within a species both. A gene is a section of DNA located at a particular site on a DNA molecule, called its locus. The base sequence of each gene carries the coded genetic information that

Organisms exchange substances with their environment Section 4 Genetic information, variation and relationships between organisms

SHS Curriculum Maps/SAH/2020

		Cell-surface membranes		are associated with mass	determines the sequence of	
		contain embedded proteins.		transport systems that carry	amino acids during protein	
		Some of these are involved in		substances between the	synthesis. The genetic code	
		cell signalling –		exchange surfaces and the rest	used is the same in all	
		communication between cells.		of the body and between parts	organisms, providing evidence	
		Others act as antigens,		of the body. Mass transport	for evolution. Genetic	
		allowing recognition of 'self'		maintains the final diffusion	diversity within a species can	
		and 'foreign' cells		gradients that bring	be caused by gene mutation,	
		by the immune system.		substances to and from the	chromosome mutation or	
		Interactions between different		cell membranes of individual	random factors associated	
		types of cell are involved in		cells. It also helps to maintain	with meiosis and fertilisation.	
		disease, recovery		the relatively stable	This genetic diversity is acted	
		from disease and prevention		environment that is tissue	upon by natural selection,	
		of symptoms occurring at a			resulting in species becoming	
		later date if exposed to the			better adapted to their	
		same antigen, or			environment. Variation within	
		antigen-bearing pathogen			a species can be measured	
					using differences in the base	
					sequence of DNA or in the	
					amino acid sequence of	
					proteins. Biodiversity within a	
					community can be measured	
					using species richness and an	
					index of diversity	
	Teacher B(6 lessons a	Teacher B(6 lessons a	Teacher B(6 lessons a	Teacher B(6 lessons a	Teacher B(6 lessons a	Teacher B(6 lessons a
	fortnight)	fortnight)	fortnight)	fortnight)	fortnight)	fortnight)
	Biological molecules	Biological Molecules	Topic 2- Nucleic acid	Section 3	7.3 circulatory system of a	Chapter 10 Biodiversity
	1.1- Introductions	1.6 Proteins	2.2 DNA replication	Organisms exchange	mammal.	10.2 Diversity within a
	Describe what a	Explain how amino	Describe the events	substances with their	manniai.	community
	mole is, and what	acids are linked to	which take place during	environment.	Explain why large	Describe what we
	is meant by a	form polypeptides	DNA replication	environment.	organisms move	understand by species
	molar solution		Describe the formation		substances around	diversity
	Explain bonding	- the primary	of a new polynucleotide	6.5 Limiting water loss	their bodies.	
	and the formation	structure of	strand.	Explain how terrestrial plants	 Describe the 	Explain how a diversity index
	of molecules	proteins	Explain the	and insects balance the need		is used as a measure of
	Describe	 Explain how 	semi-conservative	for gas-exchange and the need	features of the	species diversity
		polypeptides are		to conserve water	transport systems	
	polymerisation and	arranged to form	process of DNA		of large organisms.	10.3 Species diversity and
	state what	the secondary	replication	6.6 Structure of the human	Describe the	human activity
	macromolecules	structure and then		gas-exchange system	circulatory system	 Describe the impact of
	are		2.3 Energy and ATP	• Describe how the human	of insects.	agriculture on species
	Describe	the tertiary	 Define what energy is 	gas exchange system is	Describe the	diversity
	condensation and	structure of a	and why organisms need	arranged		
	hydrolysis	protein	it	Explain the functions of the	circulatory system	Explain the balance between
	Describe	• Explain how the	• Explain how ATP stores	human gas-exchange system	of fish.	conservation and farming
	metabolism	quaternary	energy	numun gus exenange system	Describe the	
		structure of a	 Describe how ATP is 	C 7 The mechanism of	circulatory system	10.4 Investigating diversity
	1.2 – monosaccharides.		synthesised	6.7 The mechanism of	of mammals.	0 0 /
	Describe how	protein is formed	 Describe the role of ATP 	breathing		Explain the use of the
	carbohydrates are	Describe the test	in biological processes	• Explain how and why air	• Explain the relative	following techniques in
	constructed	for proteins	in biological processes	is moved into the lungs	efficiency of	comparing genetic
	Describe the		2.4. water and its functions.	when breathing in	different	diversity within, and
	structure of	1.7 Enzymes action.	 Describe the structure of 	• Explain how air is moved	circulatory	between, species:
	monosaccharides	 Explain how 		out of the lungs when	systems.	 observable
		enzymes speed up	the water molecule	breathing out	7.4 The structure of the heart	characteristics
	Describe how to	chemical reactions	State the properties of	Explain what is meant by		 base sequence of
	carry out the	• Describe how the	the water molecule	pulmonary ventilation and	Describe the appearance	DNA
	Benedict's test for	structure of	• Explain the importance	how it is calculated	of the heart and its	 base sequence of
	reducing and		of the water molecule to		associated blood vessels	mRNA
	non-reducing	enzyme molecules	living organisms.	6.8 Exchange of gases in the		 amino acid
	sugars	relates to their	Describe inorganic ions	lungs	• Explain why the heart is	sequence of
		function	and their roles	 Describe the essential 	made up of two adjacent	proteins
	1.3 Disaccharides	 Explain the lock 		features of exchange	pumps	Explain how immunological
	Explain how	and key model of	6. Exchange	surfaces		comparisons are used to
	monosaccharides	enzyme action.	6.1 Exchange between	Explain how gases are	Core Practical 5:	
	are linked together	Explain the	organisms and their	exchanged in the alveoli of	Dissection of animal or	investigate variations in
						proteins
	-	induced-fit model	0	_	plant gas exchange or	proteins
	to form	induced-fit model	environment	humans.	plant gas exchange or	
	to form disaccharides	induced-fit model of enzyme action.	• Explain how the size of	humans. 6.9 Enzymes and digestion	mass transport system or	10.5 Quantitative
Churchenster will	to form	of enzyme action.	 environment Explain how the size of an organism and its 	humans.6.9 Enzymes and digestionDescribe the structure	mass transport system or of organ within such a	10.5 Quantitative investigations of variation
Students will	to form disaccharides	of enzyme action. 1.8 Factors affecting enzyme	 Explain how the size of an organism and its structure relate to its 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the 	mass transport system or	 10.5 Quantitative investigations of variation Describe how variation is
Students will	to form disaccharides • Describe how	of enzyme action. 1.8 Factors affecting enzyme action	 Explain how the size of an organism and its structure relate to its surface area to volume 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the 	mass transport system or of organ within such a system	 10.5 Quantitative investigations of variation Describe how variation is measured
Students will	to form disaccharides • Describe how α-glucose molecules are	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the	 Explain how the size of an organism and its structure relate to its surface area to volume ratio 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system 	mass transport system or of organ within such a system Explain how the structure of	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is
Students will	to form disaccharides Describe how α-glucose molecules are linked to form	of enzyme action. 1.8 Factors affecting enzyme action	 Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive 	mass transport system or of organ within such a system	 10.5 Quantitative investigations of variation Describe how variation is measured
Students will	to form disaccharides Describe how α-glucose molecules are linked to form starch	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the	 Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food 	mass transport system or of organ within such a system Explain how the structure of	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test 	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and 	mass transport system or of organ within such a system Explain how the structure of the heart is related to its	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing 	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an enzyme-controlled	 Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically 	mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing sugars. 	of enzyme action. 1.8 Factors affecting enzyme action Describe how the rate of an enzyme-controlled reaction is measured	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically Explain the role of enzymes in 	 mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle Describe the stages of 	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of variation and their
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing sugars. Describe the test 	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an enzyme-controlled reaction is measured • Explain how	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume ratio 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically Explain the role of enzymes in digestion of carbohydrates, 	 mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle Describe the stages of the cardiac cycle 	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of variation and their causes
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing sugars. 	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an enzyme-controlled reaction is measured • Explain how temperature	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume ratio Explain how surfaces are 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically Explain the role of enzymes in 	 mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle Describe the stages of the cardiac cycle Explain how valves 	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of variation and their causes Explain what is meant by the
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing sugars. Describe the test for starch. 	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an enzyme-controlled reaction is measured • Explain how temperature affects the rate of	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume ratio Explain how surfaces are specially adapted to facilitate exchange. 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically Explain the role of enzymes in digestion of carbohydrates, 	 mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle Describe the stages of the cardiac cycle Explain how valves control the flow of blood 	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of variation and their causes Explain what is meant by the
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing sugars. Describe the test 	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an enzyme-controlled reaction is measured • Explain how temperature affects the rate of an	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume ratio Explain how surfaces are specially adapted to facilitate 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically Explain the role of enzymes in digestion of carbohydrates, 	 mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle Describe the stages of the cardiac cycle Explain how valves control the flow of blood through the heart 	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of variation and their causes Explain what is meant by the mean and standard variation
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing sugars. Describe the test for starch. 	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an enzyme-controlled reaction is measured • Explain how temperature affects the rate of an enzyme-controlled	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume ratio Explain how surfaces are specially adapted to facilitate exchange. 6.2 Gas exchange in single-celled organisms and 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically Explain the role of enzymes in digestion of carbohydrates, lipids and proteins 	 mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle Describe the stages of the cardiac cycle Explain how valves control the flow of blood through the heart Explain the volume and 	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of variation and their causes Explain what is meant by the mean and standard variation Catch up practical
Students will	 to form disaccharides Describe how α-glucose molecules are linked to form starch Describe the test for non-reducing sugars. Describe the test for starch. 1.4- starch, glycogen and	of enzyme action. 1.8 Factors affecting enzyme action • Describe how the rate of an enzyme-controlled reaction is measured • Explain how temperature affects the rate of an enzyme-controlled reaction	 environment Explain how the size of an organism and its structure relate to its surface area to volume ratio Describe how larger organisms increase their surface area to volume ratio Explain how surfaces are specially adapted to facilitate exchange. 6.2 Gas exchange in 	 humans. 6.9 Enzymes and digestion Describe the structure and function of the major parts of the digestive system Explain how the digestive system breaks down food both physically and chemically Explain the role of enzymes in digestion of carbohydrates, lipids and proteins 6.10 Absorption of the products of digestion 	 mass transport system or of organ within such a system Explain how the structure of the heart is related to its functions 7.5 The cardiac cycle Describe the stages of the cardiac cycle Explain how valves control the flow of blood through the heart Explain the volume and pressure changes which take 	 10.5 Quantitative investigations of variation Describe how variation is measured Explain what sampling is and why it is used Describe the types of variation and their causes Explain what is meant by the mean and standard variation Catch up practical Teacher A(4 Lessons a
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Language for Life (Key terms/Vocabulary)	activation energy active immunity, active site, active aerobic, allele allergen allergy ,antibiotic, anticodon antigen antioxidant apoplastic, artificial selection, asthma ,atheroma, ATP, B cell, B lymphocytes Benedict's test, biodiversity, biomass period of time.Biuret testbody mass index (BMI) cancer a diseasecarcinogen cardiac cycle cardiac outputcarrier molecule (carrier protein, centrifugation cholesterol chromatid chromatin, chromosome codon cohesion collagen fibrous cartilage and bone.community complementary DNA condensation continuous variation, coronary arteries ,coronary heart disease (CHD, correlation co-transport counter current covalent bond	activation energy active immunity, active site, active aerobic, allele allergen allergy , antibiotic, anticodon antigen antioxidant apoplastic, artificial selection, asthma , atheroma, ATP, B cell, B lymphocytes Benedict's test, biodiversity, biomass period of time.Biuret testbody mass index (BMI) cancer a diseasecarcinogen cardiac cycle cardiac outputcarrier molecule (carrier protein, centrifugation cholesterol chromatid chromatin, chromosome codon cohesion collagen fibrous cartilage and bone.community complementary DNA condensation continuous variation ,coronary arteries ,coronary heart disease (CHD, correlation co-transport counter current covalent bond	activation energy active immunity, active site ,active aerobic ,allele allergen allergy ,antibiotic ,anticodon antigen antioxidant apoplastic, artificial selection ,asthma ,atheroma ,ATP ,B cell ,B lymphocytes Benedict's test, biodiversity ,biomass period of time.Biuret testbody mass index (BMI) cancer a diseasecarcinogen cardiac cycle cardiac outputcarrier molecule (carrier protein, centrifugation cholesterol chromatid chromatin ,chromosome codon cohesion collagen fibrous cartilage and bone.community complementary DNA condensation continuous variation ,coronary arteries ,coronary heart disease (CHD, correlation co-transport counter current covalent bond	activation energy active immunity, active site ,active aerobic ,allele allergen allergy ,antibiotic ,anticodon antigen antioxidant apoplastic, artificial selection ,asthma ,atheroma ,ATP ,B cell ,B lymphocytes Benedict's test, biodiversity ,biomass period of time.Biuret testbody mass index (BMI) cancer a diseasecarcinogen cardiac cycle cardiac outputcarrier molecule (carrier protein, centrifugation cholesterol chromatid chromatin ,chromosome codon cohesion collagen fibrous cartilage and bone.community complementary DNA condensation continuous variation ,coronary arteries ,coronary heart disease (CHD, correlation co-transport counter current covalent bond	activation energy active immunity, active site ,active aerobic ,allele allergen allergy ,antibiotic ,anticodon antigen antioxidant apoplastic, artificial selection ,asthma ,atheroma ,ATP ,B cell ,B lymphocytes Benedict's test, biodiversity ,biomass period of time.Biuret testbody mass index (BMI) cancer a diseasecarcinogen cardiac cycle cardiac outputcarrier molecule (carrier protein, centrifugation cholesterol chromatid chromatin ,chromosome codon cohesion collagen fibrous cartilage and bone.community complementary DNA condensation continuous variation ,coronary arteries ,coronary heart disease (CHD, correlation co-transport counter current covalent bond	activation energy active immunity, active site ,active aerobic ,allele allergen allergy ,antibiotic ,anticodon antigen antioxidant apoplastic, artificial selection ,asthma ,atheroma ,ATP ,B cell ,B lymphocytes Benedict's test, biodiversity ,biomass period of time.Biuret testbody mass index (BMI) cancer a diseasecarcinogen cardiac cycle cardiac outputcarrier molecule (carrier protein, centrifugation cholesterol chromatid chromatin ,chromosome codon cohesion collagen fibrous cartilage and bone.community complementary DNA condensation continuous variation ,coronary arteries ,coronary heart disease (CHD, correlation co-transport counter current covalent bond
Extended writing Opportunities	The importance of proteins in the control of processes and responses in organisms. The uses of water in living organisms	 Cells and organisms carry out exchanges with their external environment to maintain their internal environment. How bacteria can affect the lives of humans and other organisms 	 The membranes of different types of cells are involved in many different functions. The part played by the movement of substances across cell 	 How energy is transferred within and between organisms. The causes of disease in humans 	2. Using DNA in science and technology	The part played by enzymes in the functioning of different cells, tissues
Maths Across the Curriculum	1 Recognise and make use of appropriate units in calculations. 2. Recognise and use expressions in decimal and standard form 3. Use ratios, fractions and percentages 4. Estimate results 5. Use calculators to find and use power, exponential and logarithmic function. 1.1 Use an appropriate number of significant figure	 Recognise and make use of appropriate units in calculations. Recognise and use expressions in decimal and standard form Use ratios, fractions and percentages Estimate results Use calculators to find and use power, exponential and logarithmic function. Use an appropriate number of significant figure 	.2 Find arithmetic means 1.3 Construct and interpret frequency tables and diagrams, bar charts and histogram 1.4 understand simple probability MS 1.5 Understand the principles of sampling as applied to scientific data MS 1.6 Understand the terms mean, median and mode MS 1.7 Use a scatter diagram to identify a correlation between two variables MS1.8 Make order of magnitude calculations MS 1.9 Select and use a statistical test MS 1.8 Make order of magnitude calculations MS 1.9 Select and use a statistical test MS 1.10 Understand measures of dispersion, including standard deviation and range MS 1.11 Identify uncertainties in measurements.	.2 Find arithmetic means 1.3 Construct and interpret frequency tables and diagrams, bar charts and histogram 1.4 understand simple probability MS 1.5 Understand the principles of sampling as applied to scientific data MS 1.6 Understand the terms mean, median and mode MS 1.7 Use a scatter diagram to identify a correlation between two variables MS1.8 Make order of magnitude calculations MS 1.9 Select and use a statistical test MS 1.8 Make order of magnitude calculations MS 1.9 Select and use a statistical test MS 1.10 Understand measures of dispersion, including standard deviation and range MS 1.11 Identify uncertainties in measurements.	MS 2.1 Understand and use the symbols: =, <>, >, \propto , . No exemplification required. MS 2.2 Change the subject of an equation MS 2.3 Substitute numerical values into algebraic equations MS 2.4 Solve algebraic equations MS 2.5 Use logarithms in relation to quantities that range over several orders of magnitude. MS 3.1 Translate information between graphical, numerical and algebraic forms MS 3.2 Plot two variables from experimental or other data MS 3.3 Understand that y = mx + c represents a linear relationship MS 3.4 Determine the intercept of a graph MS 3.5 Calculate rate of change from a graph showing a linear relationship MS 3.6 Draw and use the slope of a tangent to a curve as a measure of rate of change MS 4.1 Calculate the circumferences, surface areas and volume	MS 2.1 Understand and use the symbols: =, <>, >, \propto , . No exemplification required. MS 2.2 Change the subject of an equation MS 2.3 Substitute numerical values into algebraic equations MS 2.4 Solve algebraic equations MS 2.5 Use logarithms in relation to quantities that range over several orders of magnitude. MS 3.1 Translate information between graphical, numerical and algebraic forms MS 3.2 Plot two variables from experimental or other data MS 3.3 Understand that y = mx + c represents a linear relationship MS 3.4 Determine the intercept of a graph MS 3.5 Calculate rate of change from a graph showing a linear relationship MS 3.6 Draw and use the slope of a tangent to a curve as a measure of rate of change MS 4.1 Calculate the circumferences, surface areas and volume
Links to careers/ aspirations	Aeronautical engineer, Botanist, conservationist, dietician, Equine Dentist, Forensic scientists, Geoscientist, Hydrotherapist, immunologist, journalist, kinesiologist, lab technician, marine Biologist, Neuro scientist, optician, paramedic, roboticist, sports scientists, urologist, Volcanologist, weather forecaster, Xray technician, yacht master, Zoologist.	Aeronautical engineer, Botanist, conservationist, dietician, Equine Dentist, Forensic scientists, Geoscientist, Hydrotherapist, immunologist, journalist, kinesiologist, lab technician, marine Biologist, Neuro scientist, optician, paramedic, roboticist, sports scientists, urologist, Volcanologist, weather forecaster, Xray technician, yacht master, Zoologist.	Aeronautical engineer, Botanist, conservationist, dietician, Equine Dentist, Forensic scientists, Geoscientist, Hydrotherapist, immunologist, journalist, kinesiologist, lab technician, marine Biologist, Neuro scientist, optician, paramedic, roboticist, sports scientists, urologist, Volcanologist, weather forecaster, Xray technician, yacht master, Zoologist.	Aeronautical engineer, Botanist, conservationist, dietician, Equine Dentist, Forensic scientists, Geoscientist, Hydrotherapist, immunologist, journalist, kinesiologist, lab technician, marine Biologist, Neuro scientist, optician, paramedic, roboticist, sports scientists, urologist, Volcanologist, weather forecaster, Xray technician, yacht master, Zoologist.	Aeronautical engineer, Botanist, conservationist, dietician, Equine Dentist, Forensic scientists, Geoscientist, Hydrotherapist, immunologist, journalist, kinesiologist, lab technician, marine Biologist, Neuro scientist, optician, paramedic, roboticist, sports scientists, urologist, Volcanologist, weather forecaster, Xray technician, yacht master, Zoologist.	Aeronautical engineer, Botanist, conservationist, dietician, Equine Dentist, Forensic scientists, Geoscientist, Hydrotherapist, immunologist, journalist, kinesiologist, lab technician, marine Biologist, Neuro scientist, optician, paramedic, roboticist, sports scientists, urologist, Volcanologist, weather forecaster, Xray technician, yacht master, Zoologist.
Cultural Capital	Research work on proteins and the importance of proteins in medicine including in treating diseases. Example the sequencing of the genome of the coronavirus.	What are the causes of cardiovascular diseases? What are the Social and ethical issues related to genetic screening	Research work by Pharmaceutical companies developing immunosuppressant drugs. Possible methods of transporting drugs How the different vaccine for coronavirus works	The cause of cardiovascular diseases and how it is treated. Effect of mass transport in plants and the impact on farming and food production.	What is the role of genetics and the environment in determining characteristics?	What are the roles of zoos and seed banks in botanical gardens in the survival of species.
Practical Application of Skills	At. a. use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH). AT b use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer. AT c use laboratory glassware apparatus for a variety of	At. a. use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH). AT b use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer. AT c use laboratory glassware apparatus for a variety of	At. a. use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH). AT b use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer. AT c use laboratory glassware apparatus for a variety of	At. a. use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH). AT b use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer. AT c use laboratory glassware apparatus for a variety of	At. a. use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH). AT b use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer. AT c use laboratory glassware apparatus for a variety of	At. a. use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH). AT b use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer. AT c use laboratory glassware apparatus for a variety of

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