



	<p>The classification of an organism. Cells are the unit of an organism. Organisms can either be unicellular or multicellular. Bacteria are unicellular, whereas animal and plants are multicellular. Labelling and defining the functions for the organelles of animal, plant and bacteria cells to include: Cell wall, cell membrane, nucleus, cytoplasm, mitochondria, chloroplasts and vacuole.</p> <p>Being familiar with using an optical microscope to view cells.</p> <p>The functions of animal specialised cells to include, muscle cells, red blood cells and sperm cells.</p>	<p>The cell membrane is partially-permeable to allow for the transport of substances into and out of the cell. Diffusion is the movement of substances from an area of high concentration to low concentration.</p> <p>The respiratory system to include labelling of a diagram and the mechanisms of breathing.</p>	<p>The cell membrane is partially-permeable to allow for the transport of substances into and out of the cell. Diffusion is the movement of substances from an area of high concentration to low concentration.</p> <p>The respiratory system to include labelling of a diagram and the mechanisms of breathing.</p>	<p>Multicellular organisms such as humans are made of a hierarchal structure of cells → tissues → organs → organ system → organism.</p> <p>To name animal and plant specialised cells and to recall their functions and adaptations. Especially for muscle cells, red blood cells, palisade cells, xylem cells and phloem cells.</p> <p>That gas exchange happens in the alveoli.</p>	<p>The importance of respiration so that the dangers of CHD is accessible. The function of the blood components, blood vessels and labelling of the heart.</p> <p>The process and importance of mitosis in humans.</p> <p>The labelling of the digestion system and recall of the functions for the digestive organs.</p> <p>The nutrients required for a balanced diet, the function of each nutrient and the foods which contain the nutrients.</p>	<p>The labelling of the digestion system and recall of the functions for the digestive organs.</p> <p>The nutrients required for a balanced diet, the function of each nutrient and the foods which contain the nutrients.</p>
	<b>Why are we teaching this now?</b>	<b>Why are we teaching this now?</b>	<b>Why are we teaching this now?</b>	<b>Why are we teaching this now?</b>	<b>Why are we teaching this now?</b>	<b>Why are we teaching this now?</b>
	In biology, the cell is the smallest functional unit. The subsequent Biology topics will be difficult to access	Key biological processes, such as respiration are dependent upon the movement of	Key biological processes, such as respiration are dependent upon the movement of	Organisation follows on from cell biology, so students now to understand how to	The levels of organisation would have been taught in term 4 and so would have the circulatory	In year 7, students would have been taught how to label the digestive system, the functions of the

	<p>without the knowledge of cell organelles. Year 7 (KS3) would have learnt about cell organelles so year 9 will now be building on their prior knowledge.</p>	<p>substance into and out of the cell. Active transport, diffusion and osmosis are interleaved throughout the KS4 Biology topics, so it is crucial that students can recall the different transport mechanisms at this stage.</p> <p>Diffusion would have been previously taught in year 7 so year 9 will now be building on their prior knowledge.</p>	<p>substance into and out of the cell. Active transport, diffusion and osmosis are interleaved throughout the KS4 Biology topics, so it is crucial that students can recall the different transport mechanisms at this stage.</p>	<p>define the levels of organisation.</p> <p>The levels of organisation need to be taught prior to function of animal and plants tissues and organ systems.</p>	<p>system. Students can access what CHD is, the risk factors and treatment.</p> <p>Students were taught mitosis in term 1, which is important for understanding that benign and malignant tumours grow due to uncontrolled cell division by mitosis.</p> <p>In year 7, students would have been taught how to label the digestive system, the functions of the digestive organs, and the importance of the key nutrients in our diet.</p>	<p>digestive organs, and the importance of the key nutrients in our diet.</p>
--	--	---	---	---	---	---

**Exam Board AQA**

Topic Big question	Lesson questions	Lesson objective	Outcomes	Key Terms Literacy Numeracy Practical activities	Assessment and homework tasks	Resources	Personal Development curriculum links (SMSC, British Values, PSHE)
<b>Term 1</b>							
<b>B1a – Cell structure and cell division</b>							
<b>How are different cells adapted to their function?</b>	What is the difference between animal and plant cells?	To be able to draw and label plant, animal and bacterial cells; and be able to identify them as eukaryotic or prokaryotic.	<ul style="list-style-type: none"> <li>- To recall that animal and plant cells are types of eukaryotic cells, and bacterial cells are prokaryotic cells</li> <li>- To describe differences between prokaryotic and eukaryotic cells</li> <li>- To explain the function of different cell structures</li> </ul>	Eukaryotic Nucleus Plasmid Prokaryotic	Homework tasks linked to the lesson question.  Plenary questions at the end of every lesson.		British values – respect through silence is a key aspect of the Abbey science lessons.  – Students are expected to listen to, and respect others’ opinions.
	How are organelles viewed within a cell?	To be able to recall the differences between different types of microscope and use microscopes to view specimens, and then calculate magnification.	<ul style="list-style-type: none"> <li>- To understand the difference between magnification and resolution.</li> <li>- To describe advantages and disadvantages of light and electron microscopes</li> </ul>	Magnification Micrographs Resolving Power Scanning Electron Microscope (SEM) Transmission Electron Microscope (TEM)  Using magnification = image size/actual size Estimating size			SMSC – should animal / plant cells be used for us to view under a microscope?

			- To calculate magnification	Converting between units			
	How are organelles viewed within a cell? <b>REQUIRED PRACTICAL</b>	To use the knowledge from previous lesson to complete required practical 1 (Microscopy)	“Use a light microscope to observe, draw and label a selection of plant and animal cells. A scale magnification must be included”	<p>Magnification Micrographs Resolving Power Scanning Electron Microscope (SEM) Transmission Electron Microscope (TEM)</p> <p>Using magnification = image size/actual size Estimating size Converting between units.</p> <p>To view organelles using a microscope, <b>practical activity</b></p>			

## Term 2

### B1a – Cell structure and cell division

<b>How are different cells adapted to their function?</b>	How are cells adapted to their function?	To learn different types of cell and how they are specialised to carry out their function.	<ul style="list-style-type: none"> <li>- To define the term specialised cell.</li> <li>- To describe and explain how specialised cells are adapted.</li> </ul>	Differentiation Specialised	End of topic assessment for B1a  Homework tasks linked to the lesson question.	Knowledge organiser CGP textbook Standardised lesson presentations	British values – respect through silence is a key aspect of the Abbey science lessons.  – Students are expected to listen to, and respect others’ opinions.
	What is the link between DNA, chromosomes and genes?	To learn what DNA, chromosomes and genes all are, and how they are linked together.	- To recall where chromosomes are found.	Chromosome DNA Gene	Plenary questions at the end of every lesson.		

			<ul style="list-style-type: none"> <li>- To understand what chromosomes are made from.</li> <li>- To explain that chromosomes are usually found in pairs, except in sex cells, and where we inherit them from.</li> </ul>				
	How do our body cells replicate?	To be able to define mitosis as a process in which body cells replicate.	<ul style="list-style-type: none"> <li>- To define mitosis.</li> <li>- To describe what is formed in mitosis.</li> <li>- To explain what happens during the cell cycle.</li> </ul>	<a href="#">Daughter Cell</a> <a href="#">Mitosis</a> <a href="#">Stem Cells</a>			
	What are stem cells and how can they be used?	To be able to identify stems cells, and be able to give advantages and disadvantages of using them.	<ul style="list-style-type: none"> <li>- To identify where stem cells can be found in plants and animals.</li> <li>- To describe the process that stems cells go through to come differentiated, specialised cells.</li> <li>- To explain how stem cells can be used in medical treatment and the ethical issues surrounding this.</li> </ul>	<a href="#">Adult stem cell culture</a> <a href="#">Donor</a> <a href="#">Embryonic stem cell</a> <a href="#">Ethical</a> <a href="#">In-vitro fertilisation (IVF)</a> <a href="#">Gene</a> <a href="#">Mutation</a> <a href="#">Therapeutic cloning</a> <a href="#">Umbilical cord</a>			SMSC - Discussion based around the use of stem cells from adults and from a foetus. Discussion around IVF.

### B1b – Transport in cells

<b>How are different substances transported</b>	What is diffusion?	To understand that diffusion is the spreading out of particles from an	<ul style="list-style-type: none"> <li>- To describe how dissolved substances can move in and out</li> </ul>	<a href="#">Diffusion</a>	Homework tasks linked to the lesson question.	Knowledge organiser CGP textbook	British values – respect through silence is a key
---	--------------------	--	--	---------------------------	---	-------------------------------------	---

around cells?		area of higher concentration to an area of lower concentration.	of a cell, through the cell membrane, by diffusion. - To explain how the rate of diffusion is affected by the difference in the concentration of particles, the temperature and the surface area available for diffusion.		Plenary questions at the end of every lesson.	Standardised lesson presentations	aspect of the Abbey science lessons.  – Students are expected to listen to, and respect others’ opinions.
	How is osmosis different to diffusion?	To understand that water moves in and out of plant cells by osmosis through a partially permeable cell membrane	- To define osmosis. - To understand the movement of water molecules in and out of cells.	Flaccid Osmosis Partially permeable Plasmolysis Turgid			
	How can you measure osmosis? <b>REQUIRED PRACTICAL</b>	To use the knowledge from previous lesson to complete required practical 2 (Osmosis)	- To investigate the effect of different concentrations of sugar solutions on plant cells.	Osmosis Partially permeable  To draw and interpret graphs showing the effect of the concentration of a sugar/salt solution on the mass of plant tissue.  To investigate the effect of concentration on osmosis in plant cells, <b>practical activity.</b>			
<b>Term 3</b>							

**B1b – Transport in cells**

<p><b>How are different substances transported around cells?</b></p>	<p>What is active transport?</p>	<p>To define active transport and explain the differences between active transport, diffusion and osmosis</p>	<ul style="list-style-type: none"> <li>- To define active transport.</li> <li>- To describe how substances move in and out of a cell by active transport.</li> <li>- To explain the differences between active transport, diffusion and osmosis</li> </ul>	<p>Concentration gradient ATP</p>	<p>End of topic assessment for B1b.</p> <p>Homework tasks linked to the lesson question.</p> <p>Plenary questions at the end of every lesson.</p>	<p>Knowledge organiser CGP textbook Standardised lesson presentations</p>	<p>British values – respect through silence is a key aspect of the Abbey science lessons.</p> <p>– Students are expected to listen to, and respect others’ opinions.</p>
	<p>How are exchange surfaces adapted for exchanging materials?</p>	<p>To understand that larger organism need transport systems to allow sufficient molecules to be transported to and from all cells.</p>	<ul style="list-style-type: none"> <li>- To calculate surface area to volume ratios and know how to compare them.</li> <li>- To explain why exchange surfaces need a large surface area to volume ratio.</li> </ul>	<p>Exchange Gaseous Diffusion pathways</p> <p>Calculating surface area to volume ratio</p>			
	<p>How are gases and nutrients exchanged in organisms?</p>	<p>To be able to describe and explain where/how gases and nutrients are exchanged in humans, fish and leaves.</p>	<ul style="list-style-type: none"> <li>- To describe how villi are adapted to aid the absorption of nutrients.</li> <li>- To explain how the gills and leaves are adapted to maximise</li> </ul>	<p>Alveoli Lamellae Stomata Villi</p>			

			the exchange of gases.				
--	--	--	------------------------	--	--	--	--

**B2a – Tissues, organs and organ systems**

<b>How are cells organised to carry out important functions?</b>	How are cells organised?	To be able to explain the hierarchy of organisation in a multicellular organ system	<ul style="list-style-type: none"> <li>- To recall the definition of a cell, tissue, organ, organ system and organism.</li> <li>- To understand the hierarchy of organisation.</li> <li>- To explain examples of each stage of organisation</li> </ul>	Differentiation Organ Organ system Specialised Tissue	Homework tasks linked to the lesson question.  Plenary questions at the end of every lesson.	Knowledge organiser CGP textbook Standardised lesson presentations	British values – respect through silence is a key aspect of the Abbey science lessons.  – Students are expected to listen to, and respect others’ opinions.
	How are the lungs adapted for gas exchange?	To be able to describe and explain the functions of the main parts of the human respiratory system to aid with gaseous exchange.	<ul style="list-style-type: none"> <li>- To identify the parts of - the human gas exchange system and know their functions. To describe how gas exchange occurs in humans.</li> <li>- To explain the adaptations of the gas exchange surfaces.</li> </ul>	Alveoli Gas exchange Trachea Thorax  Calculating breathing rate in breaths per minute			

**Term 4**

**B2a – Tissues, organs and organ systems**

<b>How are cells organised to carry out important functions?</b>	What is the structure of the heart?	To be able to label relevant parts of the heart, explain why the left walls are thicker, and recall the cycle in	<ul style="list-style-type: none"> <li>- To identify the functions and adaptations of the parts of the heart.</li> </ul>	Aorta Atrium (plural: atria), Coronary artery Pacemaker Vena cava	Termly assessment focussed on B2a (tissues, organs and organ systems).	Knowledge organiser CGP textbook	SMSC – discussion around the use of artificial pacemakers.
--	-------------------------------------	--	--	---	--	-------------------------------------	--

	which the blood is pumped.	<ul style="list-style-type: none"> <li>- To describe the structure and functions of the heart.</li> <li>- To explain the movement of blood around the heart.</li> </ul>	Ventricle	<p>Homework tasks linked to the lesson question.</p> <p>Plenary questions at the end of every lesson.</p>	Standardised lesson presentations	
How is blood transported around the body?	To be able to identify different types of blood vessel and describe their function.	<ul style="list-style-type: none"> <li>- To recall that blood moves through arteries, veins and capillaries.</li> <li>- To understand how arteries, veins and capillaries are adapted for their function.</li> <li>- To understand the difference between a single and a double circulatory system.</li> </ul>	<p>Artery</p> <p>Capillary</p> <p>Double circulation</p> <p>Lumen</p> <p>Vein</p> <p>Calculating the rate of blood flow.</p>			
What makes up blood?	To be able to identify parts of the blood and their function, including how red blood cells are adapted.	<ul style="list-style-type: none"> <li>- To recall the function of red blood cells, white blood cells and platelets, and how they are adapted to their function.</li> <li>- To explain how their size, shape and lack of nucleus help red</li> </ul>	<p>Haemoglobin</p> <p>Oxyhaemoglobin</p> <p>Plasma</p> <p>Red blood cells</p>			SMSC - Possible opportunity to discuss the issue of blood donation and transfusion and the ethics behind both.

			<p>blood cells carry oxygen.</p> <ul style="list-style-type: none"> <li>- To describe how haemoglobin reacts with oxygen to form oxyhaemoglobin.</li> </ul>				
How are plants organised?	To be able to identify the different plant organs and describe their functions.	<ul style="list-style-type: none"> <li>- To name and locate the parts of a plant, in particular the leaf.</li> <li>- To state that chlorophyll pigments in chloroplasts absorb light energy for photosynthesis.</li> <li>- To explain how the cellular structure of a leaf is adapted for efficient photosynthesis.</li> </ul>	<p>Epidermal tissue Palisade mesophyll Spongy mesophyll Vascular bundle</p> <p>Uptake of coloured liquid in a celery stalk <b>practical activity</b>.</p>			<p>British values – respect through silence is a key aspect of the Abbey science lessons.</p> <p>– Students are expected to listen to, and respect others’ opinions.</p>	
What substances to plant need to transport?	To be able to define and explain the processes of transpiration and translocation.	<ul style="list-style-type: none"> <li>- To define transpiration as the movement of water through a plant through the xylem.</li> <li>- To define translocation as the movement of sugars through phloem.</li> <li>- To explain how the structure of phloem is</li> </ul>	<p>Phloem Transpiration Translocation Xylem</p>				

			<p>adapted for translocation.</p> <ul style="list-style-type: none"> <li>- To explain that transpiration involves evaporation and diffusion.</li> </ul>				
	How are plants adapted for efficient transpiration?	To be able to describe and explain the role the stomata play in transpiration.	<ul style="list-style-type: none"> <li>- To describe the structure and function of the stomata.</li> <li>- To explain how stomata are opened and closed to control the rate of transpiration.</li> </ul>	<p>Guard cells Stomata Transpiration Xylem</p> <p>Observing stomata cells with a microscope <b>practical activity.</b></p>			
	What factors affect the rate of transpiration?	To be able to recall factors that affect the rate of transpiration and explain this effect.	<ul style="list-style-type: none"> <li>- To recall that transpiration rate can be affected by light intensity, temperature, airflow and humidity and explain why.</li> <li>- To explain that transpiration produces a tension from above, creating a water potential gradient that moves water up the plant.</li> </ul>	<p>Potometer Water potential gradient</p>			

**B2b – Health and disease**

<b>What factors negatively affect health?</b>	What does it mean to be healthy?	To be able to give a definition for health and interpret data on the link between health and lifestyle choices.	<ul style="list-style-type: none"> <li>- To understand that health is complete physical and mental well-being and diseases are disorders that affect part or all of an organism.</li> <li>- To describe examples of the interaction of different diseases.</li> <li>- To evaluate data that links lifestyle choices to health.</li> </ul>	<p>Communicable</p> <p>Depression</p> <p>Immune system</p> <p>Mental health</p> <p>Non-communicable</p>	<p>Homework tasks linked to the lesson question.</p> <p>Plenary questions at the end of every lesson.</p>	<p>Knowledge organiser</p> <p>CGP textbook</p> <p>Standardised lesson presentations</p>	SMSC – discussion around how lifestyle choices can affect health.
	What is cardiovascular disease?	To be able to identify the causes and symptoms of CVD and suggest suitable treatment.	<ul style="list-style-type: none"> <li>- To understand that in coronary heart disease layers of fatty material build up inside the coronary arteries and that faulty heart valves can cause heart failure.</li> <li>- To understand that treatments include stents, statins, replacement valves and replacement hearts.</li> </ul>	<p>Artificial pacemaker</p> <p>Cardiovascular disease</p> <p>Coronary heart disease</p> <p>Statin</p> <p>Stent</p>			SMSC – discussion around the ethics of using replacement hearts.

			<ul style="list-style-type: none"> <li>- To evaluate the use of stents, replacement valves and replacement hearts.</li> </ul>				
How can lifestyle affect health?	To be able to define the term risk factor and describe and explain how lifestyle factors can affect health.	<ul style="list-style-type: none"> <li>- To recall that different risk factors can increase the chance of having a non-communicable disease.</li> <li>- To understand the financial implications of different risk factors.</li> <li>- To understand the causal mechanisms for some risk factors of non-communicable diseases.</li> </ul>	<p>Causal mechanism Risk factor</p> <p>Interpreting health data in the form of a table of data, and in a graph.</p>			SMSC – discussion around how lifestyle choices can affect health.	
What is cancer?	To be able to state what cancer is and describe possible risk factors.	<ul style="list-style-type: none"> <li>- To describe what cancer is and factors that cause it to occur.</li> <li>- To explain why cancer causes damage and death.</li> <li>- To use and analyse data to evaluate different types of cancer.</li> </ul>	<p>Benign tumour Carcinogen Malignant tumour Mutation Secondary tumour</p>			SMSC – discussion around the ethics of different cancer treatments.	

**B2c – Health and disease**

<b>How do enzymes assist with reactions?</b>	What is an enzyme?	To be able to explain how enzymes work via the 'lock and key' theory.	<ul style="list-style-type: none"> <li>- To define what an enzyme is.</li> <li>- To explain the 'lock and key' theory.</li> <li>- To understand optimal conditions that enzymes require.</li> </ul>	Active site Lock and key theory Enzyme Substrate	Homework tasks linked to the lesson question.  Plenary questions at the end of every lesson.	Knowledge organiser  CGP textbook  Standardised lesson presentations	British values – respect through silence is a key aspect of the Abbey science lessons.  – Students are expected to listen to, and respect others' opinions.
	What is the effect of pH on amylase? <b>REQUIRED PRACTICAL</b>	To be able to carry out an investigation to determine the effect of pH on amylase.	<ul style="list-style-type: none"> <li>- To investigate the effect of pH on the rate of starch breakdown by the enzyme amylase.</li> <li>- To calculate the rate of chemical reactions.</li> <li>- To interpret quantitative results to explain the pattern of results.</li> </ul>	Amylase Catalyses Continuous sampling method Starch Maltose  Calculating rate of reaction  To investigate the effect of pH on amylase, <b>practical activity</b>			
	How are enzymes used in digestion?	To be able to describe and explain the functions of different enzymes during the process of digestion.	<ul style="list-style-type: none"> <li>- To understand that physical digestion increases the surface area of the food.</li> <li>- To recall the enzymes, substrates and products of digestion in the different parts of the digestive system.</li> </ul>	Carbohdrase Lipase Protease			

			- To interpret data to link optimum pH of an enzyme with conditions inside the digestive system.				
<b>Term 6</b>							
<b>B2c – Health and disease</b>							
<b>How do enzymes assist with reactions?</b>	What are the products of digestion? <b>REQUIRED PRACTICAL</b>	To be able to select a suitable food test for the foodstuff selected and carry it out safely to generate valid results.	<ul style="list-style-type: none"> <li>- To use apparatus safely when completing food tests.</li> <li>- To identify appropriate reagents used to test for carbohydrates, lipids and proteins.</li> <li>- To interpret qualitative observations to identify the types of substances present in food.</li> </ul>	<b>Benedict's test</b> <b>Carbohydrates</b> <b>Qualitative</b> <b>Reagents</b>  To investigate the products of digestion using relevant food tests, <b>practical activity</b>	End of year assessment for all topics covered throughout the year.  Homework tasks linked to the lesson question.  Plenary questions at the end of every lesson.	Knowledge organiser  CGP textbook  Standardised lesson presentations	SMSC – possible discussion on whether food items should be used in this way.