

Yr. Group 10 Biology	Topic Cell Biology	Lesson Content (Order)	What do pupils need to know	Skills utilised / subject disciplines	Cross Curricular Links / Transferable knowledge.	Assessment
	Cells are the basic unit of all forms of life. In this section we explore how structural differences between types of cells enables them to perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to grow, cells must divide by mitosis producing two new identical cells. If cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a	Lesson 1 – Comparison of cells	<ul style="list-style-type: none"> Label plant, animal and bacterial cell and describe the function of the organelles Describe the differences between eukaryotic and prokaryotic cells Make order of magnitude calculations Compare different types of cells 	<p>Maths skills – Order of magnitude calculations – this needs to be taught explicitly as students will probably not have met this before. This is ‘powers of ten’ difference</p> <p>Literacy – Extended response focusing on comparison of prokaryotic and eukaryotic cells.</p> <p>Scaffolding- Word list provided to scaffold comparison.</p>	Order of magnitude – Maths, measurement, understanding of scale and size	Mini whiteboard quiz on key terms Model answer on PowerPoint to demonstrate ‘compare’ and ‘explain’ Self-assessed comparison of cells
		Lesson 2 – Microscopes	<ul style="list-style-type: none"> Explain the differences between images produced by light and electron microscopes Explain how electron microscopes have enhanced our understanding of cell structures and processes Explain what is meant by resolution and magnification 	<p>Maths skills – Working out difference in magnification of the two microscopes.</p> <p>Working scientifically skills –</p> <p>Literacy – comprehension task, terms resolution and magnification</p> <ul style="list-style-type: none"> Interleaving Opportunity – cell parts on starter quiz 	History of the microscope	Quiz as starter to consolidate cell terminology Verbal feedback and questioning after discussion of different images Comparison of resolution and magnification of light and electron microscopes.
		Lesson 3 – Required Practical Plant Cells	<ul style="list-style-type: none"> Required practical activity 1: use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included. 	<p>Maths skills – using and manipulating magnification equations, changing SI units between mm and μm.</p> <p>Working scientifically skills – using a microscope, recording detailed observations</p> <p>Literacy – Description of use of microscope – word bank provided, use of prefixes: centi, milli, nano, micro etc</p>	Measurement prefixes – centi, milli, nano, micro etc.	magnification questions: self-assessed

range of different types of cells. This phenomenon has led to the development of stem cell technology. This is a new branch of medicine that allows doctors to repair damaged organs by growing new tissue from stem cells				Scaffolding- calculation scaffold if appropriate, could add some sentence starters to sheet.		
	Lesson 4 – Required Practical Animal Cells	<ul style="list-style-type: none"> Find and view animal cells using a microscope Estimate the size of an animal cell Use the magnification equation to calculate the magnification, image, or actual size 	<p>Maths skills – use and manipulation of magnification calculation, unit changes, scale bars</p> <p>Working scientifically skills – recording of observations</p> <p>Literacy: use of prefixes: centi, milli, nano, micro etc</p> <p>Scaffolding- calculation scaffold if appropriate</p> <p>Interleaving Opportunity – functions of parts, e.g., mitochondria, ribosomes etc</p>	Measurement prefixes – centi, milli, nano, micro etc.	Self-assessment of the homework to describe method of how to find and view plant cells in focus.	
	Lesson 5 – Specialised Cells	<ul style="list-style-type: none"> Describe some of the features of specialised cells Explain why we need specialised cells Relate special features of a cell to its function 	<p>Literacy – description of specialized cells using key terms – oracy. WAGOLL on PowerPoint.</p> <p>Scaffolding- display some sentence starters or key words for each cell</p> <p>Interleaving Opportunity – organelle structure</p>		Exam question starter Modelling of answer for sperm cell exam questions on specialized cells: self-assessed	
	Lesson 6 – How do cells get what they need? Diffusion	<ul style="list-style-type: none"> Describe how substances move in and out of cells by diffusion, giving examples 	<p>Working scientifically skills – observations, concluding from observations</p> <p>Literacy – conclusion – WAGOLL on PowerPoint</p>		explanation of observations on diffusion prac, suggestion of factors that could have sped it up: teacher marked	

			<ul style="list-style-type: none"> Describe and explain factors that can affect the rate of diffusion Explain the importance of diffusion in living things 	Scaffolding- word bank, sentence starters can be given. Interleaving Opportunity - cell parts, particle movement		
		Lesson 7 - Internal surfaces	<ul style="list-style-type: none"> Explain why bigger organisms need to have particular features to deliver essential substances Describe and explain the adaptations in plants and animals for the exchange of materials Use the ideas of surface area to volume ratio and concentration gradients to explain the need for circulatory systems. 	Maths skills - surface area: volume ratio calculations Literacy - WAGOLLS given to model and to self-assess against. Scaffolding- table to complete to ensure description and explanation are separated. Word bank.		exam questions on lungs and villi: self-assessed
		Lesson 8 - Required Practical Osmosis	<ul style="list-style-type: none"> Describe osmosis in terms of water and concentration Identify variables to change, measure and control Weigh and record accurately 	Maths skills - accurate weighing technique Working scientifically skills - recording data accurately, identifying variables to change, measure and control Literacy - key language included on PowerPoint		variables identified and method written for osmosis: self-assessed
		Lesson 9 - Required Practical Osmosis Completion	<ul style="list-style-type: none"> Measure change in mass accurately and calculate percentage change Display and interpret results appropriately Describe and explain the patterns in the results 	Maths skills - calculating percentage change, scaling, and plotting of graph. Working scientifically skills - accurate measurements, presenting data, drawing conclusions Literacy - WAGOLL on PowerPoint for increase in mass Scaffolding- model answer		percentage change calcs and graph: teacher marked

		<p>Lesson 10 – Active Transport</p>	<ul style="list-style-type: none"> Describe how substances are taken up by active transport Compare diffusion, osmosis, and active transport Apply knowledge to exam questions 	<p>Scaffolding- provide the statements to put into the Venn diagram.</p>	Venn diagrams	<p>formative task: self-assessed</p>
		<p>Lesson 11 – DNA, genes, chromosomes, and the cell cycle</p>	<ul style="list-style-type: none"> Identify DNA, genes, chromosomes on a diagram Describe the main stages in the cell cycle Explain the importance of cell differentiation 	<p>Maths skills – calculation of time in exam question Working scientifically skills – observations of diagrams Literacy – WAGOLLS provided Scaffolding- Sentence starters, word bank given</p>		<p>cell cycle descriptions and calculations: self-assessed</p>
		<p>Lesson 12 – GCSE BIOLOGY ONLY Culturing Microorganisms</p>	<ul style="list-style-type: none"> Calculate the number of bacteria in a population given mean division time Describe how to produce an uncontaminated culture of bacteria using aseptic technique Identify variables to change, measure and control to test the action of disinfectants or antibiotics 	<p>Maths skills – calculation of number of bacteria in a colony Working scientifically skills – identification of variables, working safely Literacy – WAGOLL on PowerPoint Scaffolding- give prepared table for aseptic techniques and word bank Interleaving Opportunity – bacterial structures and magnification question on starter quiz</p>	Antibiotic use – debate	<p>BIO ONLY – aseptic technique explanations, calculation of number of bacteria</p> <p>Starter quiz Calculations on bacterial numbers Aseptic technique grid Discussion and questioning around variables</p>
		<p>Lesson 13 – GCSE BIOLOGY ONLY Culturing Microorganisms (part 2)</p>	<ul style="list-style-type: none"> Make and record accurate measurements Describe conclusions from the data and use data to support Check for reproducibility in the conclusions Calculate the area of the clear zone using πr^2 	<p>Maths skills – use of πr^2 to calculate area of inhibition. Working scientifically skills – measuring accurately, processing data, writing conclusions Literacy – WAGOLL on PowerPoint</p>	Calculate area of circle using πr^2	<p>BIO ONLY – conclusion and calculations of clear zone areas</p> <p>Starter quiz Reproducibility check Exam questions</p>

		Lesson 14 – Stem Cells	<ul style="list-style-type: none"> Define a stem cell and describe their function in embryos and meristem Describe uses of stem cells in both plants and animals Evaluate the use of stem cells in treating diseases 	Working scientifically skills – evaluating the ethics of the application of scientific technology Literacy – WAGOLL on ppt Scaffolding- give a table to scaffold +/- points and give some to choose from Interleaving Opportunity – link this to cell cycle and to specialized cells – all cells come from unspecialized cells and then become specialized	Ethics and issues involving stem cells to treat diseases – debate/current affairs/evaluating evidence/forming opinions Ethics of embryonic stem cell use	Starter quiz Evaluation self-assessed Evaluation of embryonic and adult stem cells
		Lesson 15 – Uses of stem cells	<ul style="list-style-type: none"> Describe the process of therapeutic cloning Describe some advantages and disadvantages of this process Apply knowledge and understanding to exam questions 	Literacy – WAGOLL on ppt	Ethics and issues involving stem cells to treat diseases – debate/current affairs/evaluating evidence/forming opinions Ethics of embryonic stem cell use	Formative task: self-assessed
		Lesson 16 – Revision	<ul style="list-style-type: none"> 			
		Lesson 17 – Assessment	<ul style="list-style-type: none"> 			End of Topic test: teacher marked
		Lesson 18 – Corrections and follow up	<ul style="list-style-type: none"> 			Re-teach.

Cultural Capital (Essential general knowledge that pupils need to be educated citizens, introducing them to the best that has been thought and said and helping to engender an appreciation of human creativity and achievement.