

Year	Term	Lesson title	Lesson objectives	AQA combined specification reference
Year 9	Term 1	Looking at cells	<ul style="list-style-type: none"> Describe the structure of eukaryotic cells. Recognise the order of magnitude of cells. Explain how the main sub-cellular structures are related to their functions. 	4.1.1.1; 4.1.1.2
Year 9	Term 1	The light microscope	<ul style="list-style-type: none"> Describe how to use a microscope. Observe plant and animal cells with a light microscope. Understand the limitations of light microscopy. 	4.1.1.5
Year 9	Term 1	Looking at cells in more detail	<ul style="list-style-type: none"> Identify the differences in the magnification and resolving power of light and electron microscopes. Describe simply how electron microscopes work in comparison to light microscopes. Explain how electron microscopy has increased our understanding of sub-cellular structures. 	4.1.1.5
Year 9	Term 1	Required practical: Using a light microscope to observe and record animal and plant cells	<ul style="list-style-type: none"> Apply knowledge to select techniques, instruments, apparatus and materials to observe cells. Make and record observations and measurements. Present observations and other data using appropriate methods. 	4.1.1.2
Year 9	Term 1	Required practical: Using a light microscope to observe and record animal and plant cells	<ul style="list-style-type: none"> Apply knowledge to select techniques, instruments, apparatus and materials to observe cells. Make and record observations and measurements. Present observations and other data using appropriate methods. 	
Year 9	Term 1	Primitive cells	<ul style="list-style-type: none"> Describe and explain the differences between prokaryotic cells and eukaryotic cells. Explain how prokaryotic and eukaryotic cells evolved over time. 	4.1.1.1; 4.1.1.2; 4.6.4
Year 9	Term 1	Cell division	<ul style="list-style-type: none"> Describe the process of mitosis in growth, and mitosis as part of the cell cycle. Describe how the process of mitosis produces cells that are identical genetically to the parent cell. 	4.1.2.1; 4.1.2.2
Year 9	Term 1	Cell differentiation	<ul style="list-style-type: none"> Explain the importance of cell differentiation. Understand size and scale in relation to cells, tissues, organs and body systems. Describe how cells, tissues, organs and organ systems are organised to make up an organism. 	4.1.1.3; 4.1.1.4; 4.2.1
Year 9	Term 1	Cancer	<ul style="list-style-type: none"> Describe cancer as a condition resulting from changes in cells that lead to their uncontrolled growth, division and spread. Understand some of the risk factors that trigger cells to become cancerous. Use data to analyse and evaluate the impact of cancer. 	4.2.2.7

Year 9	Term 1	Stem cells	<ul style="list-style-type: none"> ● Identify cells as being differentiated, or as stem cells. ● Describe the function of stem cells in embryonic and adult animals. ● Explain how stem cells can be useful. ● Explore the use of stem cells in medicine. ● Identify the risks in using stem cells. ● Evaluate the benefits and disadvantages of using stem cells. 	4.1.2.3
Year 9	Term 1	Key concept: Cell development	<ul style="list-style-type: none"> ● Revise ideas about cell structure, cell division and stem cells. ● Apply ideas about cells to unfamiliar contexts. ● Describe how plant meristems can be used in cloning. 	4.1.2.3
Year 9	Term 1	Cells at work	<ul style="list-style-type: none"> ● Recognise that all organisms respire. ● Explain respiration as the process of making energy. ● Describe aerobic respiration as an exothermic reaction. 	4.4.2.1
Year 9	Term 1	Living without oxygen	<ul style="list-style-type: none"> ● Describe the process of anaerobic respiration. ● Explain when anaerobic processes occur. ● Compare the processes of aerobic and anaerobic respiration. ● Explain how the body removed lactic acid produced during anaerobic respiration. 	4.2.2.1; 4.4.2.2
Year 9	Term 1	Maths skills: Size and number	<ul style="list-style-type: none"> ● To make estimates of the results of simple calculations, without using a calculator. ● To use ratio and proportion to calibrate a microscope. ● To recognise and use numbers in decimal and standard form. 	4.1
Year 9	Term 1	Explaining photosynthesis	<ul style="list-style-type: none"> ● Identify the raw materials and products of photosynthesis. ● Describe photosynthesis by an equation. ● Explain gas exchange in leaves. ● Explain the importance of photosynthesis. ● Explain how plants use the glucose they produce. 	4.4.1.1
Year 9	Term 2	Investigating leaves	<ul style="list-style-type: none"> ● Identify the internal structures of a leaf. ● Explain how the structure of a leaf is adapted for photosynthesis. ● Recall that chlorophyll pigments in chloroplasts absorb light energy for photosynthesis. ● 	4.2.3.1
Year 9	Term 2	Increasing photosynthesis	<ul style="list-style-type: none"> ● Identify factors that affect the rate of photosynthesis. ● Interpret data about the rate of photosynthesis. ● Explain the interaction of factors in limiting the rate of photosynthesis. 	4.4.1.2
Year 9	Term 2	Required practical part 1: Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed	<ul style="list-style-type: none"> ● Identify and manage variables. ● Process data and identify outliers. ● Evaluate an experimental process. 	4.4.1.2

		Required practical part 2: Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed	<ul style="list-style-type: none"> ● Identify and manage variables. ● Process data and identify outliers. ● Evaluate an experimental process. 	
Year 9	Term 2	Increasing food production	<ul style="list-style-type: none"> ● Explain how factors that increase food production can be controlled. ● Evaluate the benefits of manipulating the environment to increase food production. ● Understand and use inverse square law and light intensity in the context of photosynthesis. (Included in another lesson) 	4.4.1.2
Year 9	Term 2	Key concept: Diffusion in living systems	<ul style="list-style-type: none"> ● Use concentration gradients to explain the direction of diffusion. ● Apply the principles of diffusion to movement of different substances in plants. 	4.1.3.1
Year 9	Term 2	Looking at stomata	<ul style="list-style-type: none"> ● Describe transpiration in plants. ● Explain the structure and function of stomata. ● Explain the relationship between transpiration and leaf structure. 	4.2.3.1; 4.2.3.2
Year 9	Term 2	Moving water	<ul style="list-style-type: none"> ● Describe the structure and function of xylem and roots. ● Describe how xylem and roots are adapted to absorb water. ● Explain why plants in flooded or waterlogged soil die. ● Explain how wilting occurs. 	4.2.3.1; 4.2.3.2
Year 9	Term 2	Investigating transpiration	<ul style="list-style-type: none"> ● Describe how transpiration is affected by different factors. ● Explain the movement of water in the xylem. 	4.2.3.2
Year 9	Term 2	Moving sugar	<ul style="list-style-type: none"> ● Describe the movement of sugar in a plant as translocation. ● Explain how the structure of phloem is adapted to its function in the plant. ● Explain the movement of sugars around the plant. 	4.2.3.2
Year 9	Term 2	Maths skills: Surface area to volume ratio	<ul style="list-style-type: none"> ● Be able to calculate surface area and volume. ● Be able to calculate surface-area-to-volume ratio. ● Know how to apply ideas about surface area and volume. ● Describe the need for transport systems. Describe how the effectiveness of an exchange surface can be increased. Explain in terms of surface-area-to-volume ratios the need for transport systems 	4.1.3.1; 4.2.3.2
Year 9	Term 2	Explaining water movement	<ul style="list-style-type: none"> ● Describe how water moves by osmosis in living tissues. ● Identify factors that affect the rate of osmosis. ● Explain what the term 'partially permeable membrane' means. 	4.1.3.2
Year 9	Term 2	Required practical: Investigate the effect of a range of concentrations of salt or sugar solutions on	<ul style="list-style-type: none"> ● Use scientific ideas to develop a hypothesis. ● Plan experiments to test a hypothesis. ● Draw conclusions from data and compare these with hypotheses made. 	4.1.3.2

		the mass of plant tissue		
Year 9	Term 2	Required practical: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue	<ul style="list-style-type: none"> • Use scientific ideas to develop a hypothesis. • Plan experiments to test a hypothesis. • Draw conclusions from data and compare these with hypotheses made. 	
Year 9	Term 2	Learning about active transport	<ul style="list-style-type: none"> • Describe active transport. • Explain how active transport is different from diffusion and osmosis. • Explain why active transport is important. 	4.1.3.3
		Pause lesson	<ul style="list-style-type: none"> • 	
		Knowledge test	<ul style="list-style-type: none"> • 	
Year 9	Term 2	Explaining enzymes	<ul style="list-style-type: none"> • Describe what enzymes are and how they work. • Explain the lock-and-key theory. • Use the collision theory to explain enzyme action. 	4.2.2.1; 4.4.2.3
Year 9	Term 2	Required practical: Investigate the effect of pH on the rate of reaction of amylase enzyme	<ul style="list-style-type: none"> • Describe how safety is managed, apparatus is used and accurate measurements are made. • Explain how representative samples are taken. • Make and record accurate observations. • Draw and interpret a graph from secondary data using knowledge and observations. 	4.2.2.1
Year 9	Term 2	Learning about the digestive system	<ul style="list-style-type: none"> • Identify and locate the organs in the digestive system, and describe their functions. • Describe how the products of digestion are absorbed into the body. • Explain why the small intestine is an efficient exchange surface. 	4.2.2.1
Year 9	Term 3	Explaining digestion	<ul style="list-style-type: none"> • Describe how physical digestion helps to increase the rate of chemical digestion. • Name the sites of production and action of specific enzymes. • Interpret data about digestive enzymes. 	4.2.2.1
Year 9	Term 3	Required practical: Use qualitative reagents to test for a range of carbohydrates, lipids and proteins	<ul style="list-style-type: none"> • Suggest appropriate apparatus for the procedures. • Describe how safety is managed and apparatus is used. • Describe how accurate measurements are made. • Interpret observations and make conclusions. 	4.2.2.1

Year 9	Term 3	Required practical: Use qualitative reagents to test for a range of carbohydrates, lipids and proteins	<ul style="list-style-type: none"> ● Suggest appropriate apparatus for the procedures. ● Describe how safety is managed and apparatus is used. ● Describe how accurate measurements are made. ● Interpret observations and make conclusions. 	
Year 9	Term 1	Looking at more exchange surfaces	<ul style="list-style-type: none"> ● Identify the structures responsible for gas exchange in fish, amphibians and insects. ● Describe the adaptations of different gas exchange surfaces. ● Explain the gas exchange surfaces in amphibians. 	4.1.3.1
Year 9	Term 1	Learning about plants and minerals	<ul style="list-style-type: none"> ● Describe how mineral ions from the soil help plants to grow. ● Explain how root hair cells are adapted for efficient osmosis. ● Describe the function of different mineral ions in a plant. 	4.1.3.3; 4.2.3.2
Year 9	Term 1	Investigating how plants use minerals	<ul style="list-style-type: none"> ● Describe why plants need different mineral ions. ● Explain the effects of mineral deficiencies on plant growth. ● Explain the importance of fertilisers. 	4.1.3.3