Year	Week	Lesson title	Lesson objectives	Practical	AQA combined specification reference
Year 9	1/2	Looking at cells	● 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	3/4	The light microscope	● 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	3/4	Looking at cells in more detail	● 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	5/6	Required practical: Using a light microscope to observe and record animal and plant cells	● 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.	Req prac - Microscopes	4.1.1.2
Year 9	7/8	Primitive cells	● 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	7/8	Cell division	● 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	7/8	Cell differentiation	● 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	9/10	Cancer	● 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	9/10	Stem cells	● 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.		4.1.2.3

Year 9	9/10	Stem cell banks	● 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	11/12	Cells at work	● 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	13/14	Living without oxygen	● 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	15/16	Explaining photosynthesis	● Identify the raw materials and products of photosynthesis. ● Describe photosynthesis by an equation. ● Explain gas exchange in leaves.		4.4.1.1
Year 9	15/16	Looking at photosynthesis	● Explain the importance of photosynthesis. ● Explain how plants use the glucose they produce.		4.4.1.1; 4.2.3.2; 4.4.1.3
Year 9	15/16	Investigating leaves	● 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	17/18	Required practical: Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed	● Identify and manage variables. ● Process data and identify outliers. ● Evaluate an experimental process.	req prac - pondweed photosynthesis	4.4.1.2
Year 9	17/18	Moving water	● 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 the structure and function of stomata. ● Explain how wilting occurs.	stomata of leaves	4.2.3.1; 4.2.3.2
Year 9	17/18	Investigating transpiration	● Describe how transpiration is affected by different factors. ● Explain the movement of water in the xylem.	Potometer demo.	4.2.3.2
Year 9	19/20	Moving sugar	● 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	19/20	Explaining water movement	● 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	21/22	Required practical: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue	● Use scientific ideas to develop a hypothesis. ● Plan experiments to test a hypothesis. ● Draw conclusions from data and compare these with hypotheses made.	Req prac - osmosis	4.1.3.2
Year 9	21/22	Learning about active transport	● Describe active transport. ● Explain how active transport is different from diffusion and osmosis. ● Explain why active transport is important.		4.1.3.3
Year 9	23/24	Increasing photosynthesis & plant minerals	● 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. ● Name the minerals needed by plants and explain why		4.4.1.2
Year 9	24/25	Explaining enzymes	● 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	24/25	Required practical: Investigate the effect of pH on the rate of reaction of amylase enzyme	● 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.	Required practical: the effect of pH on the rate of reaction of amylase enzyme	4.2.2.1
Year 9	26/27	Learning about the digestive system	● 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	26/27	Explaining digestion	● 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	28/29	Required practical: Use qualitative reagents to test for a range of carbohydrates, lipids and proteins	● 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.	Req prac: Food tests	4.2.2.1
Year 9	30/31	Looking at more exchange surfaces	● 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
9	32/33	Enzymes as catalysts	● State one function of enzymes inside the body. ● Explain how enzymes control metabolism	Catalase	4.1.2.1

			• to investigate how different catalysts affect the rate of a reaction.		