AQA GCSE Combined Science: Trilogy Topic Checklists **4.1 Cell Biology**

4.1.1 Cell Structure				
Topic	**Success Criteria**	**Progress**		
Eukaryotes and Prokaryotes	I can name and identify the main parts present in a eukaryotic cell.			
	I can name and identify the main parts present in a prokaryotic cell.			
	I can describe how genetic material is stored in bacterial cells.			
	I can compare the relative sizes of prokaryotic cells and eukaryotic cells.			
	I can make order of magnitude calculations, including the use of standard form.			
Animal and Plant Cells	I can name and identify the main parts present in most animal cells.			
	In addition to the parts found in animal cells, I can name and identify the main parts present in most plant cells.			
	I can explain how the main sub-cellular structures are related to their functions.			
	I can describe how to use a light microscope to observe, draw and label a selection of plant and animal cells (required practical activity 1).			
Cell Specialisation	I can give some examples of specialised animal cells.			
	I can give some examples of specialised plant cells.			
	I can explain how the structure of different types of cells relate to their function in a tissue, an organ or organ system, or the whole organism.			
Cell Differentiation	I can describe when differentiation occurs in most types of animal cells and in many types of plant cells.			
	I can describe the main purpose of cell division in mature animals.			
	I can explain the importance of cell differentiation.			

Topic	Success Criteria	Progress		
Microscopy	I understand how microscopy techniques have developed over time.			
	I can explain how electron microscopy has increased understanding of sub-cellular structures.			
	I can carry out calculations involving magnification, real size and image size using the formula: $\text{magnification} = \frac{\text{size of image}}{\text{size of real object}}$			
	I can express answers in standard form where appropriate.			

4.1.2 Cell Division				
Topic	**Success Criteria**	**Progress**		
Chromosomes	I can describe where chromosomes are located in a human body cell.			
	I can explain the difference between chromosomes, DNA and genes.			
	I can give the number of chromosomes present in a human body cell and how these are arranged.			
Mitosis and the Cell Cycle	I can describe what happens to the genetic material in cells during the cell cycle.			
	I can describe the stages of the cell cycle, including mitosis.			
	I can explain why cell division by mitosis is important in multicellular organisms.			
	I can recognise and describe situations where mitosis occurs.			
Stem Cells	I can give a definition for the term 'stem cell'.			
	I can describe the function of stem cells in embryos, in adult animals and in the meristems in plants.			
	I can describe how stem cells in embryos can be cloned and made to differentiate into most different types of human cells.			
	I can describe the process of therapeutic cloning.			
	I can explain how treatment with stem cells may be able to help conditions such as diabetes and paralysis.			
	I can describe how stem cells from adult bone marrow can form many types of cells including blood cells.			
	I can evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments.			
	I can describe how meristem tissue in plants can differentiate into any type of plant cell, throughout the life of the plant.			
	I can give examples of how stem cells from meristems in plants can be used.			

4.1.3 Transport in Cells				
Topic	**Success Criteria**	**Progress**		
Diffusion	I can describe how substances are transported into and out of cells by diffusion.			
	I can give examples of some substances that are transported in and out of cells by diffusion.			
	I can explain how the following factors affect the rate of diffusion: • difference in concentration (concentration gradient); • temperature; • surface area of the membrane.			
	I can explain how the surface area to volume ratio of a single-celled organism allows sufficient transport of molecules into and out of the cell to meet the needs of the organism.			
	I can calculate and compare surface area to volume ratios.			
	I can explain the need for exchange surfaces and a transport system in multicellular organisms in terms of surface area to volume ratio.			
	I can describe how the small intestine and lungs in mammals, gills in fish and the roots and leaves in plants are adapted for exchanging materials.			
	I can explain why surfaces and organ systems in multicellular organisms are specialised.			
	I can explain how the effectiveness of an exchange surface is increased by: • having a large surface area; • a membrane that is thin, to provide a short diffusion path; • (in animals) having an efficient blood supply; • (in animals, for gaseous exchange) being ventilated.			

Topic	Success Criteria	Progress		
Osmosis	I can describe how substances are transported into and out of cells by osmosis.			
	I can describe an experiment to investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue (required practical activity 2).			
	I can use simple compound measures of rate of water uptake.			
	I can use percentages and calculate percentage gain and loss of mass of plant tissue.			
	I can plot, draw and interpret graphs to show the gain or loss of mass of plant tissue.			
Active Transport	I can describe how substances are transported into and out of cells by active transport.			
	I can explain why active transport is used to absorb mineral ions into plant root hairs.			
	I can explain why active transport is used to absorb sugar molecules from the gut into the blood.			
	I can explain the differences between diffusion, osmosis and active transport.			