AQA GCSE Biology 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.			
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.			

Topic	Success Criteria	Progress		
Culturing Microorganisms	I can describe how bacteria multiply by simple cell division (binary fission) and the conditions in which this happens.			
	I know that bacteria can be grown in a nutrient broth solution or as colonies on an agar gel plate.			
	I know that uncontaminated cultures of microorganisms are required for investigating the action of disinfectants and antibiotics.			
	I can describe how to prepare an uncontaminated culture using aseptic technique.			
	I can explain why: • Petri dishes and culture media must be sterilised before use; • inoculating loops used to transfer microorganisms to the media must be sterilised by passing them through a flame; • the lid of the Petri dish should be secured with adhesive tape and stored upside down; • in school laboratories, cultures should generally be incubated at 25°C.			
	I can calculate cross-sectional areas of colonies or clear areas around colonies using πr^2.			
	I can calculate the number of bacteria in a population after a certain time if given the mean division time.			
	(HT only) I can express answers in standard form.			
	I can describe an experiment to investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measure zones of inhibition (required practical activity 2).			

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.			
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 3).			
	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.			

Topic	Success Criteria	Progress		
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.			