

4.1 Cell biology

Cell Structure student checklist

AQA Criteria	Objectives			
4.1.1.1	Eukaryotes and prokaryotes			
	Plant and animal cells (eukaryotic cells) have a cell membrane, cytoplasm and genetic material enclosed in a nucleus.			
	Bacterial cells (prokaryotic cells) are much smaller in comparison. They have cytoplasm and a cell membrane surrounded by a cell wall. The genetic material is not enclosed in a nucleus. It is a single DNA loop and there may be one or more small rings of DNA called plasmids .			
4.1.1.2	Animal and plant cells			
	Students should be able to explain how the main sub-cellular structures, including the nucleus, cell membranes, mitochondria, chloroplasts in plant cells and plasmids in bacterial cells are related to their functions.			
	Most animal cells have the following parts: • nucleus • cytoplasm • a cell membrane • mitochondria • ribosomes .			
	In addition to the parts found in animal cells, plant cells often have: • chloroplasts • a permanent vacuole filled with cell sap.			
	Plant and algal cells also have a cell wall made of cellulose , which strengthens the cell.			
4.1.1.3	Cell specialisation			
	You should be able to, (when provided with appropriate Information), explain how the structure of different types of cell relate to their function in a tissue, an organ or organ system, or the whole organism.			
	Cells may be specialised to carry out a particular function: • sperm cells, nerve cells and muscle cells in animals • root hair cells, xylem and phloem cells in plants.			
4.1.1.4	Cell differentiation			
	You should be able to explain the importance of cell differentiation. As an organism develops, cells differentiate to form different types of cells. • Most types of animal cell differentiate at an early stage. • Many types of plant cells retain the ability to differentiate throughout life.			
	In mature animals, cell division is mainly restricted to repair and replacement. As a cell differentiates it acquires different sub-cellular structures to enable it to carry out a certain function. It has become a specialised cell.			
4.1.1.5	Microscopes			
	You should be able to: • understand how microscopy techniques have developed over time • explain how electron microscopy has increased understanding of sub-cellular structures. Limited to the differences in magnification and resolution.			

<p>An electron microscope has much higher magnification and resolving power (resolution) than a light microscope. This means that it can be used to study cells in much finer detail. This has enabled biologists to see and understand many more sub-cellular structures.</p>			
<p>You should be able to carry out calculations involving magnification, real size and image size using the formula: magnification = $\frac{\text{size of image}}{\text{size of real object}}$</p>			
<p>You should be able to express answers in standard form if appropriate.</p>			