

# Module map

GCSE Science	Module story	Science ideas and explanations	GCSE Additional Science
<p>Some specialized cells are described in <i>GCSE Science</i>.</p> <p>Embryonic stem cells, and the ethical debate surrounding their use in medical research, are introduced in B1 <i>You and your genes</i>.</p> <p>Asexual reproduction as a type of cloning is studied in B1 <i>You and your genes</i>.</p> <p>The link between genes and proteins is introduced in B1 <i>You and your genes</i>.</p> <p>Hormones are introduced in the context of humans in B3 <i>Life on Earth</i>.</p>	<p><b>Cellular organization</b></p> <p>↓</p> <p><b>Zygote development</b></p> <p>↓</p> <p><b>The cell cycle</b></p> <p>↓</p> <p><b>Mitosis and meiosis</b></p> <p>↓</p> <p><b>Cell specialization</b></p> <p>↓</p> <p><b>Protein synthesis</b></p> <p>↓</p> <p><b>Phototropism</b></p>	<p>Growth and development are part of an organism's life cycle. During development, specialized cells are made and organized into tissues and organs.</p> <p>A zygote divides to form unspecialized stem cells which can develop into any type of cell in the body. After early development, human cells are differentiated. Unspecialized plant cells (meristem tissue) remain throughout the plant's life cycle. Unlike animals, most plants continue to grow in height and width throughout their life cycle, and plants are able to regrow damaged or lost parts. This growth pattern is exploited for propagation by cuttings.</p> <p>Cell growth, during which the number of organelles increases and chromosomes are copied, is followed by cell division. The structure of DNA allows it to be copied sufficiently accurately to pass on genetic information from cell to cell.</p> <p>Mitosis produces two new cells identical to the parent cell. This type of cell division is used for growth and repair. Meiosis produces gametes, with half the chromosome number of the parent cell, so that a zygote receives a single set of chromosomes from each parent. Meiosis promotes genetic variation in offspring.</p> <p>The one-gene-one-protein hypothesis describes the relationship between the genetic code and protein synthesis in the cell. Although body cells in an organism contain the same genes, many genes are inactive. Thus a cell produces only the proteins required for its specialized role.</p> <p>Protein synthesis takes place in the cytoplasm. Copies of particular genes are made in the nucleus and transported to the cytoplasm where the genetic code is followed to synthesis the required protein. The order of bases in a gene determines the order in which amino acids are joined together, giving the unique structure for a particular protein.</p> <p>Phototropism is a plant growth response which increases a plant's chance of survival. The mechanism for phototropism involves auxins, a type of plant hormone. Unspecialized plant cells can develop into a range of other tissues in response to hormonal changes.</p>	