B2 Cell Division

Lessons TBAT	Key Knowledge	Practical	Assessment
TBAT: Describe how cells divide by mitosis TBAT: Compare differentiation in plants and animals TBAT: Describe the function of a stem cell TBAT: Explain the ethical concerns of stem cell use	Cells divide in a series of stages called the cell cycle. Students should be able to describe the stages of the cell cycle, including mitosis. During the cell cycle the genetic material is doubled and then divided into two identical cells. Before a cell can divide it needs to grow and increase the number of sub-cellular structures such as ribosomes and mitochondria. The DNA replicates to form two copies of each chromosome. In mitosis one set of chromosomes is pulled to each end of the cell and the nucleus divides. Finally the cytoplasm and cell membranes divide to form two identical cells. Students need to understand the three overall stages of the cell cycle but do not need to know the different phases of the mitosis stage. Cell division by mitosis is important in the growth and development of multicellular organisms. Students should be able to recognise and describe situations in given contexts where mitosis is occurring. Students should be able to, when provided with appropriate information, explain how the structure of different types of cell		Text to include B1 and B2 content Maths focus

	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. Students 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. A stem cell is an undifferentiated cell of an organism which is capable of giving rise to many more cells of the same type, and from which certain other cells can arise from differentiation. Students should be able to describe the function of stem cells in embryos, in adult animals and in the meristems in plants. Stem cells from human embryos can be cloned and made to differentiate into most different types of human cells. Stem cells from adult bone marrow can form many types of cells including blood cells. Meristem tissue in plants can differentiate into any type of plant cell, throughout the life of the plant. Knowledge and understanding of stem cell techniques are not required. Treatment with stem cells may be able to help conditions such as diabetes and paralysis. In therapeutic cloning an embryo is produced with the same genes as the patient. Stem cells from the embryo are not rejected by the patient's body so they may be used for medical treatment. The use of stem cells has potential risks such as transfer of viral infection,	Key stage 3 Cells and organisation ♣ cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope ♣ the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts ♣ the similarities and differences between plant and animal cells ♣ the role of diffusion in the movement of materials in and between cells ♣ the structural adaptations of some unicellular organisms ♣ the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.

	and some people have ethical or religious objections. Stem cells from meristems in plants can be used to produce clones of plants quickly and economically. • Rare species can be cloned to protect from extinction. • Crop plants with special features such as disease resistance can be cloned to produce large numbers of identical plants for farmers.	

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