YEAR 9 BIOLOGY SEMESTER 1 CELL BIOLOGY					
Lesson	Title	Objectives	Check your progress		
			MEG 2	MEG 5	MEG 8
1	Looking at cells and the light microscope	-Describe the structure of eukaryotic cells -Explain how the main sub-cellular structures are related to their functions	Describe the functions of subcellular structures found in eukaryotic cells	Understand the size and scale of cells and be able to use and concert units	Carry out order of magnitude calculations when comparing cell size; calculate with numbers in standard form
2	Looking at cells in more detail	-Identify the differences in the magnification and resolving power of light and electron microscopes -Explain how electron microscopy has increased out understanding of subcellular structures	Calculate magnification used by a light microscope using eyepiece and objective lens magnifications	Calculate the magnification of a light or electron micrograph	Explain limitations of light microscopy and advantages of electron microscopy
3	Required practical: using a light microscope to observe and record cells	-Apply knowledge to select techniques, instruments, apparatus and materials to observe cells -Make and record observations and measurements -Present observations and other data using appropriate methods			
4	Primitive cells	-Describe the differences between prokaryotic and eukaryotic cells -Explain how the main sub-cellular structures of prokaryotic and eukaryotic cells are related t their functions	Describe the structure of a prokaryotic cell	Describe the differences between eukaryotic and prokaryotic cells	Explain why scientists have now separated organisms into three domains using evidence from chemical analysis

5	Specialised cells	-Explain the importance of cell differentiation -Describe how cells tissues, organs and organ systems are organised to make up an organism -Understand size and scale in relation to cells, tissues, organs and organ systems	Recall that organism development is based on cell division and cell specialisation	Explain the importance of differentiation and explain how cells are specialised for their function(s)	Understand size and scale in the components of organ systems
6	Cell division – mitosis	-Describe the process of mitosis in growth -Describe mitosis as part of the cell cycle -Describe how the process of mitosis produces cells that are genetically identical to the parent cell -Give examples of where mitosis is necessary to produce identical daughter cells -Describe the use and potential of cloned cells in biological research	Recall that cells must divide for growth and replacement of cells	Describe how chromosomes double their DNA and are pulled to opposite ends of the cell, before the cytoplasm divides, during mitosis	Describe the events of the cell cycle and explain the synthesis of new sub-cellular components and DNA
7	Cancer	-Describe cancer as a condition resulting from changes in cells that lead to their uncontrolled growth, division and spread -Understand some of the risk factors that trigger cells to become cancerous			
8	Stem cells and stem cell banks	-Describe the function of stem cells in embryonic and adult animals -Discuss potential benefits and risks associated with the use of stem cells in medicine	Recall where stem cells are found	Understand the potential of stem cell therapies	Evaluate scientific and ethical issues involved with stem cell therapies
9	Aerobic and anaerobic respiration	-Explain the need for energy -Describe aerobic respiration as an exothermic reaction -Describe the process of anaerobic respiration	Recall that organisms can respire with oxygen (aerobic) or without oxygen (anaerobic)	Use word equations to describe the processes of aerobic and anaerobic respiration	Use symbol equations for aerobic and anaerobic respiration and be able to compare the two processes

		-Compare the process of aerobic and anaerobic respiration			
10	Growing microorganisms	-Describe the techniques used to produce uncontaminated cultures of microorganisms -Describe how bacteria reproduce by binary fission -Calculate the number of bacteria in a population	Describe equipment, materials and procedures required to work with microorganisms	Describe the process of binary fission	Be able to calculate numbers of microorganisms produced given the mean generation time
11	Required practical: investigating disinfectants	-Carry out experiments with due regard for health and safety -present and process data, identifying anomalous results -evaluate methods and suggest further investigations			
12	Testing new antibiotics	-Use appropriate apparatus to investigate the effect of antibiotics on bacterial growth -Use microorganisms safely -Apply sampling techniques to ensure that samples are representative			

<u>Key term list</u>

DNA, chloroplast, chlorophyll, chromosome, eukaryotic, order of magnitude
magnification, resolution, light microscope, electron microscope, ultrastructure, SEM, TEM, field of view, scale
domain, kingdom, genome, nucleic acid, plasmid, prokaryotic, Prokaryota
differentiation, organ, organ system, specialised, tissue
mitosis, stem cell, daughter cell, cell cycle, gamete, meiosis, placenta, zygote
benign tumour, carcinogen, malignant tumour, mutation, secondary tumour
adult stem cell, culture, cell lines, embryonic stem cell, ethical, *in-vitro* fertilisation
donor, gene, therapeutic cloning, umbilical cord
active transport, respiration, aerobic, exothermic, anaerobic, fermentation
culture, culture medium, agar plate, autoclave, colony, bacteria, inoculating loop, nutrient broth, petri dish, sterilise, binary fission, bacterial growth curve
antibiotic, pathogen, sampling technique

antiseptic, diffusion, incubation calibrate, graticule, standard form
<u>Math Skills this Semester</u> -Make estimates for simple calculations -Be able to use ratio and proportion to calibrate a microscope -Recognise and use numbers in decimal and standard form -Cell size -Order of magnitude -Magnification calculation: total magnification = magnification of eyepiece x magnification of objective lens -Magnification of images calculation: magnification of image = size of image/size of real object -Scale bars -Quantitative studies with microorganisms -Bacterial growth curves -Presenting and processing data -Estimating cell size: size of one cell = diameter of field of view/number of cells that cross this diameter -Measuring cell size – eyepiece graticule and stage micrometer -Word and symbol equations