Year Level: 11 **Subject: Biology Unit 1** **Semester: 1**			
Term 1 Week	**Unit**		**Learning Focus**
1	How do organisms function?	Cells: Cell structure and function	• Basic structural features of life; prokaryote; eukaryote; surface area to volume ratio; internal structure of the cell; cell organelle structure and function) • How to correctly and safely use a light microscope to make biological drawings of stained and unstained cells, including preparation and staining of a wet mount • Preparation of biological drawings of a diversity of cells • Surface area to volume ratios
2			
3		Crossing the plasma membrane	• Characteristics of the plasma membrane; internal and external cellular environments; • Simple diffusion; facilitated diffusion; osmosis, and active transport
4			
5		Energy transformations and functioning systems	• Distinction between photosynthetic autotrophs and chemosynthetic autotrophs and heterotrophs; • Photosynthesis; aerobic and anaerobic respiration • Vascular plant systems • Mammalian excretory system
6			
7			
8	How do living systems sustain life?	Survival through adaptations and regulation	• Structural, physiological and behavioural adaptations • Models for biomimicry • Homeostasis; stimulus-response model; feedback loops; malfunctions in homeostasis
9			

Term 2 Week	Unit		Learning Focus
1-8 (1-2 periods per week)	Practical investigation	Negotiation with students/class to define research question – laboratory investigation and/or fieldwork	• Hypothesis formulation; determination of aims, questions and predictions; identification of independent, dependent and controlled variables • Methodology and equipment list • Fieldwork techniques; risk assessment; undertaking of experiment and/or fieldwork • Analysis and evaluation of data, methods and models • Limitations of conclusions and possible further investigations • Poster presentation
1	How do living systems sustain life?...cont…	Organising biodiversity	• Classification of biodiversity • Binomial nomenclature; morphology and molecular characteristics • Strategies for managing Earth's biodiversity • Classification of plants and animals using a key
2			
3		Relationships between organisms within an ecosystem	• Amensalism; commensalism; mutualism; parasitism; predation; keystone species • Food chains and webs • Factors affecting distribution, density and size of a population.
4			
5			
6		Unit Revision	
7		Unit 1 Exam	
8		Complete Investigation	
9		**Commence Unit 2**	
10			
11			

Year Level: VCE Subject: UNIT 2 BIOLOGY

Semester: 2

Week	Unit	Learning Focus	Victorian Curriculum (VCAA dot points)

1-2	The Cell Cycle	To explore interphase and mitosis as a means of somatic cell division.	•derivation of all cells from pre-existing cells through completion of the cell cycle. •the rapid procession of prokaryotic cells through their cell cycle by binary fission. •the key events in the phases (G1, S, G2, M and C) of the eukaryotic cell cycle, including the characteristics of the sub-phases of mitosis (prophase, metaphase, anaphase and telophase) and cytokinesis in plant and animal cells.
3-4	Asexual Reproduction	To investigate asexual reproduction and explore the advantages and disadvantages of genetic clones.	•the types of asexual reproduction including fission, budding, vegetative propagation and spore formation. •the biological advantages and disadvantages of asexual reproduction. •emerging issues associated with cloning, including applications in agriculture and horticulture.
4	Sexual Reproduction	To examine meiosis and relate this to genetic diversity.	•how an offspring from two parents has a unique genetic identity. •the key events in meiosis that result in the production of gametes from somatic cells including the significance of crossing over of chromatids between homologous chromosomes in Prophase 1 and the non-dividing of the centromere in Metaphase 1. •the biological advantage of sexual reproduction, specifically the genetic diversity in offspring.
5-6	Cell Growth and Differentiation	To investigate the role of stem cells. To study mutant cell behaviour which leads to cancer.	•the types and function of stem cells in human development, including the distinction between embryonic and adult stem cells and their potential use in the development of medical therapies. •the consequences of stem cell differentiation in human prenatal development including the development of germ layers, types of tissues formed from germ layers and the distinction between embryo and foetus. •the disruption of the regulation of the cell cycle through genetic predisposition or the action of mutagens that gives rise to uncontrolled cell division including cancer and abnormal embryonic development.
7-8	Genomes, Genes and Alleles	To relate alleles to genes and the human genome. To define haploid and diploid cells.	•the distinction between a genome, gene and allele. •the genome as the sum total of an organism's DNA measured in the number of base pairs contained in a haploid set of chromosomes. •the role of genomic research since the Human Genome Project, with reference to the sequencing of the genes of many organisms, comparing relatedness between species,

			determining gene function and genomic applications for the early detection and diagnosis of human diseases.
9-10	Chromosomes	To discover supercoiling of DNA to form chromosomes. To distinguish between autosomes and sex chromosomes. To explore abnormal karyotypes.	•the role of chromosomes as structures that package DNA, their variability in terms of size and the number of genes they carry in different organisms, the distinction between an autosome and a sex chromosome and the nature of a homologous pair of chromosomes (one maternal and one paternal) as carrying the same gene loci. •presentation of an organism's set of chromosomes as a karyotype that can be used to identify chromosome number abnormalities including Down's, Klinefelter's and Turner's syndromes in humans.
11-12	Genotypes and Phenotypes	To explore inheritance patterns. To investigate polygenic inheritance which leads to continuous variation.	•the use of symbols in the writing of the genotypes for the alleles present at a particular gene locus. •the distinction between a dominant and recessive phenotype. •the relative influences of genetic material, environmental factors and interactions of DNA with other molecules (epigenetic factors) on phenotypes. •qualitative treatment of polygenic inheritance as contributing to continuous variation in a population, illustrated by the determination of human skin colour through the genes involved in melanin production or by variation in height.
13-14	Pedigree charts, genetic cross outcomes and genetic decision-making	To construct and interpret pedigree charts based on different inheritance patterns. To practise genetic crosses and predict potential offspring.	•pedigree charts and patterns of inheritance including autosomal dominant, autosomal recessive, X-linked and Y-linked traits. •the determination of genotypes and prediction of the outcomes of genetic crosses including monohybrid crosses, and monohybrid test crosses. •the inheritance of two characteristics as either independent or linked, and the biological consequence of crossing over for linked genes. •the nature and uses of genetic testing for screening of embryos and adults, and its social and ethical implications.
15	Research Investigation	To investigate and communicate a substantiated response to a question related to an issue in genetics	• communicate the findings of their investigation and explain the biological concepts, identify different opinions, outline the legal, social and ethical implications for the individual and/or species and justify their conclusions. Material for the investigation can be gathered from laboratory work, computer simulations and modelling, literature searches, global databases and interviews with experts.