

VCE

Students must complete VCE Units 1 and 2 before undertaking units 3 and 4. Candidates taking the VCE course at the year 12 stage must complete Units 3 and 4, and an assessment of practical work. Course material is covered in the workbook in the

topics indicated. The CD-ROM symbol indicates that additional material is available on the Teacher Resource CD-ROM. Weblinks supporting each topic are present throughout, but are not specifically indicated.

VCE Y12 course		Topic in Year 12 workbook	Topic in Year 12 workbook
Unit 3: Signatures of Life		Unit 4: Continuity and Change	
<p>1 Molecules of Life:</p> <ul style="list-style-type: none"> Chemical nature of the cell: synthesis of biomacromolecules (polysaccharides, nucleic acids, proteins). The structure and function of proteins, lipids and nucleic acids. The proteome. Role of organelles and plasma membranes in the packaging and transport of biomolecules. The nature of biochemical processes: enzymes, energy requirements of cells (catabolic and anabolic reactions), energy transformation (photosynthesis and respiration), and the factors affecting them. Medical applications of molecular biology (including drug design and medical diagnosis). Experimental methods to investigate the molecular composition of cells and biochemical processes (including energy transformations and enzyme activity) 	<p>The Chemistry of Life</p> <p>The Genetic Code</p> <p>The Chemistry of Life</p> <p>The Chemistry of Life</p> <p>Chemiosmosis</p> <p>Defence and the Immune System</p> <p>Gene Technology</p> <p>Medical Diagnosis</p> <p>The Chemistry of Life</p>	<p>1 Heredity:</p> <ul style="list-style-type: none"> Molecular structure: Genome and gene expression; genes as units of inheritance. Principal events in transcription and translation. Tools and techniques in genetic engineering (gel electrophoresis, DNA profiling, DNA sequencing, DNA recombination, DNA amplification, gene cloning and gene transformation, gene delivery systems). Transmission of heritable characteristics: genes as units of inheritance and gene regulation. Eukaryote chromosomes and alleles. Prokaryote chromosome and plasmids. Cell reproduction: cell cycle, DNA replication, apoptosis. Binary fission. Gamete production. Meiosis. Variation: mutations. Genotype and phenotype. Continuous and discontinuous variation. Patterns of inheritance in sexually reproducing organisms: one gene locus (monohybrid cross including dominance, recessiveness, co-dominance, and multiple alleles). Two gene loci (dihybrid cross). Pedigree analysis (autosomal, sex-linked inheritance, and test cross). Experimental methods to investigate the manipulation of DNA and inheritance of traits (for example by tracing patterns of inheritance by analysis of pedigrees). 	<p>The Genetic Code</p> <p>Gene Technology</p> <p>Inheritance</p> <p>The Genetic Code</p> <p>Operon Theory</p> <p>Eukaryotic Gene Regulation</p> <p>The Genetic Code</p> <p>Cell Division & Cloning</p> <p>Inheritance</p> <p>Mutations</p> <p>Inheritance</p> <p>Inheritance</p> <p>Inheritance Supplement</p> <p>Gene Technology</p> <p>Inheritance</p>
<p>2 Detecting and Responding:</p> <ul style="list-style-type: none"> Coordination and regulation: Stability and change in the internal environment. Principles of homeostasis (stimulus-response and negative feedback model, role of the nervous and endocrine systems). Signaling molecules (neurotransmitters, hormones, pheromones) and plant growth regulators. Signal transduction (signals and membrane receptors) and responses. Detecting 'self' and 'non-self' molecules (antigens and membrane receptors). Pathogens (non-cellular and cellular agents) and controls. Physical and chemical barriers to infection in plants and animals. Immune response: structure and overall function of the lymphatic system. Non-specific responses (inflammatory response, phagocytosis, and blood clotting). Specific responses (T-cell lymphocytes and cell-mediated response; B-cell lymphocytes and humoral mediated response, antigens and antibodies; memory cells). Disorders of the immune response: autoimmunity, hypersensitivity, allergens and allergic responses. Acquired immunity: natural and artificial immunity (including vaccines and use of antibody sera). 	<p>Principles of Homeostasis</p> <p>Control and Coordination</p> <p>Plant Hormones & Applications</p> <p>Principles of Homeostasis</p> <p>Defence & the Immune System</p> <p>Pathogens & Disease</p> <p>Parasitic Infections</p> <p>Defence and the Immune System</p> <p>Defence and the Immune System</p> <p>Defence and the Immune System</p> <p>Defence and the Immune System</p>	<p>2 Change over Time:</p> <ul style="list-style-type: none"> Change in populations: gene pools and allele frequencies. Selection pressures. Genetic drift. Natural selection as a mechanism of evolution. Geological time scale, relative and actual dating techniques. Evidence for evolution: fossil record, biogeography, comparative anatomy, molecular evidence. Patterns of evolution: divergent and convergent evolution. Speciation. Extinction. Development of evolutionary theory. Evolutionary relationships: conservation of genes; genome phylogeny; and mitochondrial evolution. Patterns and origins of human evolution. Interrelationships between biological, cultural and technological evolution. Human intervention in evolutionary processes by selective breeding and application of gene technologies (cloning, transformation, stem cell differentiation, genetic screening and gene therapy). 	<p>Population Genetics</p> <p>Population Genetics</p> <p>Evidence for Evolution</p> <p>Geological Time Scale</p> <p>Evidence for Evolution</p> <p>Evolution</p> <p>Mass Extinctions</p> <p>Population Genetics</p> <p>Evolution</p> <p>Human Evolution</p> <p>Human Evolution</p> <p>Human Evolution Supplement</p> <p>Human Evolution</p> <p>Human Evolution Supplement</p> <p>Population Genetics</p> <p>Cell Division & Cloning</p>
Practical Work			
<ul style="list-style-type: none"> Practical work, including the use of simple statistical tests in ecology and genetics. The use of chi-squared in genetics. 	<p>Year 11 workbook: Skills in Biology</p> <p>Inheritance Supplement</p>		