

# 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

as indicated below. Additional material to complete a unit requirement is available on the Teacher Resource CD-ROM and identified below. Weblinks supporting each topic are identified throughout each chapter, but are not specifically indicated.

VCE Year 12 course		Topic in Year 12 workbook	Topic in Year 12 workbook
<b>Unit 3: Signatures of Life</b>		<b>Unit 4: Continuity and Change</b>	
<b>1 Molecules of Life:</b> <ul style="list-style-type: none"> <li>Chemical nature of the cell: synthesis of biomacromolecules (polysaccharides, nucleic acids, proteins). The structure and function of proteins, lipids and nucleic acids. The proteome.</li> <li>Role of organelles and plasma membranes in the packaging and transport of biomolecules.</li> <li>The nature of biochemical processes: enzymes, energy requirements of cells (catabolic and anabolic reactions), energy transformation (photosynthesis and respiration), and the factors affecting them.</li> <li>Medical applications of molecular biology (including drug design and medical diagnosis).</li> </ul>	The Chemistry of Life  The Genetic Code  The Chemistry of Life  Cellular Energetics  Defence and the Immune System Gene Technology The Chemistry of Life	The Genetic Code  Gene Technology  Inheritance  The Genetic Code  <i>also see</i> Heredity Supplement on the TRC	
	<ul style="list-style-type: none"> <li>Experimental methods to investigate the molecular composition of cells and biochemical processes (including energy transformations and enzyme activity)</li> </ul>	<i>also see</i> Molecules of Life Supplement on the TRC	The Genetic Code Cell Division & Cloning Inheritance  Mutations Inheritance  Inheritance
<b>2 Detecting and Responding:</b> <ul style="list-style-type: none"> <li>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.</li> <li>Detecting 'self' and 'non-self' molecules (antigens and membrane receptors). Pathogens (non-cellular and cellular agents) and controls.</li> <li>Physical and chemical barriers to infection in plants and animals.</li> <li>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).</li> <li>Disorders of the immune response: autoimmunity, hypersensitivity, allergens and allergic responses.</li> <li>Acquired immunity: natural and artificial immunity (including vaccines and use of antibody sera).</li> </ul>	Principles of Homeostasis Homeostasis & Adaptation Control and Coordination  <i>also see</i> Detecting & Responding supplement on the TRC  Defence & the Immune System Pathogens & Disease  Defence & the Immune System  Defence & the Immune System  Defence & the Immune System  Defence & the Immune System	Gene Technology Inheritance  Gene Technology Inheritance	
	<b>Practical Work</b> <ul style="list-style-type: none"> <li>Practical work, including the use of simple statistical tests in ecology and genetics.</li> <li>The use of chi-squared in genetics.</li> </ul>	Year 11 workbook: Skills in Biology	<b>2 Change over Time:</b> <ul style="list-style-type: none"> <li>Change in populations: gene pools and allele frequencies. Selection pressures. Genetic drift.</li> <li>Natural selection as a mechanism of evolution.</li> <li>Geological time scale, relative and actual dating techniques.</li> <li>Evidence for evolution: fossil record, biogeography, comparative anatomy, molecular evidence.</li> <li>Patterns of evolution: divergent and convergent evolution. Speciation. Extinction.</li> <li>Development of evolutionary theory.</li> <li>Evolutionary relationships: conservation of genes; genome phylogeny; and mitochondrial evolution.</li> <li>Patterns and origins of human evolution.</li> <li>Interrelationships between biological, cultural and technological evolution.</li> <li>Human intervention in evolutionary processes by selective breeding and application of gene technologies (cloning, transformation, stem cell differentiation, genetic screening and gene therapy).</li> </ul>