

Preliminary HSC

Candidates taking the Preliminary HSC course must complete all four core topics 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.

HSC Prelim		Topic in Year 11 Workbook	Topic in Year 11 Workbook
A Local Ecosystem			
1	<p><i>Biotic and abiotic factors determine distribution and diversity of biota in ecosystems:</i></p> <ul style="list-style-type: none"> Abiotic characteristics of aquatic and terrestrial environments. Factors determining the distribution and abundance of species in a given habitat. The role of photosynthesis and cellular respiration in ecosystems. The uses of energy by organisms. The general equation for aerobic respiration. 	<p>Environment & Adaptation</p> <p>Population Dynamics</p> <p>Nutrition Gas Exchange Nutrition Gas Exchange</p>	
2	<p><i>Each aquatic or terrestrial ecosystem is unique:</i></p> <ul style="list-style-type: none"> Trends in population estimates of species. Factors affecting numbers in populations of predators and prey. Interactions between organisms: allelopathy, parasitism, mutualism, and commensalism. Role of decomposers in ecosystems. Trophic interactions: food chains, food webs, pyramids of biomass and energy. Adaptation and problems associated with inferring characteristics of organisms as adaptations for living in a particular habitat. Adaptations of plants and animals to factors in their environment. The short and long-term consequences on the ecosystem of resource competition. The impacts of humans on ecosystems. 	<p>Population Dynamics</p> <p>Population Dynamics</p> <p>Communities</p> <p>Communities</p> <p>Communities</p> <p>Environment & Adaptation</p> <p>Environment & Adaptation</p> <p>Communities</p> <p>Changes in Ecosystems</p>	
Patterns in Nature			
1	<p><i>Organisms are made of cells with similar structural characteristics:</i></p> <ul style="list-style-type: none"> Cell theory. Structure, function, and appearance of cellular organelles. 	Cell Structure	
2	<p><i>Membranes around cells both separate cells enable links with the external environment:</i></p> <ul style="list-style-type: none"> The major groups of substances in living cells and their uses in cell activity. The structure and role of cell membranes. Diffusion and osmosis. Surface area to volume ratio and its significance to cellular transport rates. 	<p>Cell Structure</p> <p>Cellular Processes Cellular Processes</p> <p>Cellular Processes</p>	
3	<p><i>Specialised structures enable animals and plants to obtain nutrients from their environment:</i></p> <ul style="list-style-type: none"> Structural and functional relationships between cells, tissues, organs and organ systems in multicellular organisms. Autotrophs versus heterotrophs. Requirements of photosynthesis. Role of photosynthesis in ecosystems. The general equation for photosynthesis. Plant structures required for obtaining water and minerals. The relationship between leaf shape, the distribution of leaf tissues, and their role. The role of teeth. Dental adaptations. Comparison of the digestive systems of carnivores and herbivores. 	<p>Cellular Processes</p> <p>Plant & Animal Nutrition Plant & Animal Nutrition</p> <p>Plant & Animal Nutrition Plant & Animal Nutrition Transport & Excretion Plant & Animal Nutrition Transport & Excretion Plant & Animal Nutrition</p>	
4	<p><i>Gas exchange and transport systems enable transfers internally and with the environment:</i></p> <ul style="list-style-type: none"> Gas exchange surfaces in multicellular animals (insects, frogs, fish, and mammals). Comparison of the roles of the respiratory, circulatory and excretory systems. The relationship between the needs of cells and the need for a transport system. Transport systems in plants. Comparison of open and closed circulatory systems (vertebrate and invertebrates). 	<p>Gas Exchange</p> <p>Gas Exchange Transport & Excretion Transport & Excretion</p> <p>Transport & Excretion Transport & Excretion</p>	
5	<p><i>Maintenance requires growth and repair:</i></p> <ul style="list-style-type: none"> Process and role of mitosis. The sites of mitosis in plants, insects, and mammals. The need for cytokinesis in cell division. DNA locations in the cell. 		<p>Cellular Processes</p> <p>Cellular Processes Cellular Processes</p>
Life on Earth			
1	<p><i>Evidence for the origin of life:</i></p> <ul style="list-style-type: none"> Conditions on primeval Earth; origin of organic molecules. Miller-Urey experiments. 		The Origin and Evolution of Life
2	<p><i>The fossil record provides evidence for evolution:</i></p> <ul style="list-style-type: none"> Fossil formation and the fossil record. The major stages in the evolution of life. 		The Origin and Evolution of Life
3	<p><i>New technologies expand our understanding of the origins of life and of evolution:</i></p> <ul style="list-style-type: none"> Features of bacterial taxa. 		Classification
4	<p><i>Studies of extant taxa help us understand the past:</i></p> <ul style="list-style-type: none"> Principles of classification, selection criteria for classification. Technology and the revision of classification schemes. Binomial nomenclature, and dichotomous keys. Classification of extinct species. 		Classification The Origin & Evolution of Life
Evolution of Australian Biota			
1	<p><i>Continental drift and Australia's past:</i></p> <ul style="list-style-type: none"> Continental drift. Australia's past as part of Gondwana. Evolutionary relationship between Australia's extinct megafauna and extant species. 		The Evolution of Australia's Biota
2	<p><i>The evolution of Australia's biota:</i></p> <ul style="list-style-type: none"> Changing environments in Australia and the relationship of this to the evolution of the Australian flora and fauna. Changes in the distribution of Australian species, as indicated by the fossil record. Current theories accounting for these changes. Adaptations of Australian flora and fauna to cope with variations in climate and resources. 		The Evolution of Australia's Biota Environment & Adaptation Communities, Natural Changes in Ecosystems, Human Impact on Ecosystems
3	<p><i>Reproductive adaptations in Australia's biota:</i></p> <ul style="list-style-type: none"> Mitosis and meiosis in reproduction and development. External/internal fertilisation. Pollination, seed dispersal, and asexual reproduction in Australian flora. Mechanisms found in Australian fauna for fertilisation and survival of offspring. 		Reproduction & Development Reproduction & Development Environment & Adaptation Reproduction & Development
4	<p><i>Studying the past helps us plan for the future:</i></p> <ul style="list-style-type: none"> Predicting the impact of human activity on ecosystems and using past studies to predict possible future environments and the survival or extinction of species. The need to maintain biodiversity. 		The Evolution of Australia's Biota, Natural Changes in Ecosystems, Human Impact on Ecosystems The Evolution of Australia's Biota
Practical Work			
	<ul style="list-style-type: none"> Biological drawings, experimental design, field studies, collection of primary data, handling and analysis of primary and secondary data, and scientific reporting. 		<p>Skills in Biology Practical Ecology</p> <p><i>also see</i> Spreadsheets & Statistics on the TRC</p>