



**COURSE OUTLINE**  
**INTEGRATED SCIENCE – GENERAL YEAR 12: 2021**  
**UNIT 3 AND UNIT 4**



Term	Week	Topic and key teaching points	Syllabus content	Assessment
1	1	<b>Unit 3 Introduction – Our Human Footprint</b> <ul style="list-style-type: none"><li>• Give out SCSA documents and assessment schedule</li><li>• Revise Scientific Method</li><li>• Graphing</li><li>• How humans affect the environment</li></ul>	<b>Science Inquiry Skills</b> <ul style="list-style-type: none"><li>• Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes</li><li>• Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error and use evidence to make and justify conclusions</li><li>• Communicate scientific ideas and information for a particular purpose, using appropriate scientific language, conventions and representations</li></ul>	
1	2	<ul style="list-style-type: none"><li>• Characteristics of different ecosystems found in a local community</li><li>• Features of natural, urban, agricultural, aquacultural, freshwater and marine ecosystems</li><li>• Abiotic factors of a local ecosystem</li><li>• Impacts of temperature, pH, salinity, light, water and atmospheric gases on the survival of organisms living in that ecosystem</li></ul>	<b>Earth systems / Cycles in Nature</b> <ul style="list-style-type: none"><li>• Differences in geographical and physical conditions result in a wide variety of ecosystems</li><li>• Abiotic factors, including temperature, pH, salinity, light, water and atmospheric gases, impact on the survival of organisms within the environment</li></ul>	



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1	3	<ul style="list-style-type: none"><li>• Set up investigation on factors affecting microorganism growth</li><li>• Abiotic factors and their interaction with biotic factors</li></ul>	<b>Earth systems / Cycles in Nature</b> <ul style="list-style-type: none"><li>• There is interaction between organisms, biological communities and the biotic environment in which they live</li></ul>	<b>Task 1:</b> Science inquiry (practical and investigation) – Factors Affecting Microorganism Growth
1	4	<ul style="list-style-type: none"><li>• The sun as the original source of energy for ecosystems</li><li>• Transfer of energy through food webs</li><li>• Fieldwork, local ecosystem</li></ul>	<b>Earth systems / Cycles in Nature</b> <ul style="list-style-type: none"><li>• The biotic components of an ecosystem transfer and transform energy, originating primarily from the sun, into biomass</li><li>• Food chains and food webs show the feeding relationship between organisms within a community</li></ul>	
1	5	<ul style="list-style-type: none"><li>• Biogeochemical cycles as a natural circulation of essential elements</li><li>• The flow of elements from the abiotic to the biotic components of the biosphere and back again</li><li>• Examples of gaseous and sedimentary biogeochemical cycles, including carbon and water.</li></ul>	<b>Earth systems / Cycles in Nature</b> <ul style="list-style-type: none"><li>• Biotic components interact with abiotic components to facilitate biogeochemical cycling</li></ul>	<b>Task 2:</b> Science inquiry (investigation) – Monitoring a local ecosystem



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1	6	<ul style="list-style-type: none"> <li>• Role of producers, consumers and decomposers in ecosystems</li> <li>• Transfer of energy through ecosystems</li> <li>• Food chains and food webs</li> <li>• Pyramids of numbers and biomass</li> <li>• Trophic levels and diminishing energy through the levels</li> </ul>	<b>Earth systems / Cycles in Nature</b> <ul style="list-style-type: none"> <li>• Producers, consumers and decomposers have a role in the transfer of energy in an ecosystem</li> <li>• Food chains and food webs show the feeding relationship between organisms within a community</li> <li>• The amount of energy transferred between trophic levels in food chains and food webs diminishes as the trophic level increases</li> </ul>	
1	7	<ul style="list-style-type: none"> <li>• Carrying capacity of an ecological population</li> <li>• Factors affecting carrying capacity</li> <li>• Importance of biodiversity</li> <li>• Urban sprawl and the effects on ecosystems and biodiversity</li> <li>• Extinction of flora and fauna in built-up areas</li> <li>• Human impact in ecosystems and the effect on biodiversity</li> </ul>	<b>Ecosystems and sustainability</b> <ul style="list-style-type: none"> <li>• Changes to abiotic and biotic factors, including climatic events, impact on the carrying capacity of ecosystems</li> <li>• Human interference is threatening biodiversity through deterioration of ecosystems and diminishing habitat areas</li> <li>• Biodiversity includes the diversity of genetics, species and ecosystems; biodiversity changes naturally over time, and varies due to differences in location</li> </ul>	<b>Task 3:</b> Research assignment – Human impacts on ecosystems
1	8	<ul style="list-style-type: none"> <li>• Competition, predation, symbiosis, mutualism, commensalism and parasitism</li> </ul>	<b>Structure and function of biological systems</b> <ul style="list-style-type: none"> <li>• Modes of interaction between species in ecosystems include competition, predation and symbiosis (mutualism, commensalism and parasitism)</li> </ul>	



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1	9	<ul style="list-style-type: none"> <li>Population density</li> <li>Factors affecting population density</li> <li>Factors affecting community structure and composition</li> </ul>	<b>Structure and function of biological systems</b> <ul style="list-style-type: none"> <li>Species interactions affect population densities and are important in determining community structure and composition</li> </ul>	<b>Task 4: Test – Earth systems / Cycles in Nature, Ecosystems and sustainability, Structure and function of biological systems</b>
2	1	<ul style="list-style-type: none"> <li>Natural selection, including: variation, changes in the environment, selection pressures, survival and change in characteristics</li> </ul>	<b>Species continuity and change</b> <ul style="list-style-type: none"> <li>Changes in ecosystems affect the survival of organisms within the ecosystem; individual variation assists survival, which over time results in changes in characteristic of the species</li> </ul>	
2	2	<ul style="list-style-type: none"> <li>Behavioural, functional and structural adaptations of endemic flora and fauna</li> </ul>	<b>Species continuity and change</b> <ul style="list-style-type: none"> <li>Variation in the form of suitable characteristics assists survival of individuals</li> </ul>	



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2	3	<ul style="list-style-type: none"> <li>Behavioural, functional and structural adaptations of invasive species (case study: cane toad)</li> </ul>	<b>Species continuity and change</b> <ul style="list-style-type: none"> <li>Environmental changes may lead to selection of advantageous biological characteristics within a species</li> </ul>	<b>Task 5:</b> Externally Set Task
2	4-5		<b>Species continuity and change</b> <ul style="list-style-type: none"> <li>Changes in ecosystems affect the survival of organisms within the ecosystem; individual variation assists survival, which over time results in changes in characteristics of the species</li> <li>Variation in the form of suitable characteristics assists survival of individuals</li> <li>Environmental changes may lead to selection of advantageous biological characteristics within a species</li> </ul>	
2	6	<b>ATAR Exams</b>		



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2	7	<b>ATAR Exams</b>		
2	8	<ul style="list-style-type: none"> <li>• <b>Unit 4 Introduction – Forensic Science</b></li> <li>• Fields and Techniques</li> </ul>	<b>Science Inquiry Skills</b> <ul style="list-style-type: none"> <li>• Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes</li> <li>• Represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error and use evidence to make and justify conclusions</li> </ul>	<b>Task 6:</b> Test – Ecosystems, sustainability and species continuity and change
2	9	<ul style="list-style-type: none"> <li>• <b>Fields of Forensics</b></li> </ul>	<b>Science Inquiry Skills</b> <ul style="list-style-type: none"> <li>• Communicate scientific ideas and information for a particular purpose, using appropriate scientific language, conventions and representations</li> </ul> <b>Science as a Human Endeavour</b> <ul style="list-style-type: none"> <li>• Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions</li> <li>• Scientific knowledge can be used to develop and evaluate projected economic, social and</li> </ul>	<b>Task 7:</b> Extended Response – Research assignment of Fields of Forensics



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			environmental impacts, and to design action for sustainability	
2	10	<b>Fingerprinting</b> <ul style="list-style-type: none"> <li>From porous surfaces</li> <li>From absorbent surfaces</li> </ul>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"> <li>The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences</li> <li>Scientific knowledge can enable scientist to offer valid explanations and make reliable predictions</li> </ul>	
2	11	<b>Soils</b> <ul style="list-style-type: none"> <li>Physical characteristics</li> <li>pH</li> <li>Humus content</li> </ul>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"> <li>Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions</li> </ul> <b>Chemical reactions</b> <ul style="list-style-type: none"> <li>The use of substances is determined by the chemical and/or physical properties of the constituent chemicals</li> <li>Chemical reactions, including combustion and reaction of acids, involve taking in or giving out energy; different types of reactions are used to produce a variety of products</li> </ul>	<b>Task 8:</b> Science Inquiry (practical) – Soil analysis



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3	1	<b>Blood</b> <ul style="list-style-type: none"><li>• Types</li><li>• Spatter patterns</li></ul>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"><li>• Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions</li></ul>	<b>Task 9:</b> Science Inquiry (practical) – Blood group identification
3	2	<b>DNA</b> <ul style="list-style-type: none"><li>• Electrophoresis</li><li>• Profiles</li></ul>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"><li>• Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions</li></ul>	<b>Task 10:</b> Extended Response – DNA as evidence
3	3	<b>Casts and Impressions</b> <ul style="list-style-type: none"><li>• 2 dimensional</li><li>• 3 dimensional</li></ul>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"><li>• Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions</li></ul>	





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3	4	<b>Impressions</b> <ul style="list-style-type: none"><li>• Tools</li><li>• Teeth</li></ul>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"><li>• The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences</li><li>• Scientific knowledge can enable scientist to offer valid explanations and make reliable predictions</li></ul>	
3	5	<b>Fibre analysis</b> <ul style="list-style-type: none"><li>• Microscope techniques</li><li>• Hair</li><li>• Fibres</li></ul>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"><li>• Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions</li></ul> <b>Chemical reactions</b> <ul style="list-style-type: none"><li>• The use of substances is determined by the chemical and/or physical properties of the constituent chemicals</li><li>• Rearrangement of reactant components occurs during chemical reactions to form new substances</li></ul>	<b>Task 11: Science Inquiry (practical) – Matching Fibres</b>
3	6	<b>Forgery</b> <ul style="list-style-type: none"><li>• Chromatography</li><li>• Handwriting</li></ul>	<b>Mixtures and solutions</b> <ul style="list-style-type: none"><li>• Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques</li></ul>	



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3	7	<b>Chemical detection</b> <ul style="list-style-type: none"><li>• <b>Toxicology</b></li></ul>	<b>Chemical reactions</b> <ul style="list-style-type: none"><li>• The use of substances is determined by the chemical and/or physical properties of the constituent chemicals</li><li>• Rearrangement of reactant components occurs during chemical reactions to form new substances</li></ul>	<b>Task 12:</b> Science Inquiry (investigation) – Identify an unknown powder
3	8	<b>Chemical detection</b> <ul style="list-style-type: none"><li>• <b>Toxicology</b></li></ul>	<b>Chemical reactions</b> <ul style="list-style-type: none"><li>• Chemical reactions, including combustion and reactions of acids, involve taking in or giving out energy; different types of reactions are used to produce a variety of products</li></ul>	
3	9	<b>Entomology</b>	<b>Science as a Human Endeavour</b> <ul style="list-style-type: none"><li>• Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions</li></ul>	



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3	10	<b>Revision and test</b>		<b>Task 13: Test – Forensic Science</b>
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