



COURSE OUTLINE
INTEGRATED SCIENCE – GENERAL YEAR 12: 2022
UNIT 3 AND UNIT 4



Term	Week	Topic and key teaching points	Syllabus content	Assessment
1	1	Unit 3 Introduction – Our Human Footprint <ul style="list-style-type: none"> Give out SCSA documents and assessment schedule Revise Scientific Method Graphing How humans affect the environment 	Science Inquiry Skills <ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 Communicate scientific ideas and information for a particular purpose, using appropriate scientific language, conventions and representations 	
1	2	<ul style="list-style-type: none"> Characteristics of different ecosystems found in a local community Features of natural, urban, agricultural, aquaculture, freshwater and marine ecosystems Abiotic factors of a local ecosystem Impacts of temperature, pH, salinity, light, water and atmospheric gases on the survival of organisms living in that ecosystem 	Earth systems / Cycles in Nature <ul style="list-style-type: none"> Differences in geographical and physical conditions result in a wide variety of ecosystems Abiotic factors, including temperature, pH, salinity, light, water and atmospheric gases, impact on the survival of organisms within the environment 	
1	3	<ul style="list-style-type: none"> Set up investigation on factors affecting microorganism growth Abiotic factors and their interaction with biotic factors 	Earth systems / Cycles in Nature <ul style="list-style-type: none"> There is interaction between organisms, biological communities and the biotic environment in which they live 	Task 1: Science inquiry (practical and investigation) – Factors Affecting Microorganism Growth (7%)



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1	4	<ul style="list-style-type: none">• The sun as the original source of energy for ecosystems• Transfer of energy through food webs• Fieldwork, local ecosystem	<p>Earth systems / Cycles in Nature</p> <ul style="list-style-type: none">• The biotic components of an ecosystem transfer and transform energy, originating primarily from the sun, into biomass• Food chains and food webs show the feeding relationship between organisms within a community <p>Science Inquiry Skills</p> <ul style="list-style-type: none">• identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes• plan, select and use appropriate investigation methods, including pre-testing, to collect reliable data; assess risk and address ethical issues associated with these methods• conduct investigations safely, competently and methodically for the collection of valid and reliable data• 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• interpret a range of scientific and media texts and evaluate the conclusions by considering the quality of available evidence• use appropriate scientific representations, including diagrams of structures and processes, to communicate conceptual understanding, solve problems and make predictions• communicate scientific ideas and information for a particular purpose, using appropriate scientific language, conventions and representations	
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1	5	<ul style="list-style-type: none"> • Biogeochemical cycles as a natural circulation of essential elements • The flow of elements from the abiotic to the biotic components of the biosphere and back again • Examples of gaseous and sedimentary biogeochemical cycles, including carbon and water. 	<p>Earth systems / Cycles in Nature</p> <ul style="list-style-type: none"> • Biotic components interact with abiotic components to facilitate biogeochemical cycling <p>Science Inquiry Skills</p> <ul style="list-style-type: none"> • identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes • plan, select and use appropriate investigation methods, including pre-testing, to collect reliable data; assess risk and address ethical issues associated with these methods • conduct investigations safely, competently and methodically for the collection of valid and reliable data • 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 • interpret a range of scientific and media texts and evaluate the conclusions by considering the quality of available evidence • use appropriate scientific representations, including diagrams of structures and processes, to communicate conceptual understanding, solve problems and make predictions • communicate scientific ideas and information for a particular purpose, using appropriate scientific language, conventions and representations 	<p>Task 2: Science inquiry (investigation) – Monitoring a local ecosystem (10%)</p>
1	6	<ul style="list-style-type: none"> • Role of producers, consumers and decomposers in ecosystems • Transfer of energy through ecosystems • Food chains and food webs • Pyramids of numbers and biomass • Trophic levels and diminishing energy through the levels 	<p>Earth systems / Cycles in Nature</p> <ul style="list-style-type: none"> • Producers, consumers and decomposers have a role in the transfer of energy in an ecosystem • Food chains and food webs show the feeding relationship between organisms within a community • The amount of energy transferred between trophic levels in food chains and food webs diminishes as the trophic level increases 	



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1	7	<ul style="list-style-type: none"> Complete a research task on a human caused environmental problem currently being experienced by human kind. 	Science as a Human Endeavour <ul style="list-style-type: none"> the use of scientific knowledge is influenced by social, economic, cultural and ethical considerations the use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences scientific knowledge can enable scientists to offer valid explanations and make reliable predictions scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts, and to design action for sustainability 	Task 3: Research assignment – Human impacts on ecosystems (10%)
1	8	<ul style="list-style-type: none"> Competition, predation, symbiosis, mutualism, commensalism and parasitism 	Structure and function of biological systems <ul style="list-style-type: none"> Modes of interaction between species in ecosystems include competition, predation and symbiosis (mutualism, commensalism and parasitism) 	
1	9	<ul style="list-style-type: none"> Population density Factors affecting population density Factors affecting community structure and composition 	Structure and function of biological systems <ul style="list-style-type: none"> Species interactions affect population densities and are important in determining community structure and composition 	
1	10	<ul style="list-style-type: none"> Carrying capacity of an ecological population Factors affecting carrying capacity Importance of biodiversity Urban sprawl and the effects on ecosystems and biodiversity Extinction of flora and fauna in built-up areas Human impact in ecosystems and the effect on biodiversity 	Ecosystems and sustainability <ul style="list-style-type: none"> Changes to abiotic and biotic factors, including climatic events, impact on the carrying capacity of ecosystems Human interference is threatening biodiversity through deterioration of ecosystems and diminishing habitat areas Biodiversity includes the diversity of genetics, species and ecosystems; biodiversity changes naturally over time, and varies due to differences in location 	



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2	1	<ul style="list-style-type: none"> Natural selection, including: variation, changes in the environment, selection pressures, survival and change in characteristics 	Species continuity and change <ul style="list-style-type: none"> 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 	Task 4: Externally Set Task (15%)
2	2	<ul style="list-style-type: none"> Behavioural, functional and structural adaptations of endemic flora and fauna 	Species continuity and change <ul style="list-style-type: none"> Variation in the form of suitable characteristics assists survival of individuals 	Task 5: Test – Environment Science (8%)
2	3	<u>UNIT 4 FORENSIC SCIENCE</u> <ul style="list-style-type: none"> Fields and Techniques 	Science Inquiry Skills <ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 	AFW
2	4	<ul style="list-style-type: none"> Fields and Techniques 	Science Inquiry Skills <ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 	YEAR 12 ATAR EXAMS



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2	5	<ul style="list-style-type: none"> Fields of Forensics 	<p>Science Inquiry Skills</p> <ul style="list-style-type: none"> Communicate scientific ideas and information for a particular purpose, using appropriate scientific language, conventions and representations <p>Science as a Human Endeavour</p> <ul style="list-style-type: none"> Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions Scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts, and to design action for sustainability 	YEAR 12 ATAR EXAMS
2	6	<p>Fingerprinting</p> <ul style="list-style-type: none"> From porous surfaces From absorbent surfaces 	<p>Science as a Human Endeavour</p> <ul style="list-style-type: none"> The use of scientific knowledge may have beneficial and/or harmful and/or unintended consequences Scientific knowledge can enable scientist to offer valid explanations and make reliable predictions 	Task 6: Extended Response – Research assignment of Fields of Forensics (10%)
2	7	<p>Soils</p> <ul style="list-style-type: none"> Physical characteristics pH Humus content 	<p>Science as a Human Endeavour</p> <ul style="list-style-type: none"> Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions <p>Chemical reactions</p> <ul style="list-style-type: none"> The use of substances is determined by the chemical and/or physical properties of the constituent chemicals 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 	Task 7: Science Inquiry (practical) – Soil analysis (6%)
2	8	<p>Blood</p> <ul style="list-style-type: none"> Types 	<p>Science Inquiry Skills</p> <ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 <p>Science as a Human Endeavour</p>	Task 8: Science Inquiry (practical) – Blood group identification (6%)



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			<ul style="list-style-type: none"> Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions 	
2	9	Blood <ul style="list-style-type: none"> Spatter patterns 	Science Inquiry Skills <ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 Science as a Human Endeavour <ul style="list-style-type: none"> Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions 	
2	10	DNA <ul style="list-style-type: none"> Electrophoresis Profiles 	Science Inquiry Skills <ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 Science as a Human Endeavour <ul style="list-style-type: none"> Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions 	Task 9: Extended Response – DNA as evidence (10%)
3	1	Casts and Impressions <ul style="list-style-type: none"> 2 dimensional 3 dimensional 	Science Inquiry Skills <ul style="list-style-type: none"> Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes 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 	



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		Impressions <ul style="list-style-type: none"> • Tools • Teeth 	Science as a Human Endeavour <ul style="list-style-type: none"> • Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions 	
3	2	Fibre analysis <ul style="list-style-type: none"> • Microscope techniques • Hair • Fibres 	Science Inquiry Skills <ul style="list-style-type: none"> • Identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes • 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 Science as a Human Endeavour <ul style="list-style-type: none"> • Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions Chemical reactions <ul style="list-style-type: none"> • The use of substances is determined by the chemical and/or physical properties of the constituent chemicals • Rearrangement of reactant components occurs during chemical reactions to form new substances 	Task 10: Science Inquiry (practical) – Matching Fibres (6%)
3	3	Forgery <ul style="list-style-type: none"> • Chromatography • Handwriting 	Mixtures and solutions <ul style="list-style-type: none"> • Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques 	
3	4	Chemical detection <ul style="list-style-type: none"> • Toxicology 	Chemical reactions <ul style="list-style-type: none"> • The use of substances is determined by the chemical and/or physical properties of the constituent chemicals • Rearrangement of reactant components occurs during chemical reactions to form new substances 	Task 11: Science Inquiry (investigation) – Identify an unknown powder (5%)



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3	5	Chemical detection <ul style="list-style-type: none"> Toxicology 	Chemical reactions <ul style="list-style-type: none"> 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 	
3	6	Entomology	Science as a Human Endeavour <ul style="list-style-type: none"> Scientific knowledge can enable scientists to offer valid explanations and make reliable predictions 	
3	7	Revision and test		Task 12: Test – Forensic Science (7%)
3	8			AFW
3	9			YEAR 12 EXAMS ATAR
3	10			YEAR 12 EXAMS ATAR