Kurri Kurri High School – STEM Faculty – Scope & Sequence – Year 11 Biology

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TERM 1	**Module 1: Cells as the Basis of Life** **Outcomes:** *BIO11-1; BIO11-2; BIO11-3; BIO11-4; BIO11-5; BIO11-6; BIO11-7; BIO11-8* **Content focus:** Cells are the basis of life. They coordinate activities to form colonial and multicellular organisms. Students examine the structure and function of organisms at both the cellular and tissue levels in order to describe how they facilitate the efficient provision and removal of materials to and from all cells in organisms. They are introduced to and investigate biochemical processes through the application of the Working Scientifically skills processes. Students are introduced to the study of microbiology and the tools that scientists use in this field. These tools will be used throughout the course to assist in making predictions and solving problems of a multidisciplinary nature. **Working Scientifically:** In this module, students focus on conducting investigations to collect, process and analyse data and identify trends, patterns and relationships related to cell structure and function. Students are provided with opportunities to engage with all Working Scientifically skills throughout the course. **Inquiry questions**: Cell Structure: What distinguishes one cell from another? Cell Function: How do cells coordinate activities within their internal environment and the external environment? **Working Scientifically Skills**: Questioning and Predicting, Planning, and conducting investigations, Processing Data and Information, Analysing Data and Information, Problem Solving, Communicating **Skills**: understanding of HSC key verbs, answering HSC style questions, multiple choice, short answer, long response, visualisation, modelling, critical thinking, ICT skills **Assessment**: Depth Study week 10 Term 1							**Module 2: Organisation of Living Things** **Outcomes:** *BIO11-1; BIO11-2; BIO11-3; BIO11-4; BIO11-5; BIO11-6; BIO11-7; BIO11-9* **Content Focus:** Multicellular organisms typically consist of a number of interdependent transport systems that range in complexity and allow the organism to exchange nutrients, gases and wastes between the internal and external environments. Students examine the relationship between these transport systems and compare nutrient and gas requirements. Models of transport systems and structures have been developed over time, based on evidence gathered from a variety of disciplines. The interrelatedness of these transport systems is critical in maintaining health and in solving problems related to sustainability in agriculture and ecology. **Working Scientifically:** In this module, students focus on collecting, processing and analysing data and information to identify trends, patterns and relationships; solve problems, and communicate ideas about the organisation of living things. Students are provided with opportunities to engage with all Working Scientifically skills throughout the course. **Inquiry questions:** Organisation of Cells: How are cells arranged in a multicellular organism? Nutrient and Gas Requirements: What is the difference in nutrient and gas requirements between autotrophs and heterotrophs? Transport: How does the composition of the transport medium change as it moves around an organism? **Working Scientifically Skills:** Questioning and Predicting, Processing Data and Information, Analysing Data and Information, Problem Solving, Communicating **Skills:** understanding of HSC key verbs, answering HSC questions, multiple choice, short answer, long response, visualisation, ICT skills, scientific terminology, writing scientific reports			
										Depth Study 35%	

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Module 2: Organisation of Living Things **Outcomes:** *BIO11-1; BIO11-2; BIO11-3; BIO11-4; BIO11-5; BIO11-6; BIO11-7; BIO11-9* **Content Focus:** Multicellular organisms typically consist of a number of interdependent transport systems that range in complexity and allow the organism to exchange nutrients, gases and wastes between the internal and external environments. Students examine the relationship between these transport systems and compare nutrient and gas requirements. Models of transport systems and structures have been developed over time, based on evidence gathered from a variety of disciplines. The interrelatedness of these transport systems is critical in maintaining health and in solving problems related to sustainability in agriculture and ecology. **Working Scientifically:** In this module, students focus on collecting, processing and analysing data and information to: identify trends, patterns and relationships; solve problems, and communicate ideas about the organisation of living things. Students are provided with opportunities to engage with all Working Scientifically skills throughout the course. **Inquiry questions:** Organisation of Cells: How are cells arranged in a multicellular organism? Nutrient and Gas Requirements: What is the difference in nutrient and gas requirements between autotrophs and heterotrophs? Transport: How does the composition of the transport medium change as it moves around an organism? **Working Scientifically Skills:** Questioning and Predicting, Processing Data and Information, Analysing Data, and Information, Problem Solving, Communicating **Skills:** understanding of HSC key verbs, answering HSC questions, multiple choice, short answer, long response, visualisation, ICT skills, scientific terminology, writing scientific reports **Assessment:** Practical Portfolio week 8 Term 2					**Module 3: Biological Diversity** **Outcomes:** *BIO11-1; BIO11-2; BIO11-3; BIO11-4; BIO11-5; BIO11-6; BIO11-7; BIO11-10* **Content Focus:** Biodiversity is important to balance the Earth's ecosystems. Biodiversity can be affected slowly or quickly over time by natural selective pressures. Human impact can also affect biodiversity over a shorter time period. In this module, students learn about the Theory of Evolution by Natural selection and the effect of various selective pressures. Monitoring biodiversity is key to being able to predict future change. Monitoring, including the monitoring of abiotic factors in the environment, enables ecologists to design strategies to reduce the effects of adverse biological change. Students investigate adaptations of organisms that increase the organism's ability to survive in their environment. **Working Scientifically:** In this module, students focus on: designing appropriate investigations; collecting and processing data to develop questions to test hypotheses using appropriate media; communicating their understanding. Students are provided with opportunities to engage with all Working Scientifically skills throughout the course. **Inquiry questions:** Effects of the Environment on Organisms: How do environmental pressures promote a change in species diversity and abundance? Adaptations: How do adaptations increase the organism's ability to survive? Theory of Evolution by Natural Selection: What is the relationship between evolution and biodiversity? Evolution- the Evidence: What is the evidence that supports the Theory of Evolution by Natural Sselection? **Working Scientifically Skills:** Processing Data and Information, Analysing Data, and Information, Problem Solving, Communicating **Skills:** understanding of HSC key verbs, answering HSC style questions, multiple choice, short answer, long response, visualisation, ICT skills, scientific terminology. **Assessment:** Practical Portfolio week 8 Term 2				
				Field Study Excursion			Practical Portfolio 40%		

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TERM 3	**Module 3: Biological Diversity** **Outcomes:** *BIO11-1; BIO11-2; BIO11-3; BIO11-4; BIO11-5; BIO11-6; BIO11-7; BIO11-10* **Content Focus:** Monitoring biodiversity is key to being able to predict future change. Monitoring, including the monitoring of abiotic factors in the environment, enables ecologists to design strategies to reduce the effects of adverse biological change. Students investigate adaptations of organisms that increase the organism's ability to survive in their environment.		**Module 4: Ecosystem Dynamics** **Outcomes:** *BIO11-1; BIO11-2; BIO11-3; BIO11-4; BIO11-5; BIO11-6; BIO11-7; BIO11-11* **Content Focus:** The Earth's biodiversity has increased since life first appeared on the planet. The Theory of Evolution by Natural Selection can be used to explain periodic increases and decreases in populations and biodiversity. Scientific knowledge derived from the fossil record, and geological evidence has enabled scientists to offer valid explanations for this progression in terms of biotic and abiotic relationships. Students engage in the study of past ecosystems and create models of possible future ecosystems so that human impact on biodiversity can be minimised. The study of ecosystem dynamics integrates a range of data that can be used to predict environmental change into the future. **Working Scientifically:** In this module, students focus on developing questions and hypotheses when planning and conducting investigations. Students study trends, patterns and relationships in data to analyse the interrelationships within and dynamics of an ecosystem. Students are provided with opportunities to engage with all Working Scientifically skills throughout the course. **Inquiry questions:** Population Dynamics: What effect can one species have on the other species in a community? Past Ecosystems: How do selection pressures within an ecosystem influence evolutionary change? Future Ecosystems- How can human activity impact on an ecosystem? **Working Scientifically Skills:** Planning and conducting investigations**,** Processing Data and Information, Analysing Data, and Information, Problem Solving, Communicating **Skills:** understanding of HSC key verbs, answering HSC style questions, multiple choice, short answer, long response, visualisation, ICT skills, scientific terminology. **Assessment:** Final Examination week 8 & 9 Term 3							
								Final Exams 25%	Final Exams 25%	