Kurri Kurri High School – STEM Faculty – Scope & Sequence – Year 12 Biology - 2022

TERM 4

1	2	3	4	5	6	7	8	9	10	11

Module 5: Heredity

Outcomes: BIO11/12-3, BIO11/12-4; BIO 11/12-5; BIO11/12-6; BIO11/12-7; BIO12-12

Content focus: Life continues through the processes of reproduction and heredity. Students expand their knowledge of evolution by understanding the cellular processes involved in increasing genetic diversity. They investigate reproduction and inheritance patterns in both plants and animals as well as the role of DNA in polypeptide synthesis and the uses of technologies in the study of inheritance patterns.

Students also learn about contemporary research and the work of geneticists across a variety of industries, including medical applications and agriculture. They explore the effects on society and the environment through the application of genetic research.

Working Scientifically:

In this module, students focus on processing and representing data in appropriate formats to analyse and evaluate trends, relationships and patterns. Students derive and justify valid conclusions about the processes involved in heredity. Students should be provided with opportunities to engage with all Working Scientifically skills throughout the course

Inquiry questions:

Reproduction - How does reproduction ensure the continuity of a species?

Cell replication - How important is it for genetic material to be replicated exactly?

DNA and Polypeptide Synthesis - Why is polypeptide synthesis important?

Genetic Variation - How can the genetic similarities and differences within and between species be compared?

Inheritance Patterns in a Population - Can population genetic patterns be predicted with any accuracy?

Working Scientifically Skills: Conducting investigations, 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, modelling, critical and creative thinking, ICT skills

Assessment: Research Task week 8 Term 1

							Research Task 20%			

TERM 1

1	2	3	4	5	6	7	8	9	10	11

Module 6: Genetic Change (including Depth Study 10 hours)

Outcomes: BIO11/12-1, BIO11/12-4; BIO11/12-5; BIO11/12-6; BIO11/12-7; BIO12-13

Content Focus: Students learn about natural and human-induced causes and effects of genetic change, including mutations, environmental pressure and uses of biotechnology. Students investigate how the processes of inheritance and evolution are applied. The work of scientists in various fields of work, including agriculture, industry and medicine, can be explored within the context of biotechnology. The impact of biotechnology on biological diversity is also explored in this module.

Working Scientifically:

In this module, students focus on analysing trends and patterns and solving problems using evidence from data and information. Students also focus on communicating ideas about genetic change for a specific purpose. Students should be provided with opportunities to engage with all Working Scientifically skills throughout the course.

Inquiry questions:

Mutation - How does mutation introduce new alleles into a population?

Biotechnology - How do genetic techniques affect Earth's biodiversity?

Genetic Technologies - Does artificial manipulation of DNA have the potential to change populations forever?

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, Peer evaluations, ethical understanding, ICT skills, scientific terminology, numeracy- percentages, critical and creative thinking, sustainability, intercultural understanding

Assessment: Depth Study week 9 Term 2

								Depth Study 30%		

TERM 2

1	2	3	4	5	6	7	8	9	10
Module 7: Infectious Disease (including Depth Study 5 hours) **Outcomes:** BIO 11/12-1; BIO11/12-2; BIO11/12-3; BIO11/12-4; BIO11/12-5; BIO11/12-6; BIO11/12-7; BIO12-14 **Content focus**: In this module, students examine the treatment, prevention and control of infectious disease both locally and globally. It includes study of the human immune system and its response to an infectious disease. The value of studying infectious disease and its causes and effects is highlighted by the cost to humans in terms of losses in productivity and production, as well as the impact on overall health. This module also considers medical and agricultural applications that draw on the work of a variety of scientists. **Working Scientifically:** In this module, students focus on developing and evaluating questions and hypotheses when planning and conducting investigations to analyse trends, patterns and relationships in data about infectious diseases. Students should be provided with opportunities to engage with all Working Scientifically skills throughout the course. **Inquiry questions:** Causes of Infectious Disease – How are diseases transmitted? Immunity – How does the human immune system respond to exposure to a pathogen? Prevention, Treatment and Control – How can the spread of infectious diseases be controlled? **Working Scientifically Skills*:*** Questioning and Predicting, Planning investigations, Conducting investigations, 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, scientific terminology, ICT skills, intercultural understanding, critical and creative thinking, numeracy-analysing trends, patterns and relationships in data related to diseases, sustainability, understanding Aboriginal histories and culture. **Assessment:** Data analysis Task, Week 7 Term 2									
						Data analysis Task 20%			

TERM 3

1	2	3	4	5	6	7	8	9	10
Module 8: Non-infectious Disease and disorders **Outcomes***: BIO11/12-4; BIO11/12-5; BIO11/12-6; BIO11/12-7; BIO12-15* **Content focus:** Students engage with the study of non-infectious disease and disorders, including their causes and effects on human health. They explore technologies and their uses in treating disease and disorders as well as the epidemiology of non-infectious disease in populations. This module examines the practical applications of STEM. It looks at the importance of understanding the multidisciplinary nature of Science applications. It also examines physiology and engineered solutions to problems related to the management of human disorders. **Working Scientifically:** In this module, students focus on collecting and processing data to analyse trends and patterns and solve problems. They also focus on communicating ideas about non-infectious disease and disorders. Students should be provided with opportunities to engage with all working Scientifically skills. **Inquiry questions:** Homeostasis – How is an organism's internal environment maintained in response to a changing external environment? Causes and effects – Do non-infectious diseases cause more deaths than infectious diseases? Epidemiology – Why are epidemiological studies used? Prevention – How can non-infectious diseases be prevented? **Working Scientifically Skills*:*** Questioning and Predicting, Planning investigations, Conducting investigations, 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, scientific terminology, ICT skills, Numeracy, understanding difference and diversity, Intercultural understanding, Critical and creative thinking **Assessment:** Trial HSC Examination, Week 1-2 Term 3									
Trial HSC 30%									