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|  | General Integrated Science Year 11Course outlineUnit 1 |

#### **Semester 1 – Unit 1 The Cell and Exercise Physiology**

| **Week** | **Key teaching points** |
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| 1 - 4 | **Human Biology: atoms, molecules that build cells*** Introduction to Course Expectations, Scientific Inquiry, STEM and the Engineering Design process
* **Practical:** Chemicals important to life
	+ physical properties of glucose, starch, lipids and proteins
	+ chemical tests for glucose, starch, lipids and proteins
* **Science Inquiry** Planning, conducting, analysing and evaluating the macronutrients in spring onion.
	+ Report writing
	+ graphing data
	+ Designing and building Infographics

**Assessment Task 1: Science inquiry Investigation Test: based on the two practicals above 5%****How nutrients are recycled in the ecosystem*** Research, design, build and maintain a Worm Farm as an application of
* requirements of organisms and
* carbon and nitrogen cycles
* Use a binocular microscope to observe decomposers such as annelids, fungi
* Analyse cycles in nature in terms of the atoms and molecules of life
* Explain how the interaction between the hydro, litho and atmosphere are represented by biogeochemical cycles.
* Demonstrate how conservation of matter occurs in cycles in nature
* Discuss how natural resources are important in everyday life, in terms of cellular reactions.
* Human activities and natural processes impact on cycles in nature

**Assessment Task 2 Preparation: Field Notes, Research and Plan Science Inquiry Investigation.**  |
| 5  | **Reactions of Life and Energy Flow*** atoms and molecules that build organic molecules for life; carbohydrates, lipids, protein, chlorophyll, haemoglobin
* the flow of energy through living systems
* Chemical Reactions of Life: Photosynthesis and Respiration - reactions for the organisms, food chain

**Assessment Task 2: Science inquiry Investigation: Ecosystem Interactions: build a mini-ecosystem and explanation. 10%** |
| 6-7 | * the cell is the simplest form of organisation that can perform activities required for life eg photosynthesis, respiration, DNA synthesis, protein synthesis, cell division
* Select one cell organelle to research in detail the structure and function including materials needed from the environment and wastes produced in the cellular chemical reactions.

**Assessment Task 3: Extended response: Research investigation and iMovie product– Ancient Ecosystems 5%** |
| 8 | * Follow design process to build a prototype of selected organelle. Keep notes in an electronic design brief.
	+ Identify and research the structure and function of one cell organelle
	+ Develop a prototype and justify materials chosen to build prototype
	+ Plan and build a prototype of the organelle using available materials
	+ Design a key that explains the components of the organelle.

**Assessment Task 4: Extended Response, Build a prototype of the organelle. Submit with the design brief, including key and reflections. 5%** |

| **Week** | **Key teaching points** |
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| 9 | **Assessment Task 5: Test, Cell Structure and Function and cycling of nutrients (use the Worm Farm to answer multi choice and short responses) 5%****Exercise Physiology*** forms of organisation of multicellular organisms include tissues, organs and systems with emphasis on respiratory, skeletal muscular system, cardiovascular
* changes in a system can affect the survival of organisms; variation assists survival of individuals

**Assessment Task 6: Science Inquiry: Practical Effect of exercise on body temperature. Borrow infra-red digital temperature probes from ECU. 5%** |
| 10 | **Assessment Task 7: Extended Response and Presentation using digital technologies****Design an exercise program suitable for students to do during class. Explain the cell biology and justify the design. 5%** |
| 11- 13 | **Species continuity and change*** Explain how reproduction and inheritance play an important role in the continuity of species
* What is DNA?
* How is DNA inherited?
* How do humans use their understanding of genetics?

**Assessment Task 8: Science inquiry Research and Extended Response DNA 5%****Short week 11 with Pupil free and Anzac Day** |
| 14  | * Explain how change in physical environment leads to eventual change in biological characteristics of a species
* How do we explain diversity?
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| 15 - 16 | **Year 11 Examination Period and Research Break** |
| 17 - 18 | **Species continuity and change*** How do we explain diversity?
* How do species evolve?
* How do we interpret evidence?
	+ Human evolution

**Assessment Task 9: Test – Species continuity and change 5%** |
| 19 - 20 | **Ecosystems and sustainability*** interrelationship between systems assist cellular activity to sustain life
* biological communities interact with each other and their physical environment

**Urban Shade STEM Learning Project Module.****Assessment Task 10: Science Inquiry: Practical, factors affecting heat island effect 5%** |

Notes: <https://www.teachengineering.org/curriculum/browse?collection=Lessons>