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|  | General Integrated Science Year 11Course outline Unit 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%** |

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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? |
| 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>