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| **Term 1****Week 1** **and****2****Term 1****Week 3** **Term 1****Week** **4** **and** **5** | **Biological and Earth Systems: and how they form Ecosystems**Introduction to Course expectations, Scientific Inquiry and the Engineering Design process* Introduction to Connect and the class website
	+ Write a word document and upload during first class
* **Laboratory skills:**
	+ Use materials and processes safely
	+ Use indicators to distinguish between solutions: acids, salts, bases
	+ Measure volume, mass, temperature, accurately
	+ Use indicators to distinguish between materials: acids, salts, bases, glucose, starch, proteins lipids
	+ Use the binocular microscope to observe inorganic crystals and living tissues

**Atoms, molecules, cells and how they work together*** **Laboratory skills:**
	+ Use materials and processes safely
	+ Make solutions, precipitates, measuring mass, volume, temperature changes
	+ Practise physical and chemical separation techniques
	+ Distinguish between materials and energy

**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 organism, food chain
* Demonstrate how simple molecules react to form complex molecules

Photosynthesis 6 CO2 + 6 H2O + energy 🡪 C6H12O6  + 6 O2Respiration C6H12O6  + 6 O2 🡪 6 CO2 + 6 H2O + energy**How are nutrients recycled in the ecosystem?*** Explain how the interaction between the hydrosphere, lithosphere 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.
* **Laboratory skills:**
	+ Use materials and processes safely
	+ Use solutions to precipitate ions
	+ Use separation techniques to recover mixture components

**Ecosystems and sustainability*** interrelationship between systems assist cellular activity to sustain life
* biological communities interact with each other and their physical environment
* Prepare carbon dioxide gas in the laboratory and test the properties
* **Laboratory skills:**
	+ Make and test carbon dioxide gas essential to life on earth
* Human activities and natural processes impact on cycles in nature
* Use a binocular microscope to observe decomposers such as annelids, fungi
* Analyse cycles in nature in terms of the atoms and molecules of life
* Research, design, build and maintain a Worm Farm as an application of
	+ requirements of organisms and
	+ carbon and nitrogen cycles
	+ water cycle
 | **Biological and Earth Systems Booklet 1*** <http://integratedsciencegeneral11.weebly.com/chemicals-of-life-booklet-1.html>
* WebHunt
* Design Process Template and worksheet
* Mathematical Skills
* Indicators and solutions
* Chemical tests to identify some macronutrients
* Observation and description of the organs of spring onions *Allium cepa*
* Testing for macronutrients in *Allium cepa*
* Science Investigation Skills
* Visualising the hypothesis
* Writing the Report Template
* Binocular Microscope
* Inverse Proportionality

Laboratory Skills* Making stock solutions, Exothermic, Endothermic,
	+ Weighing, thermometer, reagent bottles, labelling

**Biological and Earth Systems Booklet 2 Reactions of Life, Energy Flow and Matter Cycles**<http://integratedsciencegeneral11.weebly.com/reactions-of-life-and-energy-flow-booklet-2.html>* Macronutrients and Food Matrix
* Biogeochemical Cycles
* Annelids and their role in biogeochemical cycles.
* Precipitate reactions
	+ Conservation of matter
	+ Temperature
* Filtration and crystalisation

Energy vs matterInorganic vs organic<http://integratedsciencegeneral11.weebly.com/biogeochemical-cycles-booklet-3.html> | **BIS 3.1 What are the Earth’s major interactions?**Read the following pagesp 88 to 96p 92 What do you know about the lithosphere?p 94 What do you know about the atmosphere?p 95 What do you know about the hydrosphere?p 96 What do you know about the biosphere?**Page 88 Complete activity “Remembering Spheres**” (in the pink area) **BIS 3.2 How does matter cycle on Earth?**p 98 to 104**Natural Cycles**p 99 Waterp 101 Nitrogenp 102 Carbon**Preparation: Research and Plan Science Inquiry Investigation on building a portable worm farm for Assessment Task 2** | **Week 3****Assessment Task 1: Science Inquiry Test****.** **Week 5****Assessment Task 2:** **: Ecosystem Interactions: build a mini-ecosystem and explanation. 10%** | **5%****10** |
| **Term 1****Week****6** | **Cell reactions*** Respiration, an important life process
* the cell is the simplest form of organisation that can perform activities required for life eg photosynthesis, respiration, DNA synthesis, protein synthesis, cell division
* Monocular light Microscopes
 | Booklet 4 Cell Organelles and Cellular Reactions<http://integratedsciencegeneral11.weebly.com/cell-organelles-booklet-4.html><http://integratedsciencegeneral11.weebly.com/cellular-reactions-as-black-boxes.html> |  |  |  |
| **Term** **1****Week 7** | * 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.
 | Structure and function of biological systems<http://integratedsciencegeneral11.weebly.com/task-3-cell-organelle-infographic.html> | For Assessment Task 3Research and investigation of structure and function of cell organelle. Apply knowledge of atoms and molecules required and wastes produced by the organelle | **Assessment Task 3:** **Extended response: Research investigation and iMovie product– Ancient Ecosystems** | **5** |
| **Term****1****Week****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.
 | <http://integratedsciencegeneral11.weebly.com/task-4-prototype-of-cell-organelle.html> |  | **Assessment Task 4: Extended Response, Build a prototype of the organelle. Submit with the design brief** | **5** |
| **Term****1****Week****9** | Cellular RespirationThe Black Box Model of a cell organelleInputs of energy and materials 🡪 Organelle 🡪 Inputs of energy and materials The mitochondrion is the black box for cellular respiration* Cellular Respiration in yeast
 | [**http://integratedsciencegeneral11.weebly.com/cellular-reactions-as-black-boxes.html**](http://integratedsciencegeneral11.weebly.com/cellular-reactions-as-black-boxes.html)[**http://integratedsciencegeneral11.weebly.com/task-6-cellular-respiration-report.html**](http://integratedsciencegeneral11.weebly.com/task-6-cellular-respiration-report.html) |  | Assessment Task 6 SIS Scientific Report on Investigation “Factors affecting Cellular Respiration in Yeast” | **5** |
| **Term****1****Week****10** **and****11** | Exercise Physiologyforms 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* **Homeostasis in humans in regard to internal body temperature**
 | [**http://integratedsciencegeneral11.weebly.com/exercise-physiology.html**](http://integratedsciencegeneral11.weebly.com/exercise-physiology.html)[**http://integratedsciencegeneral11.weebly.com/task-7-exercise-and-internal-body-temperature.html**](http://integratedsciencegeneral11.weebly.com/task-7-exercise-and-internal-body-temperature.html) |  | Assessment Task 7: Science Inquiry: Practical Effect of exercise on body temperature.  | **5** |

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| **Term****2****Weeks 1 to 2** | Species continuity and changeExplain how reproduction and inheritance play an important role in the continuity of speciesWhat is DNA?How is DNA inherited?How do humans use their understanding of genetics | <http://integratedsciencegeneral11.weebly.com/species-continuity--dna.html>**Extracting DNA**  | **BIS 4 Genetics****4.1 What is DNA? p 128 to p 142**p 134 Extracting DNAp 136 What do you know about Watson and Crick’s double helix discovery?p 139 What do you know about the relationship between DNA, chromosomes, genes and characteristics.p140 What do you know about passing DNA to the next generation?p141 What do you know about mitosis and meiosis | **Assessment Task 8: Science inquiry Research and Extended Response**  | 5 |
| **Term****2****Weeks 3 to 4** | Explain how change in physical environment leads to eventual change in biological characteristics of a species | **BIS 4.2 How is DNA Inherited? p 143 to p 155**p145 What do you know about Gregor Mendel’s contribution to Genetics?p149 What do you know about monohybrid crosses?p 151 What do you know about sex linkage?p 154What do you know about pedigree construction and analysis? |  | **Assessment Task 9: Research and Extended Response** Species continuity and change ; representations of the DNA molecule | **5** |
| **Term 2****Weeks 5 and 6** | **Assessment Break** |

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| **Term****2****Weeks** **7** **and****8** | Species continuity and changeHow do we explain diversity?How do species evolve?How do we interpret evidence? Human evolution  | [**http://integratedsciencegeneral11.weebly.com/species-change---evolution.html**](http://integratedsciencegeneral11.weebly.com/species-change---evolution.html)**BIS 5 The Origin of Species p 178 to 221**5.1 Biodiversity p 188 What do you know about pre evolutionary theory?p183 What do you know about early evolutionary ideas?p 196 What do you know about natural selection?p 202What do you know about evidence for evolution?p 213 What do you know about analysing the living?p 217 What do you know about the origins of life?**p 220 The rise of the bipedal ape.** |  | Assessment Task 9: Species continuity and change Test | **5** |
| **Term****2****Weeks 9 to 10** | **Ecosystems and sustainability*** interrelationship between systems assist cellular activity to sustain life
* biological communities interact with each other and their physical environment
* Do Urban Shade

Notes: <https://www.teachengineering.org/curriculum/browse?collection=Lessons> |  |  | **Urban Shade STEM Learning Project Module.****Assessment Task 10: Science Inquiry: Practical, factors affecting heat island effect** | **5** |
| **Term** **1****Weeks 1 to 10****and** **Term 2****Weeks** **to 5** | **Unit 1 Earth and Biological Systems Science Inquiry Skills****This unit includes the knowledge, understandings and skills described below. The order and detail in which the key concepts are organised are decisions to be made by the teacher.****Planning :** <http://integratedsciencegeneral.weebly.com/planning-the-investigation.html>* identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes
* plan, select and use appropriate [investigation](http://www.australiancurriculum.edu.au/Glossary?a=S&t=Investigation) methods, including pre-testing, to collect [reliable data](http://www.australiancurriculum.edu.au/Glossary?a=S&t=Reliable%20data); assess risk and address ethical issues associated with these methods

**Conducting:** <http://integratedsciencegeneral.weebly.com/conducting-a-fair-test.html>* conduct investigations safely, competently and methodically for the collection of valid and reliable data

**Data Collection and Analysis**: <http://integratedsciencegeneral.weebly.com/data-collection-and-analysis.html>* 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

**Evaluation and Communication**: <http://integratedsciencegeneral.weebly.com/evaluation-and-communication.html>* communicate scientific ideas and information for a purpose, using appropriate scientific language, conventions and representations

Science as a Human Endeavour* 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](http://www.australiancurriculum.edu.au/Glossary?a=SSCSCH&t=Validity) explanations and make [reliable](http://www.australiancurriculum.edu.au/Glossary?a=SSCSCH&t=Reliability) predictions
* scientific knowledge can be used to develop and evaluate projected economic, social and environmental impacts, and to design action for sustainability
 | Safety p 1Scientific Method p 2 -13Using metric Units p 34 - 36Graphing p 16 - 24Scientific Writing p 37 - 43Referencing p 45 – 48**Microscopes**<http://integratedsciencegeneral.weebly.com/microscopes.html> | See the Science Understanding program. |