**Biology Text: Nature of Biology Book 1 Third Edition, J. Kinnear and M. Martin (NoB1)**

**Science Investigation Skills Text: Science Skills for Senior Students Second Edition, J. Harrison (SSSS)**

**Unit 3 – Earth and Biological Systems**

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| **Term / Week** | **Major Content**  **from Syllabus** | **Text Reference NoB1**  **Resources** | **Common Assessment** | **Year**  **%** |
| **Term 1**  **Weeks 1 to 2** | Earth systems/cycles in nature  * differences in geographical and physical conditions result in a wide variety of ecosystems. * Define terms: ecology, ecosystems, community, biome, population * Observe different ecosystems   **Abiotic Factors**   * abiotic factors, including temperature, pH, salinity, light, water and atmospheric gases, impact on the survival of organisms within the environment.   [**http://year12integratedscience.weebly.com/introduction-to-unit.html**](http://year12integratedscience.weebly.com/introduction-to-unit.html)[**http://year12integratedscience.weebly.com/ecosystems.html**](http://year12integratedscience.weebly.com/ecosystems.html) | **Introducing Ecosystems p 407 - 412**  **Environmental Factors p 270 - 278**  **population ecology**  https://goo.gl/rcld8V  **NOVA ecosystem CC**  https:// goo.gl/ egAAOY  <https://goo.gl/gqBxnl>  **Practical**: Plant growth and Abiotic Factors  **Practical:** Habitat selection in worms | **Week 1**  **Task 1:** Science Inquiry Pre-Test (Base-line data) | 1% |
| **Term 1**  **Weeks 3 to 5** | **Biotic Components and Energy Flow**   * the biotic components of an ecosystem transfer and transform energy, originating primarily from the sun, into biomass * there is interaction between organisms, biological communities and the abiotic environment in which they live * producers, consumers and decomposers have a role in the transfer of energy in an ecosystem * food chains and food webs show the feeding relationships between organisms within a community * the amount of energy transferred between trophic levels in food chains and food webs diminishes as the trophic level increases   http ://year12integratedscience.weebly.com/ biotic -interactions--transfer-of-energy.html <http://year12integratedscience.weebly.com/food-chains.html> [http://year12integratedscience.weebly.com/trophic-levels-and-antartic- varcticecosystems.html](http://year12integratedscience.weebly.com/trophic-levels-and-antartic-%20varcticecosystems.html) [http ://year12integratedscie nce.weebly.com/ biotic -interact io ns--transfe r-of-energy.htm l](http://year12integratedscience.weebly.com/biotic-interactions--transfer-of-energy.html) | **Specific Communities p 412** – **414 Ecosystems require Energy input p 438- 454**  **Ecological Groupings p 415** - **418**  **Ecosystems in Darkness p 458** - **460**  Food webs:  https:// goo.gl/STGKPT Nova Antarctic  <https://goo.gl/rvsZSP> Nova Arctic  <https://goo.gl/wi4DK4> https://goo.gl/GXvbmS  **Practical:** Modelling food chains and energy flows | **Week 3**  **Fieldwork Excursion** (marks included task 2)  **Set Task 2: Science inquiry (investigation) –** Creating and monitoring an artificial ecosystem  (Presentation due week 9, Validation test week 10) | 15% |
| **Term / Week** | **Major Content**  **from Syllabus** | **Text Chapter** | **Common Assessment** | **Year**  **%** |
| **Term**  **1**  **Week**  **6** | **BioGeochemical cycling**   * biotic components interact with abiotic components to facilitate biogeochemical cycling * define biogeochemical cycling [http://year12integratedscience.weebly.com/earth-and -biological-systems -unit -3.html](http://year12integratedscience.weebly.com/earth-and%20-biological-systems%20-unit%20-3.html) | **Biochemical cycles p 461- 467**  **Carbon cycling**  https://goo.gl/OmFQAD  **cave formation**  https://goo.gl/DhlmUl  **interactive carbon cycling**  https://goo.gl/cSPWCY |  |  |
| **Term**  **1**  **Weeks 7 to 8** | Structure and function of biological systems  * modes of interactions between species in ecosystems include competition, predation and symbiosis (mutualism, commensalism and parasitism) * species interactions affect population densities and are important in determining community structure and composition [**http://year12integratedscience.weebly.com/earth-and -biological-systems-unit-3.html**](http://year12integratedscience.weebly.com/earth-and%20-biological-systems-unit-3.html) | **Interactions within a living community p 420 – 433 Parasites**  <https://goo.gl/o5S9Ar> **NOVA reef ecosystem/symbiosis** <https://goo.gl/lki2hc> **Mark and recapture** <https://goo.gl/l4GyJp> **Population biology** https://goo.gl/fAchLO | **Week 7**  **Task 3:** Extended Response – Modelling Biogeochemical Cycles  **Week 8**  **Task 4:** Test – Earth systems/cycles in nature and structure and function of biological systems | 10%  5% |
| **Term**  **1**  **Weeks 9 to 10** | Ecosystems and sustainability  * changes to abiotic and biotic factors, including climatic events, impact on the carrying capacity of ecosystems * biodiversity includes the diversity of genetics, species and ecosystems; biodiversity changes naturally over time, and varies due to differences in location * human interference is threatening biodiversity through deterioration of ecosystems and diminishing habitat areas http://Year12integratedscience.weebly.com/earth -and-biological-systems-unit- 3.html | **Changes in Ecosystems p 504 – 509**  **Human impacts on ecosystems 1 p 510-526**  **Natural Change Agents p526-528  Oxford Big Ideas 10:**  **What are Earth’s Major Interactions p97-109 How do Humans Impact the Environment? P109-125**  **Nova Micronesia** [**https://goo.gl/YIHdT3**](https://goo.gl/YIHdT3)[**https://goo.gl/NGTTMf**](https://goo.gl/NGTTMf) **Biodiversity** [**https://goo.gl/QEmBJn**](https://goo.gl/QEmBJn)  **Human impact** [**https://goo.gl/N1MqI2**](https://goo.gl/N1MqI2)  **Threats to Artic Ecosystem** [**https://goo.gl/XD0WHn**](https://goo.gl/XD0WHn) **Population dynamics** [**https://goo.gl/w2QvBa**](https://goo.gl/w2QvBa)  **Practical:** Soil salinity and plant growth  **Practical:** Algal growth and fertilisers | **Week 9**  **Task 2:** Science Inquiry: In-class presentation on monitoring an artificial ecosystem  **Week 10**  Validation Test for **task 2** | See Wk 3 |
| **Term / Week** | **Major Content**  **from Syllabus** | **Text Chapter** | **Common Assessment** | **Year**  **%** |
| **Term**  **2**  **Weeks 1 to 4** | Species continuity and change  * changes in ecosystems affect the survival of organisms within the ecosystem; individual variation assists survival, which over time results in changes in characteristics of the species * variation in the form of suitable characteristics assists survival of individuals * environmental changes may lead to selection of advantageous biological characteristics within a species | **Changes in ecosystems p 500 – 538**  **Galapagos finch** [**https://goo.gl/JaDuwR**](https://goo.gl/JaDuwR) **Evolution** [**https://goo.gl/hk4UrS**](https://goo.gl/hk4UrS) **Polar bears** [**https://goo.gl/ukwfXA**](https://goo.gl/ukwfXA) **Sloth ecosystems** [**https://goo.gl/3goytT**](https://goo.gl/3goytT) **Pygmy Sloths**  [**https://goo.gl/74FVL2**](https://goo.gl/74FVL2) **Coywolf** [**https://goo.gl/wbC4rc**](https://goo.gl/wbC4rc)  **Beetle evolutions game** [**https://goo.gl/0jnfNi**](https://goo.gl/0jnfNi)  **Practical:** Modelling natural selection | **Week 2**  **Task 5: Test** – Ecosystems, sustainability and species continuity and change  **Week 4**  **Task 6: Externally Set Task by the SCSA based on the content from Unit 3 – Ecosystems, SIS, SHE** | 5%  15% |
| **Term 2**  **Weeks 5 and 6** | General Integrated ScienceStudy BreakandATAR Examination Period |  |  |  |

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.

**Unit 3 Earth and Biological Systems**

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| **Term / Week** | **Major Content**  **from Syllabus** | **Text References**  **SSSS** | **Common Assessment** | **Year**  **%** |
| **Term**  **1**  **Weeks 1 to 10**  **and**  **Term 2**  **Weeks**  **1 to 5** | Science Inquiry Skills **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 particular 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 1  Scientific Method p 2 -13  Using metric Units p 34 - 36  Graphing p 16 - 24  Scientific Writing p 37 - 43  Referencing p 45 – 48  **Microscopes**  <http://integratedsciencegeneral.weebly.com/microscopes.html> | See the Science Understanding program. |  |