**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** – **414Ecosystems require Energy input p 438- 454****Ecological Groupings p 415** - **418****Ecosystems in Darkness p 458** - **460**Food webs:https:// goo.gl/STGKPTNova 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 – 433Parasites**<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 areashttp://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 p526-528Oxford Big Ideas 10:****What are Earth’s Major Interactions p97-109How 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 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. |  |