****

**ATAR BIOLOGY**

**2017 PROGRAM**

**UNITS 1 & 2**



**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**ATAR BIOLOGY**

**2017 ASSESSMENT OUTLINE**

**UNIT 1:**

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| ***Assessment Type*** | ***Topic*** | ***Schedule******Friday of:*** | ***Weighting*** | ***My Mark*** |
| **SCIENTIFIC INQUIRY** **(30%)** | **Extended Investigation** | *Term 1,* *Week 3-9* | 10 |  |
| **Second Hand Data Investigation** | *Term 2, Week 1* | 5 |  |
| **Field work Investigation** | *Term 2, Week 4* | 15 |  |
| **EXTENDED RESPONSE** **(10%)** | **Scientific Method** | *Term 1, Week 4* | 5 |  |
| **Ecosystems and cycles** | *Term 1, Week 10* | 5 |  |
| **TEST (20%)** | **Biodiversity and Classification Test** | *Term 1, Week 8* | 10 |  |
| **Ecosystems test** | *Term 2, Week 4* | 10 |  |
| **EXAM (40%)** | **Semester 1 Exam** | *Term 2,**Weeks 6 & 7* | 40 |  |

**UNIT 2:**

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| ***Assessment Type*** | ***Topic*** | ***Schedule******Friday of:*** | ***Weighting*** | ***My Mark*** |
| **SCIENTIFIC INQUIRY (30%)** | **Microscope and Cells Assessment** | *Term 2, Week 10* | 10 |  |
| **Enzymes Assessment**  | *Term 3, Week 2* | 10 |  |
| **Second Hand Data investigation** | *Term 3, Week 3* | 10 |  |
| **EXTENDED RESPONSE (10%)** | **Body Systems** | *Term 3, Week 10* | 10 |  |
| **TEST (20%)** | **Cell and Cell Metabolism Test** | *Term 3, Week 5* | 10 |  |
| **Animal and Plant Body System Test** | *Term 4, Week 1* | 10 |  |
| **EXAMINATIONS (40%)** | **Semester 2 Exam** | *Term 4,**Week 3 & 4* | 40 |  |

Note: Assessment times may change due to other school activities.

**Rossmoyne Senior High School**

**BIOLOGY PROGRAM FOR UNIT 1 AND 2, 2017**

*Note: SI = Scientific Inquiry, SHE = Science as a Human Endeavour, ER = Extended Response*

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| **WEEK** | **UNIT CONTENT** | **OBJECTIVES & OUTLINE** | **TEXT READINGS & QUESTIONS** | **ASSESSMENTS** |
| **Term 1,****Week 1/2/3** | IntroductionScientific Inquiry/ Method | Hand out assessment outline and programs.Expectations: Assessments, study, homeworkAbsence from scheduled assessments: Medical Cert requiredMaterials: Textbook, notebook, calculator (scientific only)* Review terminology
* The Scientific Method: Steps, hypothesising, variables, skills, (fair testing ,validity, reliability, reducing experimental error)
* identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes (SIS)
* represent data in meaningful and useful ways; (e.g. tabulating, graphing, interpolating, extrapolating)
* organise and analyse data to identify trends, patterns and relationships;
* qualitatively describe sources of measurement error, and uncertainty and limitations in data;
* and select, synthesise and use evidence to make and justify conclusions (SIS)
 | NELSON BIOLOGY UNITS 1&2Chapter 13 Scientific InvestigationsBIOZONESkills in BiologyActivity Number: 1, 2, 3, 4, 5, 8, 9,10, 11, 20 | **SI: Extended Investigation****(10%)** |
| **Week 4** | Describing biodiversityBiodiversitySHE: international agreements about biodiversity encourage international cooperation in the protection of unique locations, includingClassification of cells | * Define biodiversity
* Three levels of diversity genes, species and ecosystems;
* Measures of biodiversity rely on classification and are used to make comparisons across spatial and temporal scales
* Biodiversity strategies:
* World Heritage sites, for example, Shark Bay, Great Barrier Reef
* biodiversity hotspots, for example, south west WA
* international migration routes and areas used for breeding, for example, by birds, whales, turtles, whale sharks
* Features of all living things. (MRS GREN, cell theory)
* Cells have many features in common, which is a reflection of their common evolutionary past,
* Compare prokaryotic and eukaryotic cells.
* Compare plant, animal and fungi cells
* Eukaryotic cells carry out specific cellular functions in specialised structures and organelles, including:

cell (plasma) membrane, cell wall, cytoplasm, chloroplasts, mitochondria, endoplasmic reticulum (rough and smooth), nucleus, Golgi apparatus, lysosomes, ribosomes, vacuoles | NELSON BIOLOGY UNITS 1&2Chapter 1 Biodiversity BIOZONEChanges in EcosystemsActivity Number:275, 276,277, BIOZONEClassificationActivity Number: 177BIOZONEHabitat and NicheActivity Number: 178, 180 NELSON BIOLOGY UNITS 1&2Chapter 7 Cells BIOZONECell StructureActivity Number: 29, 30, 31,32, 33, 38, 39,BIOZONECell StructureActivity Number: 40, 41, 42, 43, 44, 45R | **ER: Scientific Method****(5%)** |
| **Week 5** | MicroscopesSIS: conduct investigations, including microscopy techniques and chemical analysisSHE : developments in microscopy and associated preparation techniques have contributed to more sophisticated models of cell structure and function | * History of microscopy
* Using a microscope (staining, viewing, measuring, etc.)
* Calculation of magnification and field of view of a microscope,
* Estimation of the size of cells.
 | NELSON BIOLOGY UNITS 1&2Chapter 7 Cells BIOZONECell Structure Activity Number: 34, 35, 36, 37, Skills in BiologyActivity Number: 13 |  |
| **Week 6/7** | ClassificationSIS:select, construct and use appropriate representations, including classification keys , to communicate conceptual understanding, solve problems and make predictionsSHE : classification systems are based on international conventions and are subject to change through debate and resolution; changes are based on all currently available evidence | * Importance of classification and development of system
* Biological classification is hierarchical and based on molecular sequences, different levels of similarity of physical features and methods of reproduction.
* Biological classification systems reflect evolutionary relatedness between groups of organisms
* The main classification groups used in biology – kingdom, phylum, class, order, family, genus, species.
* Main features of the five kingdoms
* Most common definitions of species rely on morphological or genetic similarity or the ability to interbreed to produce fertile offspring in natural conditions – but in all cases, exceptions are found
* Binomial nomenclature and the use of taxonomic keys to classify organisms.
 | NELSON BIOLOGY UNITS 1&2Chapter 2 Classifying Biodiversity BIOZONEClassificationActivity Number: 168, 169, 170, 171,172,173,174,BIOZONEClassificationActivity Number: 175, 176,  |  |
| **Week 8** | Ecosystems and interrelationships SHE: keystone species theory has informed many conservation strategies. However, there are differing views about the effectiveness of single-species conservation in maintaining complex ecosystem dynamics | * Components of an ecosystem
* Biotic and abiotic factors,
* Naming ecosystems
* Types of ecosystems
* relationships and interactions within a species and between species in ecosystems include predation, competition, symbiosis (mutualism, commensalism and parasitism), collaboration and disease
* role of keystone species
 | NELSON BIOLOGY UNITS 1&2Chapter 3 Biodiverse EcosystemsBIOZONEHabitat and NicheActivity Number: 179,BIOZONECommunitiesActivity Number:250, 251, 252, 254, 255, 256, BIOZONEChanges in EcosystemsActivity Number: 284 | **TEST: Biodiversity and Classification****(10%)** |
| **Week 9** | Ecosystem dynamicsEnergy and matter in Ecosystems SIS: select, construct and use appropriate representations, including, food webs and biomass pyramids, to communicate conceptual understanding, solve problems and make predictions | * Flow of energy in an ecosystem.
* Food chains, food webs and pyramids
* Cycling of matter, carbon and nitrogen
 | NELSON BIOLOGY UNITS 1&2Chapter 4 Energy and Matter in EcosystemsBIOZONECommunitiesActivity Number:237, 238, 239, 240,241, 242, 244, 245, 246, 247, 248, 249,  |  |
| **Week 10** | Dynamic PopulationsSIS: conduct investigations, including using ecosystem surveying techniques (quadrats, line transects and capture-recapture) safely, competently and methodically for the collection of valid and reliable data | * the dynamic nature of populations influence population size, density, composition and distribution
* Use of surveying techniques.
 | NELSON BIOLOGY UNITS 1&2Chapter 5 Population DynamicsBIOZONEPopulationsActivity Number: 259, 260,261, 262,263, 264, 265, 266, 267, 268, Habitat and NicheActivity Number: 186, 187, 188, 190, 191, 192 ,193, 195 ,196,197 | **ER: Ecosystems and cycles****(5%)** |
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| **Term 2,****Week 1** | Dynamic Populations | * Habitats and niches of species or populations
* Ecosystems carrying capacities
* Ecological succession
 | NELSON BIOLOGY UNITS 1&2Chapter 5 Population Dynamics BIOZONEHabitat and NicheActivity Number: 179, 181, 182, 185Population dynamicsActivity Number:280, 282, 268 | **SI: Second Hand Data Investigation****(5%)** |
| **Week 2/3** | Impact of Human Activity | * human activities that can affect biodiversity and can impact on the magnitude, duration and speed of ecosystem change include examples of
* habitat destruction, fragmentation or degradation
* the introduction of invasive species
* unsustainable use of natural resources
* the impact of pollutants, including biomagnification
* climate change
* fire is a dynamic factor in Australian ecosystems and has different effects on biodiversity
* Primary and secondary succession
 | BIOZONEChanges in EcosystemsActivity Number: 285, 286,287, 288, 289, 290, 291, 292, 293, 294, 295, 296 BIOZONEEnvironment and AdaptationsActivity Number: 234 |  |
| **Week 4** | Conservation StrategiesSHE: identification and classification of an ecological area as a conservation reserve also requires consideration of the commercial and recreational uses of the area, as well as Indigenous Peoples’ usage rightsSHE: Australia’s Biodiversity Conservation Strategy 2010–2030 presents a long-term view of the future and the actions that need to be implemented to conserve biodiversitySHE: contemporary technologies, including satellite sensing and remote monitoring enable improved monitoring of habitat and species population change over time. | * conservation strategies used to maintain biodiversity are
* genetic strategies, including gene/seed banks and captive breeding programs
* environmental strategies, including revegetation and control of introduced species
* management strategies, including protected areas and restricted commercial and recreational access
 | BIOZONEChanges in EcosystemsActivity Number: 278, 279 | **SI: Field Work****Excursion****(15%)****TEST: Ecosystems****(10%)** |
| **Week 5** |  | ***CATCH UP / REVISION / ASSESSMENT FREE WEEK*** |  |  |
| **Week 6/7** |  | ***EXAMS*** |  | **SEMESTER 1 EXAM** **(40%)** |
| **Week 8** | ReviewCells as the basis of lifeCells requirementsCell Membrane Structure and FunctionSHE 1: the cell membrane model has been continually reconceptualised and revised since the mid-nineteenth century and the currently accepted model, based on the evidence from improved technologies, is the fluid mosaic modelSIS: select, construct and use appropriate representations, including diagrams of structures and processes, and images from different imaging techniques, to communicate conceptual understanding, solve problems and make predictions | Review Exams* Review of cell components and microscopes
* Cell requirements for life.
* Define metabolism
* Structure of cell membrane and function
* Draw a diagram of cell membrane
 | Exam Review & ReflectionsNELSON BIOLOGY UNITS 1&2Chapter 8 Cells in their EnvironmentBIOZONECellular ProcessesActivity Number: 46, 47,  |  |
| **Week 10** | Transport across the Membrane | * movement of materials across membranes occurs via
* passive processes, including diffusion, facilitated diffusion, osmosis
* active processes, including active transport, endocytosis and exocytosis
* factors that affect exchange of materials across membranes include
* the surface area to volume ratio of the cell
* concentration gradients
* the physical and chemical nature of the materials being exchanged
 | BIOZONECellular ProcessesActivity Number: 48, 49, 51, 52, 53, 55 | **SI: Microscopes and Cells Assessment****(10%)** |

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| **Term 3, Week 1** | Biological MoleculesMembranesEnzymes | * biological molecules are synthesised from monomers to produce complex structures, including carbohydrates, proteins and lipids
* biochemical processes in the cell are controlled by factors, including the
	+ nature and arrangement of internal membranes,
	+ and the presence of specific enzymes
 | BIOZONECell StructureActivity Number: 21, 22, 23, 25, 26NELSON BIOLOGY UNITS 1&2Chapter 9 Inside Cells |  |
| **Week 2** | Enzymes | * enzymes have specific functions which can be affected by factors, including
* temperature
* pH
* presence of inhibitors
* concentrations of reactants and products
* two models that are used to explain enzyme action are the lock and key model and the induced fit model
 | BIOZONECell StructureActivity Number: 27 | **SI: Enzymes Assessment****(10%)** |
| **Week 3** | Photosynthesis | * photosynthesis is a biochemical process that uses light energy to synthesise organic compounds; light dependent and light independent reactions occur at different sites in the chloroplast; and make up separate parts of the overall process that can be represented as a balanced chemical equation
* the rate of photosynthesis can be affected by the availability of light and carbon dioxide, and temperature
 | BIOZONEPlant and Animal NutritionActivity Number: 68, 69, 70, 71, 72, 73,  | **SI: Second Hand Data Investigation****(10%)** |
| **Week 4** | Respiration* SHE 4: current research for the production of food, beverages and biofuels, and the breakdown of rubbish, involves the control of cellular respiration and photosynthesis

SHE: the use of probes technologies and computer analysis has further advanced the understandings of vital chemical processes in cells | * cellular respiration is a biochemical process that occurs in different locations in the cytosol and mitochondria, and metabolises organic compounds, aerobically or anaerobically, to release useable energy in the form of ATP; products of anaerobic respiration vary between organisms (plants, yeast, bacteria, animals); the overall process of aerobic respiration can be represented as a balanced chemical equation
* the rate of respiration can be affected by the availability of oxygen and glucose, and temperature
 |  |  |
| **Week 5** | Multicellular organismsOrganisationAnimal Respiratory Systems | * multicellular organisms have a hierarchical structural organisation of cells, tissues, organs and systems
* in animals, the exchange of gases between the internal and external environments of the organism is facilitated by the structure of the exchange surface(s), including spiracles, gills, alveoli and skin
 | NELSON BIOLOGY UNITS 1&2Chapter 10 Cells to Multicellular OrganismsBIOZONECellular ProcessesActivity Number: 62, 63, 64NELSON BIOLOGY UNITS 1&2Chapter 11 Animal Systems for Life BIOZONEGas ExchangeActivity Number: 97, 100, 101, 102, 103, 105, 107 | **Test** **Cell and Cell Metabolism** **(10%)** |
| **Week 6/7** | Animal DigestiveSystems | * in animals, the acquisition and processing of nutrients is facilitated by the structure of the digestive system; animals may have a gastrovascular cavity with one opening or a specialised alimentary canal with two openings; specialisation of alimentary canals is related to diet, for example, herbivores and carnivores
 | BIOZONEPlant and Animal NutritionActivity Number: 67, 79, 80, 81, 83, 85 |  |
| **Week 8** | Animal Circulatory Systems | * in animals, the transport of materials within the internal environment for exchange with cells is facilitated by the structure of open and closed circulatory systems according to the different metabolic requirements of organisms and differing environments
 | BIOZONEInternal TransportActivity Number:115, 117, 118, 119 |  |
| **Week 9/10** | Plant Systems | * in vascular plants, gases are exchanged via stomata and the plant surface
* transport of water and mineral nutrients from the roots occurs via xylem through root pressure, capillary action (adhesion and cohesion), transpiration;
* transport of the products of photosynthesis and some mineral nutrients occurs by translocation in the phloem
* Australian plants are adapted to minimise water loss in an arid environment
 | NELSON BIOLOGY UNITS 1&2Chapter 12 Plant Systems for LifeBIOZONEPlant and Animal NutritionActivity Number: 98, 99, BIOZONEInternal TransportActivity Number: 108, 109, 110, 111, 112, 113,114 | **ER: Body Systems****(10%)** |

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| **Term 4,** **Week 1** | Animal EthicsSIS: conduct investigations, including microscopy techniques, real or virtual dissections and chemical analysis, safely, competently, ethically and methodically for the collection of valid and reliable data | * SHE: ethical treatment of animals, including the three strategies of replacement, reduction and refinement, forms the basis of many international guidelines in animal research.
 |  | **Test****Animal and Plant Body System****(10%)** |
| **Week 2** |  | ***CATCH UP /REVISION / ASSESSMENT FREE WEEK*** |  |  |
| **Week 3/4** |  | ***EXAMS*** |  | **SEMESTER 2****EXAM (40%)** |