**Year 11 Biology Unit 1: Unity and Diversity**

## Student Text

Year 11 Biology (2010) Student Resource and Activity Manual (BIOZONE)

## Area of Study One: Cells in Action

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| Dot Point | Teaching Outline | Text Heineman Biology 1  (PowerPoint Presentations) | Biozone |
| Holiday work | **Introduction**   * What is Biology? Biodiversity? Some possible videos   + United Nations <http://vimeo.com/7592397>   + The Wild Classroom <http://www.youtube.com/watch?v=vGxJArebKoc>   + E.O Wilson <http://www.ted.com/talks/lang/eng/e_o_wilson_on_saving_life_on_earth.html>   + Jane Godall <http://www.ted.com/talks/jane_goodall_at_tedglobal_07.html>   + The root of plant intelligence   <http://www.ted.com/talks/lang/eng/stefano_mancuso_the_roots_of_plant_intelligence.html>   * Intro to VCE Biology   + Overview [Year 11 Biology Unit 1 overview 2010.doc](file:///\\columba\users\Teachers\luponed\ST%20COLUMBA'S%20CURRICULUM\SCIENCE\yr11BiologyDLU\Course%20Outline\Year%2011%20Biology%20Unit%201%20overview%202010.docx)   + Check Homework * Glossary for unit 1 Cells See page 35 begin writing glossary * Biological drawings   + pp39-40   + take out microscopes and draw some simple cells * Introduction to the microscope pp75   + 3 types of microscope     - Compound light microscope     - Dissecting microscope     - Electron microscope   + Give out handout “Using a Compound microscope”   + Newspaper and letter e lowercase     - Put on coverslip     - Mount using a drop of water * Reading Heineman Biology 1   + Chapter 1 Foundation of Biology pp 3-17 Q1-4 page 9; Q. 5-8 p13; Q9-11 p17   + Question 1-11 p18 | Reading Heineman Biology 1   * Chapter 1 Foundation of Biology pp 3-17 Q1-4 page 9; Q. 5-8 p13; Q9-11 p17 * Question 1-11 p18 | Drawing Cells 31-32 |

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| 1. Cell Structure: prokaryotic and eukaryotic cells at the light and electron microscope levels; cellular organisation | **Lesson 2**   * Intro- What do you remember about cells. Animal and Plant cells * PowerPoint (Cells) * Homework Read and answer questions. Biological drawings (Read page39-40). Answer questions   **Lesson 3-4**   * Complete Cell PowerPoint-Cell Structure * Draw generic diagrams of cells. Use wiki and PowerPoint for help. (homework) * Read and complete p.78-79 q 1-4a and p.p. 81 1and 82 all pages.   **Lesson 5-6**  Cell Prac – Practical Activity 1: Cells and the Microscope   * Complete part A * Part B:Investigating protictists– single celled eukaryotic organisms   + Draw and take photos using digital Microscope camera.   + Answer questions   **Lesson 6-7**  Cell Prac – Practical Activity 1: Cells and the Microscope   * Complete Part B * Part C Investigating Animal cells   + Draw and take photos using digital Microscope camera.   + Answer questions   **Lesson 8**  Cell Prac – Practical Activity 1: Cells and the Microscope   * Part D: Investigating Bacteria (Procaryotic Cells) | *PowerPoint (Cells)*  Reading Heineman Biology 1   * Chapter 2 The structure of cells pp 20-35; Q. 1-3 p21; Q4-8 p29; Q9-13 p34 * Question Q1-7 page 35 | Light Microscope 53, 59-60  Electron Microscope 61-63  Determining Cell Size 64  Unicellular (single celled)Eukaryotes (Protoctists or Protist) p66  Plant cells 67-68  Animal Cells 69-70 |
| 2. Cell Functioning: specialised parts of cells and their functions. | **Lesson 9**  Cell Specialisation   * Activity1 - which of the following are animal and which are plant? Why? Can you identify any of these cells or what their function is : * Pages 56; 87-89   Activity – Choose 1 plant and 2 animal cells and identify features that support function. Each student different cell and place on wiki. Need to do this as a graphic image.  **Lesson 10**  Classification Types of Living Things   * The 5 kingdoms  1. Prokaryotes    1. Bacteria (    2. Cell sizes (p72) 2. Protista- Use wiki to review protista and p83. 3. Fungi 4. Animal 5. Plantcells |  | Types of cells p 56  Cellular differentiation p.p. 87  Specialisation in cells p.p. 88-89  Types of living things p 55, 221  Bacteria 54,65  Already done references to protist animal and plant cells  Features of Taxonomic Groups p.p.213-220 |
| **SAC 1- Assessment of practical activity (Investigating Cells)** | | | |
|  | Concept – Surface area: volume ratio  Have a quick read of prac while setting up.  Do the set up (6 groups of 3 and 1 group of 4 can do in pairs)  Introduction – PPT – In theory “Why do small ice cubes melt quicker than large ones?”  Complete Prac- Do questions for homework include 2 references of your own | *PowerPoint (Surface Area/Volume (examples))*  *Prac- Diffusion and surface area to volume*  *See wiki Cell membrane link* | Limitations to cell Size p79-80 |
| 3. Composition of cells: major groups of organic and inorganic substances including carbohydrates, proteins, lipids, nucleic acids, water minerals, vitamins; their general role in cell structure and function.  2. General role of enzymes in biochemical activities of cells | Composition of cells   1. Download – Douchys podcast – the Chemistry between us. 2. Introduce Biological molecules    * Water    * Macromolecules      + **Proteins**  * PPT on Enzymes and digestive system   <http://www.youtube.com/watch?v=AFbPHlhI13g>  Liver Digestion and enzymes (catalase)Demo   * Macerate some liver place in test * Add hydrogen peroxide. Hold in gas. * User taper to test for gas * Repeat but heat test in boiling water to denature enzymes.   What are enzymes?  What is a catalyst?  What is a Biological catalysts  <http://www.youtube.com/watch?v=cbZsXjgPDLQ&feature=related>  Enzyme animation explaining how they work  <http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation__how_enzymes_work.html>  <http://www.youtube.com/watch?v=CZD5xsOKres&feature=related>  Factors that effect enzymes.   * Temp * pH * Salinity * Allostreric regulators   + Macromolecules (cont...)     - Carboydrates * Lipids   + - Nucleic acids   + Other molecules * Minerals * Vitamins   Homework - w/s biological\_molecules - student to identify structure, give examples and explain function of each of the above. (on wiki) | PPT - Biological Molecules Year 11  Douchy’s Biology podcast – Episode 11.2 – The Chemistry Between Us  Heinemann Biology 1 pp 13-17  **Enzymes**  Pages 37-40 text  PPTEnzymes | Biozone:   * Biological molecules p. 45 * Carbohydrates p. 46 * Lipids p 47 * Nucleic Acids p. 48 * Proteins p. 49,50 * Enzymes p 51 |

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| 2. Biochemical processes including photosynthesis and cellular respiration in terms of inputs and outputs. | **Biological Processes**  **Respiration ( 2 lesson)**   * Discussion of respiration   + What do you know about respiration? * Cellular respiration-PowerPoint   + Glycolysis   + Anaerobic respiration (feremnetation)     - Yeast Prac handout   + Aerobic respiration * Some wiki for up to date you tube clips   + Glycolysis   + Krebs Cycle   + Electron chain reaction * Concept Map Activity Draw a diagram (Inspiration) to summarise your understanding of process of Respiration (webspiration) * Worksheet – Cellular Respiration   Resources  Cellular Respiration The song <http://www.youtube.com/watch?v=3aZrkdzrd04> <http://videos.howstuffworks.com/discovery/29543-assignment-discovery-cellular-respiration-video.htm> An overview of Glycolysis, Kreb Cycle (citric acid cycle) and electron transport chain. **Anaerobic Respiration** Glycolysis  <http://www.youtube.com/watch?v=nKgUBsC4Oyo>  <http://www.youtube.com/watch?v=O5eMW4b29rg>  **Aerobic Respiration** 1. Kreb Cycle <http://www.youtube.com/watch?v=A1DjTM1qnPM> <http://www.youtube.com/watch?v=juM2ROSLWfw>  2. The Electron Transport Chain  <http://www.youtube.com/watch?v=xbJ0nbzt5Kw> | *PowerPoints (Respirations)*  Reading Heineman Biology 1  Chapter 3.2*; p 40-42* |  |
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| 4. Internal and external environments of cells; plasma membranes. | Lesson 1 and 2 Plasma Membranes structure   * Introduction to Cell Membrane - Cell and membrane discuss in relation to size of cell and amount * Structure of membrane s(Ppt slides) * Phospholipids   + Review Lipids p 47 of student workbook   + Discuss phopholipids   + Fluid mosaic model –proteins, cholesterol * Function of membranes (slide)   Set up Naked Egg Prac  Homework   * Student Manual 73-74 (role and Structure of membranes) | *PowerPoint Movementacrossmembranes\_mod*  Student Manual 88-90 (role and Structure of membranes) |  | Limi |
| 4. Membrane transport including diffusion, osmosis, active transport, surface area to volume ratio. | Lesson 3  1. Review cell structure   * 3 facts you understand about membrane structure * 3 facts you are struggling with and/or questions * Give out handout on model membranes   + glycolipids-lips with carbohydrate chain act as markers identifying that cell   + glycoproteins-proteins with hydrocarbon chains- the one on cell membranes involved in cell-cell interactions   2.Discuss Naked Egg Demo   * What happened to dye? * What happened to egg in water? * What happened to egg in corn syrup?   3. Notes on Membrane transport (ppt cont…)   * Movement of water and other solutes   + Define solute (dissolved substance in solution) and solvent (liquid which solute dissolves into0   + Important to understand difference between diffusion and osmosis * Diffusion   + PPt notes   + Page 92 of text * Osmosis –movement of water   + Ppt notes   + Discuss naked Egg   + Lets see this in cells ***Activity*** – Rhubarb   + Page 93-94 of text   Lesson 4   * Osmosis and cell membrane - Beetroot   Passive transport of substances   * Diffusion (done this already but recap * facilitated diffusion   + ppt notes   + page 91 (do after active transport)   Active transport of substances   * active transport * page 91 of student text * Extension Ion pumps page 97   Exocytosis and endocytosis   * ppt notes * page 98 of text   Lesson 3   * Sum up the different processes (worksheet) * Revision worksheets | ***Demo****: Naked Egg Demo (deshelled egg in distilled water, concentrated sugar solution e.g. corn starch and conc salt solution.)*  Student Manual 91-94, 98  *PowerPoint Movementacrossmembranes\_mod*  ***Practical Activity*** *- Movement of Materials across a Membrane*  *Students do part A themselves but set up Part b as a demo.* | Movement of Materials across a Membrane  Worksheet: Surface Area/Volume Ratio | 8, 9  (Term 1 ends after week 8) |
| SAC 2 – Investigation of Cell membranes **SAC 2- Investigation of Cell Membranes.**  **Give them SAC details to research. Complete SAC in one 75 minute lesson. Bring pens, pencils, rulers….(No notes). Identify what makes a good poster.** | | | | |

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| 5. Cell replication: purposes of cell replication (mitosis and cytokinesis); cell growth, cell size and cell division. | Mitosis and Cytokinesis  See wiki for work left in absence <http://vce-unit1and2biology.wikispaces.com/Cell+replication>  Cell replication (somatic cells)- PowerPoint   * Why do cells replicate * Growth -Development from conception to birth (maybe a video if available) * Maintenance and repair * Cell Division-Stages of cell replication   + Interphase     - G1, S and G2     - Chromosomes and DNA   + Mitosis     - Nuclear division     - Stages of Mitosis –Prophase, metaphase. Anaphase, Telophase     - Video or animations useful here     - <http://www.youtube.com/watch?v=VlN7K1-9QB0>     - <http://www.cellsalive.com/mitosis.htm>   + Cytokinesis     - Division of cytoplasm * Sum up what happens * <http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation__how_the_cell_cycle_works.html> * definitions   PowerPoint – cell replication 2 Mitosis in more detail  define   * Nucleic Acids * Chromosomes and genes * Haploid, diploid * Homologous pairs * replicates * Structure of DNA * Phosphate, Sugar , Bases * Bases- C G T A * RNA   DNA genetic material  RNA helps to read the DNA and create the proteins  Gene codes for an amino acid | | *PowerPoint (Cell Division)*  Videos   * Mitosis * From cell divion to birth   Heineman Biology 1  Chapter 5*; p 72-86 Q 1-14*  *All questions on p86*  *Cell replication*  *Animations*  [*http://www.youtube.com/watch?v=VlN7K1-9QB0*](http://www.youtube.com/watch?v=VlN7K1-9QB0)  [*http://highered.mcgraw-hill.com/sites/0072495855/student\_view0/chapter2/animation\_\_how\_the\_cell\_cycle\_works.html*](http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation__how_the_cell_cycle_works.html)  Slides of cells undergoing mitosis. | Cell Division – p. 84  Mitosis and the Cell cycle – p 85 |
|  | | **Topic Test on Area of Study One** | | |

## Area of Study Two: Functioning Organisms

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| Dot Point | Student Manual  (PowerPoint Presentations) | Suggested Practical Activities | Week |
| 1. Obtaining nutrients: organic and inorganic requirements; autotrophs; heterotrophs.  Obtaining energy: inputs and outputs of photosynthesis. Structural features of photosynthetic organisms.  Processing nutrients: features and examples of different systems in animals | Student manual 112-114, 117-118, 120-124, 127-135.  *PowerPoint (Nutrition 2007)*  *PowerPoint (Mammal Skulls)* | Skulls Prac  Termite Prac  Article on digestion in ring-tailed possums  **SAC 3-Termites, Skulls and Guts.** | 11, 12, 13 |
| 1. Distributing materials: Features and examples of transport systems in multicellular organisms | Student manual 159-163, 156, 164-173, 147 | Observation of xylem and phloem in celery  Heart Dissection  Observation of blood smear  Demonstration of blood flow in fish tail | 14, 15 |
| 1. Removing wastes: nature of waste products and toxic substances and excretory systems in plants and animals | Student Manual 155, 176, 179-180, 177-178. | Kidney Dissection |
| 1. Exchanging Gases: features of gaseous exchange surfaces and mechanisms of gas exchange in animals and plants | Student Manual 139-146, 152. | Lung Dissection  Inflating a lung  Demonstration of lung tissue floating  Making a model lung |
| 2. Reproduction: asexual and sexual reproduction. Examples of reproduction in unicelleular and multicellular organisms | Student manual 185-193  *PowerPoint (Reproduction)*  *PowerPoint (Flower Structure)* | Dissection of flower  Dissection of fruits  Germination of pollen grains  Germination and caring for a seedling | 16 |
| 3. Classification: purposes, principles, hierarchy of biological classification.  Features of major taxonomic groups | Student Manual 223-237  *PowerPoint (Classification of Organisms)* | Insect/Plant Collection. Could be another SAC. |
| **SEMESTER EXAMINATION** | | | **17,18** |

**Assessment For Satisfactory Completion of Unit One**

Outcome 1

**SAC 1- Assessment of practical activity (Investigating Cells).**

**SAC 2 - Investigation of Cell Membranes.**

**SAC 3 - Topic Test on Area of Study One**

Outcome 2

**SAC 4 - Termites, Skulls and Guts.**

Outcomes 1 & 2

**SAC 5 - Semester Examination**

*Students are also expected to complete all set Biozone Worksheets relating to Outcomes One and Two. These will be used as an indication of satisfactory completion if SAC results are below standard.*