

Sample Course Outline 2007-2008

BIOLOGY 12

Content	Planning for Assessment (Teaching Strategies)	Achievement Indicators (Assessment activities)	BC Curriculum Learning Outcomes
Processes of Science Week 1 and ongoing	<ul style="list-style-type: none"> • Review of laboratory practices and standards. • Lecture notes • Scientific Method 'thought' experiments • 'Imaginary lab' write ups • Provide students with a lab marking rubric • Quiz and Test • Note that these elements will be part of all laboratory experiments throughout the BIO 12 course and will be assessed on an ongoing basis 	<ul style="list-style-type: none"> • Demonstrate correct use of <ul style="list-style-type: none"> ○ Dissection microscope ○ Compound microscope • Demonstrate safe and correct dissection technique • Formulate a testable hypothesis • Formulate and conduct repeatable, controlled procedure to test hypothesis • Observe, measure, record data • Interpret results to form conclusion • Conclusion support hypothesis or not? • Determine experimental reliability • Extend to further experiments/analyses • Infer/generalize from various data sources (diagrams, micrographs, graphs) • Present conclusions with most appropriate means of communication (graph, diagram, etc.) 	A1: demonstrate safe and correct technique for a variety of laboratory procedures A2: design an experiment using the scientific method A3: Interpret data from a variety of text and visual sources
Cell Biology: Structure Weeks 2 - 3	<ul style="list-style-type: none"> • Lecture notes on cell structure • PPT presentation • Lab on cell components, use of compound microscope • Video: "The Cell" • Worksheet on video • 3D cell model class project for Open House • Quiz • Exam Question Worksheet • Test 	<ul style="list-style-type: none"> • Describe structure and function of: <ul style="list-style-type: none"> ○ Cell membrane, wall, chloroplast, cytoskeleton, cytoplasm, Golgi bodies, liposome's, mitochondria, nucleus, ribosome's, polysomes, smooth and rough ER, vacuoles, vesicles • State balanced chemical reaction for cellular respiration • Describe organelle function <ul style="list-style-type: none"> ○ Smooth/rough ER ○ Vesicles ○ Golgi bodies ○ Cell membrane • Identify cell structures in diagrams and electron micrographs 	B1: Analyse the functional inter-relationships of cell structures
Cell Biology: Compounds and Biological Molecules Week 4 - 5	<ul style="list-style-type: none"> • Lecture notes on biochem • Lab on acid/base, pH, and buffers • Lab Quiz • Quiz on molecular structures (student must be able to draw from memory the basic structure of glucose, polysaccharides, amino acid, polypeptides, fatty acids, neutral fat, lipid, ATP) • Optional class project (if time permits): Build 	<ul style="list-style-type: none"> • Describe role of water as <ul style="list-style-type: none"> ○ Solvent ○ Temperature regulator ○ Lubricant • Describe Hydrogen bonding • Differentiate acids, bases, buffers • Describe importance of pH in biological systems and human body • Dehydration synthesis, hydrolysis 	B2: Describe characteristics of water and its role in biological systems B3: describe the role of acids, bases, and buffers in biological systems and the human body B4: analyse the structure and function of biological molecules in living systems, including <ul style="list-style-type: none"> • Carbohydrates

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	<p>partial DNA molecule using biochem molecular kit and structures for nucleotides.</p> <ul style="list-style-type: none"> Exam Question Worksheet Test 	<ul style="list-style-type: none"> Differentiate among <ul style="list-style-type: none"> Carbohydrates Lipids Proteins Nucleic acids Recognize: ATP, DNA, RNA, ribose, glucose, disaccharide, polysaccharide, glycerol, haemoglobin, neutral fat, phospholipids, fatty acids (sat, unsat), steroids Recognize monosaccharide empirical formula Differentiate structure and function for glucose, maltose, starch, glycogen, cellulose Describe location, structure, and function of: <ul style="list-style-type: none"> Neutral fats, steroids, Phospholipids Saturated/unsaturated fatty acids Protein structure and function (primary – quaternary) Nucleic Acid structure and function (nitrogenous bases, nucleotides) DNA vs. RNA ATP 	<ul style="list-style-type: none"> Lipids Proteins Nucleic acids
<p>Cell Biology: DNA Replication</p> <p>Week 6</p>	<ul style="list-style-type: none"> Lecture notes PPT presentation Video “DNA: The Molecule of Life” Worksheet on video Exam Question Worksheet Test 	<ul style="list-style-type: none"> DNA purpose and process of replication (semi-conservative) <ul style="list-style-type: none"> Unzip, complementary base-pairing, joining of adjacent nucleotides Recombinant DNA and its use in gene therapy and genetic modification, production of specific biological molecules (insulin), or to develop tests (attaching genetic markers). 	<p>B5: Describe DNA replication</p> <p>B6: describe recombinant DNA.</p>
<p>Cell Biology: Protein Synthesis</p> <p>Week 7</p>	<ul style="list-style-type: none"> Lecture notes Class skit on protein synthesis (students act out roles of various cell and nucleus components and must act in proper sequence to build a specific amino acid sequence). Assign roles to students to represent various tRNA, rRNA, mRNA, DNA, various amino acids Exam Question Worksheet Test 	<ul style="list-style-type: none"> Transcription, translation (initiation, elongation, termination) and the roles of tRNA, rRNA, mRNA, ribosome’s Develop amino acid sequences from mRNA or DNA sequences. Identify the complementary nature of mRNA codon and tRNA anticodon Environmental mutagens (chemicals, UV) Explain how change in DNA relates to a sequence changes. 	<p>B7: demonstrate an understanding of the process of protein synthesis</p> <p>Explain how mutations in DNA affect protein synthesis</p>

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<p>Cell Biology: Trans Membrane Transport</p> <p>Week 8 - 9</p>	<ul style="list-style-type: none"> • Lecture notes • Tonicity Demo (potato slices in salt/distilled water) • Lab on Tonicity (semi-permeable membrane) <ul style="list-style-type: none"> ○ Devise expt to investigate tonicity of cells • Surface area to volume discussion (mouse and elephant – temp management) • Lab quiz • Exam Question Worksheet • Test 	<ul style="list-style-type: none"> • Fluid mosaic model • Hydrophobic vs hydrophilic • Cell membrane is selectively permeable – compare/contrast with dialysis tubing which is semi permeable • Passive transport (diffusion, osmosis, facilitated), hyper/hypo/iso tonicity • Active transport, endocytosis (phago/pino), exocytosis • Concentration gradient, carrier proteins, energy, size of molecules • Differentiate and discuss significance of high-low area/volume when comparing cells 	<p>B9: analyse the structure and function of the cell membrane</p> <p>B10: explain why cells divide when they reach a particular surface area-to-volume ratio</p>
<p>Cell Biology: Enzymes</p> <p>Week 10 - 11</p>	<ul style="list-style-type: none"> • Lecture notes • Lab on enzyme activity (salivary amylase) – students design lab to investigate various factors that impact amylase action on starch (temp, enzyme and substrate concentration, pH, presence of heavy metal) • Lab quiz • Exam Question Worksheet • Test 	<ul style="list-style-type: none"> • Explain: metabolism, enzyme, substrate, coenzyme, activation energy • Role of enzyme in lowering activation energy (graphical) • Models of enzymatic action • Enzyme vs. coenzyme • Impact of protein denaturation on enzyme activity (e.g. changes in PH in g.i tract will assist in enzyme deactivation) • Enzyme activity affected by temp, [substrate], [enzyme], inhibitors (competitive vs. non-competitive) • Thyroid => thyroxin => function and impact on metabolism 	<p>B11: analyse the roles of enzymes in biochemical reactions</p>
<p>Human Biology:</p>	<p>ETC.</p>		