

**Biology 12 Course Preview – 2015/16**

#	Date	Chapter	P.L.O.	Topics:	Activities and Assessments (summative assessments are highlighted)
1.				Overview Introductions Safety	Demonstration of safety equipment
2.		Chapter 1		Review of Bio 11	Online activity on Delicious (Computers required)
3.		Chapter 11		Homeostasis & Sci Method	BBC Bitesize Homeostasis and online links
4.		Chapter 2	B4. describe how the polarity of the water molecule results in hydrogen bonding B4. describe the role of water as a solvent, temperature regulator, and lubricant.	Water	Water Lab or demo Water Concept Map
5.		Chapter 2	B4. distinguish among acids, bases, and buffers, and indicate the importance of pH to biological systems	Acids, Bases and Buffers	Acid/Base online Lab (Computers required)
6.		Chapter 2		Polymers	Polymer Concept Map Video: Biochem for Biology Students (Prep room)
7.		<b>Chapter 2</b>	<b>B4. demonstrate a knowledge of synthesis and hydrolysis as applied to organic polymers</b> <b>B4. distinguish among carbohydrates, lipids, proteins, and nucleic acids with respect to chemical structure</b> <b>B4. list the major functions of proteins</b>	<b>Polymers</b> <b>Protein</b>	<b>Video: Proteins: The Stuff of Life</b> <b>Quiz on Water/Acid/Base</b> <b>Protein Models</b>
8.		Chapter 2	B4. draw a generalized amino acid and identify the amine, acid (carboxyl), and R-groups B4. differentiate among the primary, secondary, tertiary, and quaternary structure of proteins B4. Identify peptide bonds in dipeptides and polypeptides	Protein	Protein Model (structure levels) Lab Protein Concept Map
9.		Chapter 2	B4. recognize the empirical formula of a carbohydrate B4. differentiate among monosaccharides, disaccharides, and polysaccharides B4. differentiate among starch, cellulose, and glycogen B4. list the main functions of carbohydrates	Carbohydrates	Carbohydrate Models
10.		<b>Chapter 2</b>	<b>B4. compare and contrast saturated and unsaturated fats in terms of molecular structure</b> <b>B4. describe the location</b>	<b>Lipids</b>	<b>Protein Quiz</b> <b>Hand Out Flash Card practice</b>

			<b>and explain the importance of the following in the human body: neutral fats, steroids, phospholipids</b>		
11.		Chapter 2	B4. name the four bases in DNA and describe the structure of DNA B4. compare and contrast the general structural composition of DNA and RNA B4. List the major functions of nucleic acids	Nucleic Acids	Review Worksheets Concept Maps on DNA Oheads of biological molecule structures
12.		Chapter 2	B4.Name the four nitrogenous bases in ribonucleic acid and describe the structure of RNA B4.Relate the general structure of the ATP molecule to its role as the “energy currency” of cells	Nucleic Acids/ATP	Lab: Extracting DNA from Onion Cells (optional?)
13.		Chapter 2	B4. Recognize molecules in structural diagrams	Review	Video: Biochemistry for Biology students (2 <sup>nd</sup> time)
14.		<b>Chapter 2</b>		<b>Biochemistry Test</b>	
15.		Chapter 3	B1. describe cell structures and their functions B1. identify the cell structures in diagrams and electron micrographs B1. describe how the following organelles function to compartmentalize the cell and move materials: ER, Vesicles, Golgi, Cell membrane B10. demonstrate an understanding of the relationship and significance of surface area to volume, with reference to cell size B10. Differentiate between cells that have a high or low surface area to volume ratio	Cell Organelles (notes on students time) Different Types of Cells Endosymbiont Theory	Ted-Ed Videos: History of cell theory, How did complex cells evolve, Operating system of Life, Cell vs. Virus, Cancer Cells CellCraft Game online Cell organelle game at BIOMAN online
16.		Chapter 3		Surface Area	Lab: Surface Area Lab
17.		Chapter 3			Haiku project Video: How Cells Work DVD (Prep Room)
18.		<b>Chapter 3</b>		<b>Cell Quiz</b>	<b>Cell Quiz</b>
19.		Chapter 4	B9. apply knowledge of organic molecules to explain the structure and function of the fluid mosaic membrane model B9. identify the hydrophobic and hydrophilic regions of the phospholipid bilayer B9. explain why the cell membrane is described as selectively permeable	Cell Membrane	BBC Bitesize video on Diffusion
20.		Chapter 4	B9. explain factors that affect the rate of diffusion across a cell membrane	Diffusion	Cell Membrane Games at BIOMAN online (includes diffusion and osmosis) Lab: Egg Lab (Sci. Method)

21.	Chapter 4	B9. describe endocytosis, including phagocytosis and pinocytosis, and contrast it with exocytosis B9. predict the effects of hypertonic, isotonic, and hypotonic environments on animal cells B9. Compare transport processes in terms of: Conc. Grad, use of proteins, energy use, type/size of molecule transported	Osmosis/Active Transport	
22.	Chapter 4	B9. Devise an experiment using the sci.method to investigate tonicity B9. compare and contrast active transport, diffusion, osmosis, facilitated transport	Scientific Method/Tonicity	
23.	Chapter 4/3		Review	HigherEd McGraw Hill Cell animations on Web
24.	<b>Chapter 4/3</b>		<b>Cell Membrane Test</b>	
25.	Chapter 24	B5. describe DNA replication with reference to three basic steps B5. Describe the purpose of DNA replication B5. Identify the site of DNA replication within the cell	DNA Replication	<a href="http://nobelprize.org/educational_games/medicine/dna_double_helix/">http://nobelprize.org/educational_games/medicine/dna_double_helix/</a>
26.	Chapter 24	B6. define recombinant DNA	Recombinant DNA	Learn Genetics WEBSITE (Utah) <a href="http://learn.genetics.utah.edu/">http://learn.genetics.utah.edu/</a>
27.	Chapter 24	B6. describe three uses for recombinant DNA	Recombinant DNA	Lab: WEBSITE Lab on rDNA <a href="http://learn.genetics.utah.edu/">http://learn.genetics.utah.edu/</a>
28.	Chapter 24	B7. demonstrate a knowledge of the basic steps of protein synthesis, identifying the roles of DNA, mRNA, tRNA, and ribosomes in the processes of transcription and translation	Protein Synthesis	Use Human Genome Video: Our Molecular Selves DNA to Phenotype Worksheet with Types of RNA Worksheets on DNA to mRNA to tRNA <a href="http://nobelprize.org/educational_games/medicine/dna/intro.html">http://nobelprize.org/educational_games/medicine/dna/intro.html</a> Video: Our Molecular Selves (on computer – Human Genome Project)
29.	Chapter 24	B7. determine the sequence of amino acids coded for by a specific DNA sequence, given a table of mRNA codons	Protein Synthesis	Ohead of Transcription/Translation (as on Quiz) Worksheets: Transcription/Translation Colouring and DNA to Phenotype Video: How Cells Work DVD (Advanced Supplement) Extra: <a href="http://207.207.4.198/pub/flash/26/transmenu_s.swf">http://207.207.4.198/pub/flash/26/transmenu_s.swf</a>
30.	Chapter 24	B7 identify the complementary nature of the mRNA codon and the tRNA anti-codon	Protein Synthesis	Lab: Protein Synthesis of CHNOPS
31.	Chapter 26	B8. give examples of two environmental mutagens that can cause mutations in humans B8. use examples to explain how mutations in DNA affect protein synthesis and may lead	Mutations	QUIZ on Protein Synthesis Notes Video: Mutation and all that (from Bio 11)

			to genetic disorders		
32.		Chapter 26		Mutations & Ethics	Use Human Genome Video: ELSI
33.		Chapter 24		Review	Review Worksheets
34.		<b>Chapter 24</b>		<b>DNA Test</b>	
35.		Chapter 6	B11. demonstrate an understanding of the following terms: metabolism, enzyme, substrate, coenzyme, activation energy B11. use graphs to identify the role of enzymes in lowering the activation energy of a biochemical reaction B11. Identify the role of vitamins in biochemical reactions B11. differentiate between the roles of enzymes and co-enzymes in biochemical reactions B11. explain models of enzymatic action (induced fit)	Enzymes	Princeton Enzyme Sheet and Intro Concept Map
36.		Chapter 6	B11. apply knowledge of proteins to explain the effects on enzyme activity of pH, temperature, substrate concentration, enzyme concentration, competitive inhibitors, and heavy metals	Factors affecting Enzymes	Enzyme Worksheet, Enzyme Activity Concept Map and Inhibition Concept Map Virtual Lab on Enzymes <a href="http://www.mhhe.com/biosci/genbio/virtual_labs/BL_11/BL_11.html">http://www.mhhe.com/biosci/genbio/virtual_labs/BL_11/BL_11.html</a>
37.		Chapter 6	B11. devise an experiment using the scientific method (to investigate enzyme activity)	Enzyme Inhibition Scientific Method	Enzyme Quiz Lab: Modeling Enzyme Inhibition
38.		Chapter 6	B1. State the balanced chemical equation for cellular respiration B11. identify the source gland for thyroxin and relate the function of thyroxin to metabolism	cellular respiration	Worksheets
39.		Chapter 6		Review	Online animations of Cellular Respiration and Enzymes <a href="http://www.qcc.cuny.edu/BiologicalSciences/Faculty/DMeyer/respiration.html">http://www.qcc.cuny.edu/BiologicalSciences/Faculty/DMeyer/respiration.html</a> <a href="http://highered.mcgraw-hill.com/sites/0072421975/student_view0/chapter6/animations_english.html">http://highered.mcgraw-hill.com/sites/0072421975/student_view0/chapter6/animations_english.html</a>
40.		<b>Chapter 6</b>		<b>Enzyme Test</b>	
41.		Chapter 11		Human Organization	Activity: Trace and fill body diagram Worksheets
42.		Chapter 14	C1. identify and give a function of all organs in system C1. describe swallowing and peristalsis	Digestive System Introduction	Worksheets: Hamburger Journey + Princeton Sheets Notes 1

43.	Chapter 14	<p>C1. explain the role of bile in the emulsification of fats</p> <p>C1. list six major functions of the liver</p> <p>C1. examine the small intestine and describe how it is specialized for digestion and absorption</p> <p>C1. describe the functions of E. coli in the colon</p> <p>C1.demonstrate dissection microscope use to examine various structures of system</p> <p>C1. Describe the structure of the villus and the capillaries and lacteals within it.</p>	Stomach, Intestine, Accessory Organs	<p>Enzyme Chart</p> <p>Bile and Gas Cartoons</p> <p>Notes 2</p> <p>Lab: Micro-viewer Digestive System</p>
44.	Chapter 14	<p>C2. relate the following digestive enzymes to their glandular sources and describe the digestive reactions</p> <p>C2.describe the role of water in digestive juices</p> <p>C2. describe the role of sodium bicarbonate in pancreatic juices</p> <p>C2. describe the role of HCl in gastric juice</p> <p>C2. describe the role of mucus in gastric juice</p> <p>C2. describe the importance of the pH level in regions of the system.</p> <p>C1. identify the source gland for and describe the function of insulin</p>	Digestive Enzymes	<p>Notes 3</p> <p>Concept maps on Hormones and Enzymes</p> <p>Digestive Worksheet 1</p> <p>Digestion Quiz #1</p>
45.	Chapter 14		Control of Digestion	Lab: Digestion Lab (Day 1)
46.	Chapter 14		Digestive System Diseases/Nutrition/Review	<p>Lab: Digestion Lab (Day 2)</p> <p>Digestion Pictionary</p> <p>Online video of digestive juices: <a href="http://highered.mcgraw-hill.com/sites/0072421975/student_view0/chapter14/animations_english_.html">http://highered.mcgraw-hill.com/sites/0072421975/student_view0/chapter14/animations_english_.html</a></p>
47.	<b>Chapter 14</b>		<b>Digestive System Test</b>	
48.	Chapter 12	<p>C5. describe and differentiate among the five types of blood vessels</p> <p>C5. identify and give functions</p> <p>C5. distinguish between pulmonary and systemic circulation</p>	Blood Vessels	<p>Worksheet Handouts</p> <p>Concept Map</p>
49.	Chapter 12	<p>C5. identify and describe differences in structure and circulation between fetal and adult systems</p> <p>C5. demonstrate a knowledge of the path of a blood cell from the aorta through the body and back to the left</p>	Circulation	<p>Lab: Micro-viewer Circulation (Lab: Circulation in a Goldfish Tail)?</p>

			ventricle C5. relate blood pressure and blood velocity to the total cross-sectional area of the five types of blood vessels A1. demonstrate the correct use of the compound microscope		
50.		Chapter 12 and Chapter 13	C7. identify and give functions of lymph capillaries, veins, and nodes C7. Describe the functions of the lymphatic system C5. describe capillary-tissue fluid exchange	Circulation	Warm-up Quiz on Circulation Video: Under Pressure (Living Body Series—DML)
51.		Chapter 12	C3. identify and give functions C4. describe the location and functions of the SA node, AV node, and Purkinje fibres	Heart	Webquest on Delicious
52.		Chapter 12	A1. demonstrate safe and correct dissection techniques	Heart	Lab: Heart Dissection
53.		Chapter 12	C4. describe the autonomic regulation of the heartbeat by the nervous system C4. demonstrate the measurement of blood pressure C4. distinguish between systolic and diastolic pressures	Heart Rate and Sounds Blood Pressure	Lab: Heart Sounds Lab and Blood Pressure Lab
54.		Chapter 12/13	C6. list the major components of plasma C6. explain the roles of antigens and antibodies	Blood Type	Lab: Electrocardiogram and Blood-Typing at <a href="http://www.nobleprize.org">www.nobleprize.org</a>
55.		Chapter 12	C6. describe the shape, function, and origin of red blood cells, white blood cells, and platelets	Blood	Lab: Blood Smear Lab and Poster
56.		Chapter 12		Blood	Blood Worksheets
57.		Chapter 12/13	C4. relate factors that affect and regulate blood pressure to hypertension and hypotension	Circulatory System Diseases/Review	Blood Quiz
58.		<b>Chapter 12/13</b>		<b>Circulatory System Test</b>	
59.		Chapter 15	C8. identify and give functions for each of the following: C8. explain the roles of cilia and mucus in the respiratory tract C8. explain the relationship between the structure and function of alveoli C9. compare and contrast the mechanics of the processes of inhalation and exhalation C9. describe the interaction of the lungs, pleural membranes, ribs, and diaphragm in the breathing process	Respiratory System Intro Lung Capacity	Lab: Lung Capacity

60.	Chapter 15	<p>C9. explain the roles of carbon dioxide and hydrogen ions in stimulating the breathing centre in the medulla oblongata</p> <p>C9. explain the roles of oxygen, carbon dioxide and hydrogen ions in stimulating carotid and aortic bodies.</p> <p>C10. describe the exchange of carbon dioxide and oxygen during internal and external respiration</p> <p>C10. distinguish between the transport of CO<sub>2</sub> and O<sub>2</sub> in the blood by explaining the roles of oxyhemoglobin, carbaminohemoglobin, reduced hemoglobin, and bicarbonate ions</p> <p>C10. write the chemical equations for internal and external respiration</p>	Mechanics of Breathing and Gas Transport	<p>Video: The Respiratory System (if time)</p> <p>COLOUR picture of Oxygen exchange OR sing for the class next day.</p>
61.	Chapter 17	<p>C11. identify and give functions for each of the following: dendrite, cell body, axon, axoplasm and axomembrane.</p> <p>C11. distinguish among sensory, motor, and interneurons with respect to structure and function</p> <p>C11. explain the transmission of a nerve impulse through a neuron, using the following terms:</p>	Introduction to Neurons Parts of the Nervous system	<p>Songs?</p> <p>Worksheet on Action Potential</p>
62.	Chapter 17	C11. relate the structure of a myelinated nerve fibre to the speed of impulse conduction	Saltatory Conduction/Synapse features	Lab: Skin Sensitivity
63.	Chapter 17	<p>C. identify the major components of a synapse</p> <p>C11. explain the process by which impulses travel across a synapse</p>	Synapse/ Neurotransmitters/ Effects of Drugs (Include notes on drugs and nervous system)	<p>Synapse Worksheet</p> <p>Mouse Party (<a href="http://learn.genetics.utah.edu/content/addiction/drugs/mouse.html">http://learn.genetics.utah.edu/content/addiction/drugs/mouse.html</a>)</p> <p>Drugs of abuse (<a href="http://learn.genetics.utah.edu/content/addiction/drugs/abuse.html">http://learn.genetics.utah.edu/content/addiction/drugs/abuse.html</a>)</p>
64.		<p>C11. demonstrate knowledge of how neurotransmitters are broken down in the synaptic cleft</p> <p>C11. relate the structure of a reflex arc to how it functions</p>	Reflex Arc	<p>Lab: Reflexes</p> <p>Reflex Arc cut and paste</p>
65.		<p>C12. contrast the locations and functions of the central and peripheral nervous systems</p> <p>C12. differentiate between the</p>	Divisions of the Nervous System	<p>Brain Handout</p> <p>Concept Map</p> <p>Nervous System and Brain Videos (in this order):</p> <p>Sym vs. Parasymp:</p>

		functions of the autonomic and somatic nervous systems C12. describe the inter-related functions of the sympathetic and parasympathetic divisions of the autonomic system with reference to: effect on body functions, neurotransmitters involved, fight or flight vs. relaxed.		<a href="http://www.garyfisk.com/anim/autonomicns.swf">http://www.garyfisk.com/anim/autonomicns.swf</a> (Gary's animations are downloadable with shockwave) Cell Communication: <a href="http://learn.genetics.utah.edu/content/begin/cells/cellcom/">http://learn.genetics.utah.edu/content/begin/cells/cellcom/</a> (this large Quicktime movie is downloadable from their site there is also a 'play by play' of each scene) How Neurons talk to each other: <a href="http://learn.genetics.utah.edu/content/addiction/reward/neurontalk.html">http://learn.genetics.utah.edu/content/addiction/reward/neurontalk.html</a> Dancer – Left brain vs. right brain <a href="http://www.youtube.com/watch?v=9CEr2GfGilw">http://www.youtube.com/watch?v=9CEr2GfGilw</a> Basketball video: <a href="http://viscog.beckman.illinois.edu/flashmovie/15.php">http://viscog.beckman.illinois.edu/flashmovie/15.php</a> Bill Nye outtake: <a href="http://www.youtube.com/watch?v=zPX6LepP1y4">http://www.youtube.com/watch?v=zPX6LepP1y4</a> Illusions: <a href="http://www.youtube.com/watch?v=GZpiUv808g&amp;feature=PlayList&amp;p=BEEE7804A252A24A&amp;index=27">http://www.youtube.com/watch?v=GZpiUv808g&amp;feature=PlayList&amp;p=BEEE7804A252A24A&amp;index=27</a> PBS Illusions: <a href="http://www.pbs.org/wnet/brain/illusions/index.html">http://www.pbs.org/wnet/brain/illusions/index.html</a> Jill Bolte's TED talk on a stroke: <a href="http://www.ted.com/index.php/talks/jill_bolte_taylor_s_powerful_stroke_of_insight.html">http://www.ted.com/index.php/talks/jill_bolte_taylor_s_powerful_stroke_of_insight.html</a>
66.	Chapter 17	C12. identify and give functions for each of the following parts of the brain	Brain	Lab: Sheep Brain Dissection
67.	Chapter 17/20	C12. identify the source gland for adrenalin and explain its role in the "fight or flight" response C12. explain how the hypothalamus and pituitary gland interact as the neuroendocrine control centre	Endocrine Hormones	Lab: Most intelligent mammals Part F of lab: <a href="http://faculty.washington.edu/chudler/neurok.html">http://faculty.washington.edu/chudler/neurok.html</a>
68.	Chapter 17		Review	Hormonal communication: <a href="http://highered.mcgraw-hill.com/sites/0072421975/student_view0/chapter20/animations_english_.html#">http://highered.mcgraw-hill.com/sites/0072421975/student_view0/chapter20/animations_english_.html#</a> Gary Fisk's Website: <a href="http://www.garyfisk.com/anim/index.html">http://www.garyfisk.com/anim/index.html</a> Review with old tests
69.	<b>Chapter 15/17/20</b>		<b>Nervous and Respiratory System Test</b>	
70.			Fetal Pig Lab	
71.	Chapter 16	C13. identify and give functions for each of the following: C13. describe how the kidneys maintain blood pH	Urinary System	Worksheets **Must colour Princeton diagram
72.	Chapter 16	C13. identify and give functions for each of the following parts of the nephron C13. contrast the blood in the renal artery and the renal vein	Nephron	Video: Urinary Tract BiologyMad Weblink: <a href="http://www.biologymad.com/resources/kidney.swf">http://www.biologymad.com/resources/kidney.swf</a>



			with respect to urea and glucose content C13. Describe the production of urine with reference to pressure filtration, selective reabsorption, reabsorption of water, tubular excretion, metabolic waste.		
73.		Chapter 16	C13. identify the source glands for ADH and aldosterone and explain how these hormones are regulated C13. describe how the hypothalamus, posterior pituitary, ADH, and nephron achieve homeostasis of water levels in the blood C13. describe how the adrenal cortex, aldosterone, and the nephron achieve homeostasis of water and sodium levels in the blood	Urinary System	Worksheets
74.		Chapter 21	C15. identify and give a function for each of the following:	Female Reproductive System	Cartoon Review of Kidneys Endocrine Wrap-up: Overhead of ADH, <a href="http://www.abpischools.org.uk/page/modules/hormones/horm8.cfm?coSiteNavigation_allTopic=1">http://www.abpischools.org.uk/page/modules/hormones/horm8.cfm?coSiteNavigation_allTopic=1</a> Nephron Quiz
75.		Chapter 21	C15. describe the functions of estrogen C15. describe the sequence of events in the ovarian and uterine cycles C15. demonstrate knowledge of the control of the ovarian and uterine cycles by hormones C15. demonstrate knowledge of a positive feedback mechanism involving oxytocin	Menstrual Cycle	Lab: Menstruation Websites: <a href="http://www.sumanasinc.com/webcontent/animations/content/ovarianuterine.html">http://www.sumanasinc.com/webcontent/animations/content/ovarianuterine.html</a> <a href="http://www.abpischools.org.uk/page/modules/hormones/index.cfm">http://www.abpischools.org.uk/page/modules/hormones/index.cfm</a>
76.		Chapter 21	C14. identify and give functions for each of the following: C14. demonstrate a knowledge of the path of sperm from the seminiferous tubules to the urethral opening C14. list the functions of seminal fluid C14. identify the tail, midpiece, head, and acrosome of a mature sperm and state their functions C14. describe the functions of testosterone C14. demonstrate a knowledge of the control of	Male Reproductive System	Worksheets

			testosterone levels by the endocrine system		
77.		Chapter 21	C15. describe the hormonal changes that occur as a result of implantation	Pregnancy/Birth	Review worksheets
78.		Chapter 21		Review	Test Outline Online Video: Life's Greatest Miracle (8 parts) <a href="http://www.pbs.org/wgbh/nova/miracle/program_adv.html">http://www.pbs.org/wgbh/nova/miracle/program_adv.html</a>
79.		<b>Chapter 21/16</b>		<b>Urinary/Reproductive System Test</b>	
80.					Review
81.					Final Exit Interviews
82.					
83.					
84.					
85.					
86.					Field Trip to AMBL
87.					
88.					
89.					
90.					