Course: AP Biology	**Teacher: John Girard**				**Draft updated: September 1, 2009**
Month	**September (24 classes)**	**October (27 classes)**	**November (22 classes)**	**December (18 classes)**	**January (20 classes)**
Topic	**Life Chemistry & Cell Transport**	**Cell Energetics, Cell Cycle, Protein Synthesis, & DNA Replication**	**Classical Genetics & Molecular Genetics**	**Evolution**	**Classification & Kingdoms**
Essential Questions	What are the properties of water and why is water important to living organisms? How do the properties of carbon contribute to the formation of organic molecules? What are cells & what are the components of cells? How do organelles perform the work of a cell? How is cell transport regulated, and how is the plasma membrane selectively permeable? What factors affect plasma membrane permeability?	How is ATP energy created? How do cells get energy to do work? How do cells communicate? Where do new cells come from? How are proteins made? How is DNA copied? Why do organisms vary in phenotype?	What are genetic traits? What controls how genetic traits are expressed? How has technology affected genetics? What are viruses & bacteria? What genetic implications do viruses and bacteria have?	How did life come to exist? Who created and who contributed to the idea of evolution and the theory of natural selection? How do the mechanisms of evolution work? What evidence is available to support evolution? What is the Hardy-Weinberg theory and how does it demonstrate that populations evolve?	How are living organisms different from each other and how are they classified? What is taxonomy? What are protists & fungi & how do they function? What are sponges, cnidarians, worms, & mollusks & how do they function? What are arthropods & echinoderms & how do they function?

Objectives	*Conduct a scientific experiment *Describe atoms and their interactions *Compare covalent & Ionic bonds *Describe the properties of water AND it's importance to life *Describe the chemical composition, structure, AND function of organic molecules *Quantify enzyme activity in beef liver *Identify and describe cell organelles *Manipulate a microscope to focus a slide *Describe cell organelle functions *Describe factors contributing to plasma membrane permeability *Compare & contrast cell transport mechanisms	*Describe the relationship between photosynthesis & cell respiration *Identify reactants & products of photosynthesis, cell respiration, & fermentation *Compare / contrast exergonic & endergonic reactions *Calculate ΔG *Describe how a plant & animal cell creates/metabolizes ATP *Describe intra and extra cellular communication mechanisms *Describe DNA structure *Describe DNA replication Compare /contrast DNA & RNA (mRNA, tRNA, & rRNA) *Describe protein synthesis *Compare & contrast mitosis & meiosis *Prepare a wet-mount onion tip microscope slide	*Identify Mendel's Laws of heredity *Complete monohybrid & dihybrid cross *Describe genetic traits & their relationship to alleles *Describe how the processes of transformation, protein electrophoresis PCR, RFLP, & DNA fingerprinting work *Debate the pros & cons of the use of genetically engineered food *Create a human karyotype & pedigree *Calculate chi-square *Describe the use of viruses and bacteria in modern genetics *Describe the structures & functions of viruses & bacteria *Compare/contrast prokaryotes & eukaryotes *Compare/contrast archaebacteria & eubacteria	*Describe Earths early atmosphere *Compare/contrast fossil types *Describe Redi, Spallanzani, Pasteur, Miller & Urey experiments & their relationship with the origins of life *Describe Darwin's idea of Evolution by the theory of natural selection & evidence to support it *Describe the contributions made by Hutton, Malthus, Cuvier, Lamarck, Lyell, & Wallace to Darwin's Theory of Evolution *Describe natural selection & its' importance in Darwin's theory & its' effects on polygenic traits *Define genetic drift & genetic equilibrium * Describe speciation & why it occurs *Compare/contrast adaptive radiation, convergent evolution, co-evolution, & punctuated equilibrium	*Differentiate organisms by characteristics utilizing a dichotomous key *Create a dichotomous key given different characteristics *Describe the structures & functions of Protists, fungi, sponges, cnidarians, worms, & mollusks *Describe the reproductive cycles of protists, fungi, sponges, cnidarians, worms, & mollusks *Compare/contrast acoelomates, pseudocoelomates, & coelomates *Compare/contrast incomplete & complete metamorphosis * Compare/contrast intracellular & extracellular digestion * Compare /contrast protostome & deuterostome development

Reading **Campbell Reece** Biology 7th edition 2005	Chap 1 pg 2-26 Chap 2 pg 32 -44 Chap 3 pg 47-55 Chap 4 pg 58-66 Chap 5 pg 68-89 Chap 6 pg 94-120 Chap 7 pg 124-137	Chap 8 pg 141-157 Chap 9 pg 160-177 Chap 10 pg 181-197 Chap 11 pg 201-213 Chap 12 pg 218-232 Chap 13 pg 238-248 Chap 19 pg 359-380	Chap 14 pg 251-268 Chap 15 pg 274-289 Chap 16 pg 293-306 Chap 17 pg 309-330 Chap 18 pg 334-356 Chap 20 pg 384-407 Chap 21 pg 411-420 Chap 27 pg 534-546	Chap 22 pg 438-451 Chap 23 pg 454-469 Chap 24 pg 472-486 Chap 26 pg 512-529 Supplemental: Excerpts from Darwin's- *The Origin of Species* Wallace's - *1858 On the Tendency of Varieties to Depart Indefinitely from the Original Type*	Chap 25 pg 491-506 Chap 28 pg 549-567 Chap 31 pg 608-623 Chap 32 pg 626-633 Chap 33 pg 638-667
Writing	Pill bug animal behavior **AP Lab #11** Released open ended essay questions	Aerobic respiration & Photosynthesis comparison project Released open ended essay questions	Genetically engineered food debate Released open ended essay questions	Released open ended essay questions	Released open ended essay questions
Assessments	Test Open ended essay questions AP Lab #1 AP Lab #2 or Peroxidase enzyme lab AP Lab #11	Test Open ended essay questions AP Lab # 3 AP Lab #4 AP Lab #5 Aerobic respiration & Photosynthesis comparison project	Test Open ended essay questions AP Lab #6 (Transformation, Restriction, PCR & Electrophoresis) AP Lab #7	Test Open ended essay questions AP Lab #8	Test Open ended essay questions Kingdoms PowerPoint Project

Instructional Strategies	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Metric measurement & conversions **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Calculate Ion charge **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Enzyme Lab **Musical** – Cell rap **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Punnett squares **Musical** – Phototropism song **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Calculate probability, create karyotypes **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work

Month	February (19 classes)	March (24 classes)	April (21 classes)	May (26 classes)	June (15 classes)
Topic	**Kingdoms**	**Human Body**	**Ecology**	**Dissection**	**Research**
Essential Questions	What are chordates & how do they function? What are fish, amphibians, reptiles, birds, & mammals & how do they function? What are plants and how do they function?	What organs are found in the human body & how do they function?	How do organisms interact within their environment? How does energy flow through an ecosystem? How is a community created? How do the environments of organisms differ? What factors affect the size of a population?	Is organ placement related to function? How are insects adapted to their environment?	How is scientific research conducted?
Objectives	*Describe structures & functions of fish, amphibians, reptiles, birds, & mammals *Describe life cycles and reproduction of fish, amphibians, reptiles, birds, & mammals *Compare/contrast invertebrate & vertebrate respiration & excretion *Compare/contrast open & closed circulatory systems *Describe plant structures & their	*Describe the structures and functions of the integumentary, skeletal, muscular, digestive, excretory, & nervous systems *Label structures of the skeletal integumentary, muscular, digestive, excretory, & nervous systems *Compare/contrast chemical & mechanical digestion *Compare/contrast	*Describe organization of the biosphere *Compare relationships between organisms *Describe the movement of energy through trophic levels *Describe primary & secondary succession and their relationship in the creation of a climax community *Compare the environments that make up a biome *Identify factors	*Dissect a frog and pig comparing organ systems *Collect, display, and classify Insects representing 8 Orders	*Research & conduct an experiment of your choosing (**With instructor approval**) *Collect and synthesize data at Outer Island

	functions *Compare / contrast primary & secondary growth in vascular plants *Describe water transport in vascular plants *Describe plant reproduction mechanisms *Classify plants *Describe the evolution of plant characteristics	skeletal, smooth, & cardiac muscle *Describe the events of nerve transmission including a synapse *Describe how human vision & hearing functions *Describe the structures & functions of the endocrine, circulatory, immune, & respiratory systems *Label structures of the endocrine, circulatory, immune, & respiratory systems *Compare/contrast negative & positive hormonal feedback systems *Compare/contrast blood vessels *Describe the path of blood circulation *Compare/contrast humoral immunity & Cell-mediated immunity *Describe gas transport and respiration	that affect population growth		

Reading **Campbell Reece** Biology 7th edition 2005	Chap 34 pg 671-705 Chap 29 pg 573-588 Chap 30 pg 591-606 Chap 35 pg 710-734 Chap 36 pg 738-753 Chap 37 pg 764-767 Chap 38 pg 771-784 Chap 39 pg 788-813	Chap 40 pg 823-840 Chap 41 pg 844-862 Chap 42 pg 867-894 Chap 43 pg 898-917 Chap 44 pg 922-938 Chap 45 pg 943-959 Chap 46 pg 964-983 Chap 47 pg 987-1006 Chap 48 pg 1011-1039 Chap 49 pg 1045-1074	Chap 50 pg 1080-1098 Chap 52 pg 1136-1155 Chap 53 pg 1159-1180 Chap 54 pg 1184-1205 Chap 55 pg 1209-1229	Primary Literature T.B.D.	Primary Literature T.B.D. based on student research
Writing	Released open ended essay questions	Released open ended essay questions	Released open ended essay questions	Primary Literature summaries Biology Research Lab	Research Lab Report Outer Island Lab
Assessments	Test Open ended essay questions AP Lab #9	Test Open ended essay questions AP Lab #10	Test Open ended essay questions AP Lab #12 The Introduction, Increase, and Crash of Reindeer on ST. MATTHEW ISLAND Population Study	Mock AP Biology Exam Anatomical comparison of frog & pig (based on dissection) Primary Literature summaries Insect Collection Biology Research Lab	Research Lab Report Outer Island Lab

Instructional Strategies	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Calculate Hardy-Weinberg **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Digesting Dinner Essay **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Differentiate Leukocytes **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Dichotomous Keys **Musical** – Oh My Fungi song **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work	**Linguistic** - Oral Lecture, Reading aloud in class **Logical / Mathematical** – Dichotomous Keys **Spacial** - PowerPoint Presentation **Kinesthetic** - Labwork **Interpersonal** – Jigsawing, Labwork **Intrapersonal** - Independent Class Work