This document outlines the academic goals, the activities and materials used in the High School Biology class in order to achieve high academic success. There is a great deal of overlap in the standards within the activities and within the core areas, thus, standards addressed repeatedly throughout the year.

Time period	Standard	Resources (unit in textbook, learning center, recurring activity, other)	Internet/Media/ other resource
Weeks 1 to 37	(1) Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:	**Miller, "Biology", 2010 Parrot Edition**	
1	(A) demonstrate safe practices during laboratory and field investigations; and	**Teacher Lecture**	
6-8	(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.	**Miller Ch 6** **Visit to American Funduq** **Biotic/Abiotic Lab**	http://www.youtube.com/user/abdulmuhib#p/search/3/4hZNp3pF_4M http://www.world-science.net/othernews/101019_drought http://populationaction.org/Articles/Whats_Your_Number/seeandsave.php?date=563580 00000 http://www.carbonfootprint.com/calculator.aspx http://www.nrdc.org/globalWarming http://www.youtube.com/watch?v=-Na9-jV_OJI http://antwrp.gsfc.nasa.gov/apod/image/0011/earthlights2_dmsp_big.jpg
Weeks 1 to 37	(2) Scientific processes. The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:	**Teacher Lecture Labs**	
2	(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;	**Miller Ch 1,** **Teacher Lecture**	"Scientific State of Mind " at http://faculty.washington.edu/crowther/Misc/Songs/music.shtml http://www.youtube.com/watch?v=ty33v7UYYbw
1,2	(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;	**Teacher Lecture, Miller Ch 1** **Science Fair Project**	
1,2	(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;	**Teacher Lecture, Miller Ch 1,** **Science Fair Project,** **Miller Ch 16,** **Huxley Quotes**	
1,2	(D) distinguish between scientific hypotheses and scientific theories;	**Teacher Lecture,** **Miller Ch 1** **Science Fair Project**	
1,2,31	(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;	**Teacher Lecture,** **Miller Ch 1,** **Science Fair Project**	
1,2,31	(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric	**Teacher Lecture,** **Miller Ch 1, Science Fair Project**	

	rulers, electronic balances, gel electrophoresis apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;		
1,2,31	(G) analyze, evaluate, make inferences, and predict trends from data; and	**Teacher Lecture, Miller Ch 1, Science Fair Project**	
1,2,31	(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.	**Teacher Lecture, Miller Ch 1, Science Fair Project**	
Weeks 1-37	(3) Scientific processes. The student uses logical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:	**Science Fair Project, Miller Mystery Science**	
37	(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage scientific thinking by the student;	**Science Fair Project Miller Mystery Science**	
1-37	(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;	**Weekly Extra Credit Monthly Extra Credit**	http://www.sciencefriday.com/ www.world-science.net
	(C) draw inferences based on data related to promotional materials for products and services;		
6-8	(D) evaluate the impact of scientific research on society and the environment;	**Miller Ch 6**	
1-37	(E) evaluate models according to their limitations in representing biological objects or events; and	**Miller Mystery Science Miller Ch 1**	
1-37	(F) research and describe the history of biology and contributions of scientists.	**Overhead Timeline- History of Life and History of Science**	
Weeks 11-12, 26-27	(4) Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. The student is expected to:	**Miller Ch 7, Scanning Electron Microscope Pics**	http://www.youtube.com/watch?v=GigxU1UXZXo&feature=related http://biosaari.blogspot.com/2007/06/mending-wall.html
26-27	(A) compare and contrast prokaryotic and eukaryotic cells;	**Miller Ch 20 & 21 Collages Modeling Theatre**	http://www.youtube.com/watch?v=ZK6YP1Smbxk&feature=related *http://www.youtube.com/watch?v=XhyRpvgm03g* http://www.youtube.com/watch?v=GScyw3ammmk
12	(B) investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules; and	**Modeling Theatre Miller Ch 7**	http://medicalpicturesinfo.com/blood-cell/

27	(C) compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza.	**Miller Ch 20** **Collages**	
Weeks 15	(5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to:	**Miller Ch 10**	
15	(A) describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;	**Miller Ch 10** **Slides**	
15	(B) examine specialized cells, including roots, stems, and leaves of plants; and animal cells such as blood, muscle, and epithelium;	**Slides**	
18-19	(C) describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and	**Miller Ch 12 & 13** **Modeling Theatre** **Gilbert, "Developmental Biology", 1991 3rd Ed.**	*The Waltz of The Ribosomes* http://faculty.washington.edu/crowther/Misc/Songs/music.shtml *Building a Histadine http://faculty.washington.edu/crowther/Misc/Songs/music.shtml*
15	(D) recognize that disruptions of the cell cycle lead to diseases such as cancer.	**Miller Ch 10**	
Weeks 16 to 19	(6) Science concepts. The student knows the mechanisms of genetics, including the role of nucleic acids and the principles of Mendelian Genetics. The student is expected to:	**Miller Ch 11-14** **Plants,** **Lenses** **Modeling Theatre**	
18	(A) identify components of DNA, and describe how information for specifying the traits of an organism is carried in the DNA;	**Miller Ch 12**	
18	(B) recognize that components that make up the genetic code are common to all organisms;	**Miller Ch 12**	
18,19	(C) explain the purpose and process of transcription and translation using models of DNA and RNA;	**Miller Ch 13**	*The Waltz of The Ribosomes* http://faculty.washington.edu/crowther/Misc/Songs/music.shtml *Building a Histadine http://faculty.washington.edu/crowther/Misc/Songs/music.shtml*
18,19	(D) recognize that gene expression is a regulated process;	**Miller Ch 13**	
18,19	(E) identify and illustrate changes in DNA and evaluate the significance of these changes;	**Modeling Theatre,** **Miller Ch 12**	
16,17	(F) predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses and non-Mendelian inheritance;	**Miller Ch 11**	
16,17	(G) recognize the significance of meiosis to sexual reproduction; and	**Miller Ch 11**	
19	(H) describe how techniques such as DNA fingerprinting, genetic modifications, and chromosomal analysis are used to study the genomes of organisms.	**Miller Ch 14**	
Weeks 19 to 26, 30 to 31	(7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to:	**Miller Ch 16-19,26** **Teacher Lecture** **Shanavas, 'Evolution and/or Creationism: An Islamic Perspective'**	

		Haught, 'God After Darwin' Alters, 'Defending Evolution' Dixon, 'A Zoology of the Future' Sis, 'The Tree of Life' Isaak, 'The Counter-Creationism Handbook' Gilbert, "Developmental Biology", 1991 3rd Ed Prothero, 'What the Fossils Say' *Macaca sylvanus* Field Trip	
20-22, 25	(A) Understand how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;	**Miller Ch 16,19 Dixon, 'A Zoology of the Future' Sis, 'The Tree of Life' Fossils Gilbert, "Developmental Biology", 1991 3rd Ed. Prothero, 'What the Fossils Say' Giant Cookie Plate Tectonic Map Modeling Theatre Lamprey and Hagfish pics**	*http://www.thebeaglevoyage.com/* http://www.edwardtbabinski.us/whales/introduction.html http://www.edwardtbabinski.us/whales/evolution_of_whales/ http://www.youtube.com/watch?v=B7zo2zY1Zqg http://biosaari.blogspot.com/2009/01/its-about-life.html http://www.youtube.com/watch?v=ojydNb3Lrrs http://csotonyi.com/Ardipithecus_ramidus_Csotonyi.html http://en.wikipedia.org/wiki/File:Humanevolutionchart.png http://www.youtube.com/watch?v=FdzBSo_ZJiw&feature=autofb
22,23,25	(B) Analyze and evaluate fossil evidence for competing scientific theories of punctuated equilibrium and phyletic gradualism;	**Miller Ch 17, 19 Gould**	
20-23	(C) Understand how natural selection produces change in populations, not individuals;	**Miller Ch 16, 17 Population Worksheets**	Hawaiian Drosophilia DVD
20-22	(D) Understand how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;	**Miller Ch 16 Alters, 'Defending Evolution' Bird Seed**	Hawaiian Drosophilia DVD *http://www.youtube.com/watch?v=LyRA807djLc*
20-24, 30	(E) Understand the relationship of natural selection to adaptation and to the development of diversity in and among species;	**Miller Ch 16-18,26 Dixon, 'A Zoology of the Future'**	Hawaiian Drosophilia DVD http://www.youtube.com/watch?v=9RKupfY_DHc
22,23	(F) Understand the effects of other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination; and	**Miller Ch 17**	
25	(G) Understand scientific explanations concerning the evolution of the cell and life.	**Miller Ch 19**	
23,24	(8) Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made. The student is expected to:	**Miller Ch 18 Samples Fruit Leaves Jones, 'Darwin's Ghost'**	
23	(A) define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community;	**Jones, 'Darwin's Ghost' Miller Ch 18**	
24	(B) categorize organisms using a hierarchical classification	**Miller Ch 18**	

	system based on similarities and differences shared among groups; and		
24	(C) compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.	**Miller Ch 18**	*http://tolweb.org/tree/*
Weeks 12 to 14	(9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to:	**Miller Ch 8,9**	
	(A) compare the structures and functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;		
12 to 14	(B) compare the reactants and products of photosynthesis and cellular respiration in terms of energy and matter;	**Miller Ch 8,9**	
11, 18, 34	(C) identify and investigate the role of enzymes; and	**Miller Ch 7, 12, 30**	
25	(D) Understand the evidence regarding formation of simple organic molecules and their organization into long complex molecules having information such as the DNA molecule for self-replicating life.	**Miller Ch 19**	
Weeks 28, 30 to 36	(10) Science concepts. The student knows that biological systems are composed of multiple levels. The student is expected to:	**Miller Ch 22,27,28,30-34** **Zoo Field Trip** **Niesen, 'Marine Biology Coloring Book'** **Skeleton** **Human Model**	
30-36	(A) describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;	**Lecture** **Judson, 'Dr. Tatiana's Sex Guide for All Creation'** **Chickens** **Niesen, 'Marine Biology Coloring Book'** **Ceratiidae Overheads** **Monotreme Pics** **Female Reproductive Model** **Neuron Poster** **Miller Ch 27, 28, 30, 31, 34**	*http://www.ultrasonic-ringtones.com/* http://www.youtube.com/watch?v=5fx-YgcP8Gg http://www.sundancechannel.com/greenporno/?bclid=23279349001&bctid=18011212001 http://www.sundancechannel.com/greenporno/?bclid=23279349001&bctid=18015779001 http://www.youtube.com/watch?v=Uzl6M1YlU3w
28	(B) describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants; and	**Miller Ch 22** **Batha Arboretum Field Trip** **Plants** **MacGruder, "Seaweeds of Hawaii"** **Flowers** **Fruit** **Cones** **Collages** **Ferns**	

		Moss	
34	(C) analyze the levels of organization in biological systems and relate the levels to each other and to the whole system.	**Miller Ch 30** **Skeleton** **Human Model**	
Weeks 3-5, 26, 27, 30 to 36	(11) Science concepts. The student knows that biological systems work to achieve and maintain balance. The student is expected to:	**Miller Ch 3, 27,28,30-34** **Carson, 'The Sea Around Us'**	
33, 34	(A) describe the role of internal feedback mechanisms in the maintenance of homeostasis;	**Miller Ch 28, 30** **Live Frogs**	
33, 35	(B) investigate and analyze how organisms, populations, and communities respond to external factors;	**Miller Ch 28, 31**	
26, 27	(C) summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems; and	**Miller Ch 20, 21**	
5	(D) describe how events and processes that occur during ecological succession can change populations and species diversity.	**Miller Ch 4**	
Weeks 3 to 10	(12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:	**Miller Ch 3-6** **Reader's Digest 'North American Wildlife' 1982** **Carson, 'The Sea Around Us'** **Benchley, 'Ocean Planet'** **Barnacles** **Niesen, 'Marine Biology Coloring Book'** **Finding Nemo** **Ceratiidae Overheads**	
3, 4	(A) interpret relationships, including predation, parasitism, commensalism, mutualism, and competition among organisms;	**Miller Ch 3** **Niesen, 'Marine Biology Coloring Book'** **Finding Nemo DVD**	http://www.youtube.com/watch?v=cQ_WeLi09p0
4, 5	(B) compare variations and adaptations of organisms in different ecosystems;	**Miller Ch 4** **Reader's Digest 'North American Wildlife' 1982** **Ceratiidae Overheads**	http://www.google.com/imgres?imgurl=http://www.cactus-art.biz/schede/EUPHORBIA/Euphorbia_resinifera/Euphorbia_resinifera/Euphorbia_resinifera_big_810.jpg&imgrefurl=http://www.cactus-art.biz/schede/EUPHORBIA/Euphorbia_resinifera/Euphorbia_resinifera/Euphorbia_resinifera.htm&usg=__asYizb5rnMIxsvgEyx_cfemsbj8=&h=810&w=810&sz=444&hl=en&start=0&sig2=Vv4M3aAARwLrNng5ed7ekQ&zoom=1&tbnid=3FQwdaK50xicgM:&tbnh=160&tbnw=154&ei=fxiyTNb-Lc2K4Qb06fnEBg&prev=/images%3Fq%3Deuphorbia%2Bcactus%26um%3D1%26hl%3Den%26client%3Dfirefox-a%26sa%3DG%26rlz%3D1R1GGGL_en___MA345%26biw%3D1280%26bih%3D640%26tbs%3Disch:1&um=1&itbs=1&iact=hc&vpx=444&vpy=111&dur=5969&hovh=225&hovw=225&tx=131&ty=128&oei=fxiyTNb-Lc2K4Qb06fnEBg&page=1&ndsp=22&ved=1t:429,r:3,s:0
3, 4	(C) analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;	**Miller Ch 3** **Finding Nemo DVD**	
6, 7, 22-24	(D) recognize that long-term survival of species is dependent on changing resource bases that are limited;	**Miller Ch 5, 17, 19** **Population Worksheets**	http://en.wikipedia.org/wiki/File:COB_data_Morocco.PNG http://www.law.umkc.edu/faculty/projects/ftrials/superior/Ism_map2.jpg

3, 4	(E) describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and	**Miller Ch 3** **Finding Nemo DVD**	
4,5, 7-9	(F) describe how environmental change can impact ecosystem stability.	**Miller Ch 4, 6** **Benchley, 'Ocean Planet'**	http://www.youtube.com/user/abdulmuhib#p/search/3/4hZNp3pF_4M http://www.world-science.net/othernews/101019_drought http://populationaction.org/Articles/Whats_Your_Number/seeandsave.php?date=563580 00000 http://www.carbonfootprint.com/calculator.aspx http://www.nrdc.org/globalWarming