Focus on Forests Correlations to

2014 HIGH SCHOOL Biology I

S.C. Academic Standards

Standard H.B.1: **The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.**										
Indicators:	**Focus on Forests Activities**									
	Introduction	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
H.B.1A.1 Ask questions to (1) generate hypotheses for scientific investigations, (2) refine models, explanations, or designs, or (3) extend the results of investigations or challenge scientific arguments or claims.			□						●	
H.B.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.		●				□	●	□	●	□
H.B.1A.3 Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: (1) formulate scientific questions and testable hypotheses based on credible scientific information, (2) identify materials, procedures, and variables, (3) use appropriate laboratory equipment, technology, and		□	●				● Water shed activity P105		●	

● Standard fully addressed
□ Standard partially addressed

E Enrichment Activity
MC Media Connections

techniques to collect qualitative and quantitative data, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.										
H.B.1A.4 Analyze and interpret data from informational texts and data collected from investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to (1) reveal patterns and construct meaning, (2) support or refute hypotheses, explanations, claims, or designs, or (3) evaluate the strength of conclusions.	●	●	●			□ E	●	●	●	□
H.B.1A.5 Use mathematical and computational thinking to (1) use and manipulate appropriate metric units, (2) express relationships between variables for models and investigations, and (3) use grade-level appropriate statistics to analyze data.	□	●					●	● E	●	
H.B.1A.6 Construct explanations of phenomena using (1) primary or secondary scientific evidence and models, (2) conclusions from scientific investigations, (3) predictions based on observations and measurements, or (4) data communicated in graphs, tables, or diagrams.	□	●	●				●	●	●	
H.B.1A.7 Construct and analyze scientific arguments to support claims, explanations, or designs using evidence and valid reasoning from observations, data, or informational texts.	●	●	●		●	●	●	●	●	□

H.B.1A.8 Obtain and evaluate scientific information to (1) answer questions, (2) explain or describe phenomena, (3) develop models, (4) evaluate hypotheses, explanations, claims, or designs or (5) identify and/or fill gaps in knowledge. Communicate using the conventions and expectations of scientific writing or oral presentations by (1) evaluating grade-appropriate primary or secondary scientific literature, or (2) reporting the results of student experimental investigations.	●	●	●					●	●	□
H.B.1B.1 Construct devices or design solutions using scientific knowledge to solve specific problems or needs: (1) ask questions to identify problems or needs, (2) ask questions about the criteria and constraints of the device or solutions, (3) generate and communicate ideas for possible devices or solutions, (4) build and test devices or solutions, (5) determine if the devices or solutions solved the problem and refine the design if needed, and (6) communicate the results.	□	●			●	●	●	●	●	□

Standard H.B.6: The student will demonstrate an understanding that ecosystems are complex, interactive systems that include both biological communities and physical components of the environment.

Indicators	**Focus on Forests Activities**									
	Introduction	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
H.B.6A.1 Analyze and interpret data that depict changes in the abiotic and biotic components of an ecosystem over time or space (such as percent	●	● E	●				●	□	●	

change, average change, correlation and proportionality) and propose hypotheses about possible relationships between the changes in the abiotic components and the biotic components of the environment.										
H.B.6A.2 Use mathematical and computational thinking to support claims that limiting factors affect the number of individuals that an ecosystem can support.		●						●		
H.B.6B.1 Develop and use models of the carbon cycle, which include the interactions between photosynthesis, cellular respiration and other processes that release carbon dioxide, to evaluate the effects of increasing atmospheric carbon dioxide on natural and agricultural ecosystems.	●								●	
H.B.6B.2 Analyze and interpret quantitative data to construct an explanation for the effects of greenhouse gases (such as carbon dioxide and methane) on the carbon cycle and global climate.									●	
H.B.6C.1 Construct scientific arguments to support claims that the changes in the biotic and abiotic components of various ecosystems over time affect the ability of an ecosystem to maintain homeostasis.	●	● E MC	●		●	●	●	●	●	
H.B.6D.1 Design solutions to reduce the impact of human activity on the biodiversity of an ecosystem.		● E			●	●	●	●	●	□

Standard H.B.2: The student will demonstrate the understanding that the essential functions of life take place within cells or systems of cells.										
Indicators	**Focus on Forests Activities**									
	Introduction	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
H.B.2B.1 Develop and use models to explain how specialized structures within cells (including the nucleus, chromosomes, cytoskeleton, endoplasmic reticulum, ribosomes, and Golgi complex) interact to produce, modify, and transport proteins. Models should compare and contrast how prokaryotic cells meet the same life needs as eukaryotic cells without similar structures.										
H.B.2B.2 Collect and interpret descriptive data on cell structure to compare and contrast different types of cells (including prokaryotic versus eukaryotic, and animal versus plant versus fungal).										
H.B.2B.3 Obtain information to contrast the structure of viruses with that of cells and to explain, in general, why viruses must use living cells to reproduce.										
H.B.2C.1 Develop and use models to exemplify how the cell membrane serves to maintain homeostasis of the cell through both active and passive transport processes.										
H.B.2C.2 Ask scientific questions to define the problems that organisms face in maintaining homeostasis within different environments (including water of varying solute										

concentrations).										
H.B.2C.3 Analyze and interpret data to explain the movement of molecules (including water) across a membrane.										
H.B.2D.1 Construct models to explain how the processes of cell division and cell differentiation produce and maintain complex multicellular organisms.										
H.B.2D.2 Develop and use models to exemplify the changes that occur in a cell during the cell cycle (including changes in cell size, chromosomes, cell membrane/cell wall, and the number of cells produced) and predict, based on the models, what might happen to a cell that does not progress through the cycle correctly.										
H.B.2D.3 Construct explanations for how the cell cycle is monitored by check point systems and communicate possible consequences of the continued cycling of abnormal cells.										
H.B.2D.4 Construct scientific arguments to support the pros and cons of biotechnological applications of stem cells using examples from both plants and animals.										

Standard H.B.3: The student will demonstrate the understanding that all essential processes within organisms require energy which in most ecosystems is ultimately derived from the Sun and transferred into chemical energy by the photosynthetic organisms of that ecosystem.										
Indicators	**Focus on Forests Activities**									
	Introduction	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
H.B.3A.1 Develop and use models to explain how chemical reactions among ATP, ADP, and inorganic phosphate act to transfer chemical energy within cells.										
H.B.3A.2 Develop and revise models to describe how photosynthesis transforms light energy into stored chemical energy.	●								●	
H.B.3A.3 Construct scientific arguments to support claims that chemical elements in the sugar molecules produced by photosynthesis may interact with other elements to form amino acids, lipids, nucleic acids or other large organic molecules.										
H.B.3A.4 Develop models of the major inputs and outputs of cellular respiration (aerobic and anaerobic) to exemplify the chemical process in which the bonds of molecules are broken, the bonds of new compounds are formed and a net transfer of energy results.									□	
H.B.3A.5 Plan and conduct scientific investigations or computer simulations to determine the relationship between variables that										

affect the processes of fermentation and/or cellular respiration in living organisms and interpret the data in terms of real-world phenomena.										
Standard H.B.4: The student will demonstrate an understanding of the specific mechanisms by which characteristics or traits are transferred from one generation to the next via genes.										
Indicators	**Focus on Forests Activities**									
	Introduction	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
H.B.4A.1 Develop and use models at different scales to explain the relationship between DNA, genes, and chromosomes in coding the instructions for characteristic traits transferred from parent to offspring.										
H.B.4A.2 Develop and use models to explain how genetic information (DNA) is copied for transmission to subsequent generations of cells (mitosis).										
H.B.4B.1 Develop and use models to describe how the structure of DNA determines the structure of resulting proteins or RNA molecules that carry out the essential functions of life.										
H.B.4B.2 Obtain, evaluate and communicate information on how **biotechnology** (including gel electrophoresis, plasmid-based transformation and DNA fingerprinting) may be used in the fields of medicine, **agriculture**, and forensic science.								□		
H.B.4C.1 Develop and use models of sex cell formation (meiosis) to explain										

why the DNA of the daughter cells is different from the DNA of the parent cell.										
H.B.4C.2 Analyze data on the variation of traits among individual organisms within a population to explain patterns in the data in the context of transmission of genetic information.										
H.B.4C.3 Construct explanations for how meiosis followed by fertilization ensures genetic variation among offspring within the same family and genetic diversity within populations of sexually reproducing organisms.										
H.B.4D.1 Develop and use models to explain how mutations in DNA that occur during replication (1) can affect the proteins that are produced or the traits that result and (2) may or may not be inherited.										

Standard B-5: The student will demonstrate an understanding of biological evolution and the diversity of life.

Indicators	**Focus on Forests Activities**									
	Introduction	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
B-5.1 Summarize the process of natural selection.						□				
B-5.2 Explain how the genetic processes result in the continuity of life-forms over time.										
B-5.3 Explain how diversity within a species increases the chances of its survival.										
B-5.4 Explain how genetic										

variability and environmental factors lead to biological evolution.										
B-5.5 Exemplify scientific evidence in the fields of anatomy, embryology, biochemistry, and paleontology that underlies the theory of biological evolution.										
B-5.6 Summarize ways that scientists use data from a variety of sources to investigate and critically analyze aspects of evolutionary theory.										

Focus on Forest – Reverse Correlation
2014 BIOLOGY I S.C. ACADEMIC STANDARDS

PLT Activities	Engineering	Cell	Energy	Heredity	Evolution	Ecosystem
Introduction: Forests are more than trees.	• H.B.1A.4 □ H.B.1A.5 □ H.B.1A.6 • H.B.1A.7 • H.B.1A.8 □ H.B.1B.1		• H.B.3A.2			• H.B.6A.1 • H.B.6B.1 • H.B.6C.1
1 Monitoring Forest Health	• H.B.1A.2 □ H.B.1A.3 • H.B.1A.4 • H.B.1A.5 • H.B.1A.6 • H.B.1A.7 • H.B.1A.8 • H.B.1B.1					• H.B.6A.1 • H.B.6A.2 • H.B.6C.1 • H.B.6D.1
2 Story of Succession	• H.B.1A.1 • H.B.1A.3 • H.B.1A.4 • H.B.1A.6 • H.B.1A.7 • H.B.1A.8					• H.B.6A.1 • H.B.6C.1

3 **Who Owns America's Forests?**						
4 **Tough Choices**	• H.B.1A.7 ● H.B.1B.1					• H.B.6C.1 ● H.B.6D.1
5 **The Nature of Fire**	□ H.B.1A.2 □ H.B.1A.4 • H.B.1A.7 ● H.B.1B.1				□ B-5.1	• H.B.6C.1 ● H.B.6D.1
6 **Forest to Faucet**	• H.B.1A.2 □ H.B.1A.3 • H.B.1A.4 • H.B.1A.5 • H.B.1A.6 • H.B.1A.7 ● H.B.1B.1					• H.B.6A.1 • H.B.6C.1 • H.B.6D.1
7 **Forest Invaders**	□ H.B.1A.2 • H.B.1A.4 • H.B.1A.5 • H.B.1A.6 • H.B.1A.7 ● H.B.1A.8 ● H.B.1B.1			□ H.B.4B.2		□ H.B.6A.1 • H.B.6A.2 • H.B.6C.1 ● H.B.6D.1
8 **Climate Change and Forests**	• H.B.1A.1 • H.B.1A.2 • H.B.1A.3 • H.B.1A.4 • H.B.1A.5 • H.B.1A.6 • H.B.1A.7 ● H.B.1A.8 ● H.B.1B.1		• H.B.3A.2 □ H.B.3A.4			• H.B.6A.1 • H.B.6B.1 • H.B.6B.2 • H.B.6C.1 ● H.B.6D.1
9 **Words to Live By**	□ H.B.1A.2 □ H.B.1A.4 □ H.B.1A.7 □ H.B.1A.8 □ H.B.1B.1					□ H.B.6D.1