

Dear Biology Teacher:

Congratulations on your Biology course assignment. The year-long Halifax County Schools' Biology Pacing Guide engages students in inquiry-based instruction. *Standards are paced in nine weeks within four quarters. **Numbers** indicate which quarter each standard is to be taught; "**X**" indicates NOT taught. You will need to cluster standards into units of study to accomplish them all.* A well-planned science unit provides opportunities for inquiry, experimentation and use of technological enhancements. A seamless integration of science content, scientific inquiry, experimentation and technological design will reinforce in students the notion that "*what*" is known is inextricably tied to "*how*" it is known. When teaching, provide opportunities for students to engage in "hands-on/minds-on" activities that unwrap the knowledge, understanding, and application of concepts. Developing conceptual understanding of science content is essential; therefore, *the ninth week within each quarter* should provide for remediation of standards prior to the benchmark and assessment.

Things to Remember:

- Engage first-hand exploration & investigation and inquiry/processing skills are nurtured.
- Instruction builds directly on student' conceptual background.
- science content is organized on the basis of broad conceptual themes common to all science disciplines.
- Mathematics and communication skills are an integral part of science instruction.
- Learning environment fosters positive attitudes towards self and society, as well as science.



Alignment of Instructional Model: (I Do; We Do; You Do)

1. **I Do: Engage** Teacher introduces Biology concept and connect to students' prior knowledge; acknowledges accuracy of understanding and any misconceptions.
2. **We Do: Explore** Students are provided collaborative opportunities for observations and questioning prior to teacher's explanation of concepts, functions, systems, and processes.
3. **I Do: Explain/Elaborate** Teacher provides a clear, concise description of new concepts & reasoning; includes anchor charts, video clips, visuals and *models* of functions, systems, and processes.
4. **We Do: Elaborate** Guided Practice with feedback
5. **You Do: Evaluate** Determine students' understanding of Biology standards through tasks, projects & assessments.

Student engagement in scientific investigation provides background for understanding the nature of scientific inquiry. In addition, the science process skills necessary for inquiry are acquired through active experience. The scientific processing skills support the development of reasoning and problem-solving ability and are the core of scientific methodologies.

Instructional Resources: <http://scnces.ncdpi.wikispaces.net/Biology%20Resources>

(See DPI resource link above for access to planning documents listed below)

Biology Essential Standards	 NCES_Biology.pdf Details Download 49 KB
Unpacked Content	 Unpacked_Content_Biology_RevisedAu... Details Download 543 KB
Assessment Examples	 Assessment_Examples_Biology_Aug201... Details Download 718 KB
Lesson Resources	9-12 Resources Use the Crosswalk document to the 2004 SCOS objectives to utilize units and/or lessons Secondary Literacy Resources Formative Assessment Probe Alignment
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Additional Resources	K-12 Resources • NC Science LiveBinder

Structure and Functions of Living Organisms					Quarters			
Bio.1.1 Understand the relationship between the structures and functions of cells and their organelles					1	2	3	4
Bio.1.1.1 Summarize the structure and function of organelles in eukaryotic cells (including the nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes) and ways that these organelles interact with each other to perform the function of the cell.					1	X	X	X
Bio.1.1.2 Compare prokaryotic and eukaryotic cells in terms of their general structures (plasma membrane and genetic material) and degree of complexity.					1	X	X	X
Bio.1.1.3 Explain how instructions in DNA lead to cell differentiation and result in cells specialized to perform specific functions in multicellular organisms.					1	X	X	X
Bio.1.2 Analyze the cell as a living system.					1	2	3	4
Bio.1.2.1 Explain how homeostasis is maintained in the cell and within an organism in various environments (including temperature and pH).					1	X	X	X
Bio.1.2.2 Analyze how cells grow and reproduce in terms of interphase, mitosis and cytokinesis.					1	X	X	X
Bio.1.2.3 Explain how specific cell adaptations help cells survive in particular environments (focus on unicellular organisms).					1	X	X	X
Ecosystems					Quarters			
Bio.2.1 Analyze the interdependence of living organisms within their environments.					1	2	3	4
Bio.2.1.1 Analyze the flow of energy and cycling of matter (water, carbon, nitrogen and oxygen) through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem.					X	2	X	X
Bio.2.1.2 Analyze the survival and reproductive success of organisms in terms of behavioral, structural, and reproductive adaptations.					X	2	X	X
Bio.2.1.3 Explain various ways organisms interact with each other (including predation, competition, parasitism, mutualism) and with their environments resulting in stability within ecosystems.					X	2	X	X
Bio.2.1.4 Explain why ecosystems can be relatively stable over hundreds or thousands of years, even though populations may fluctuate (emphasizing availability of food, availability of shelter, number of predators and disease).					X	2	X	X
Bio.2.2 Understand the impact of human activities on the environment (one generation affects the next).					1	2	3	4
Bio.2.2.1 Infer how human activities (including population growth, pollution, global warming, burning of fossil fuels, habitat destruction and introduction of nonnative species) may impact the environment.					X	2	X	X
Bio.2.2.2 Explain how the use, protection and conservation of natural resources by humans impact the environment from one generation to the next.					X	2	X	X
Evolution and Genetics					Quarters			
Bio.3.1 Explain how traits are determined by the structure and function of DNA					1	2	3	4
Bio.3.1.1 Explain the double-stranded, complementary nature of DNA as related to its function in the cell.					X	X	3	X
Bio.3.1.2 Explain how DNA and RNA code for proteins and determine traits.					X	X	3	X
Bio.3.1.3 Explain how mutations in DNA that result from interactions with the environment (i.e. radiation and chemicals) or new combinations in existing genes lead to changes in function and phenotype.					X	X	3	X
Bio.3.2 Understand how the environment, and/or the interaction of alleles, influences the expression of genetic traits.					1	2	3	4
Bio.3.2.1 Explain the role of meiosis in sexual reproduction and genetic variation.					X	X	3	X
Bio.3.2.2 Predict offspring ratios based on a variety of inheritance patterns (including dominance, co-dominance, incomplete dominance, multiple alleles, and sex-linked traits).					X	X	3	X
Bio.3.2.3 Explain how the environment can influence the expression of genetic traits.					X	X	3	X
Bio.3.2 Understand how the environment, and/or the interaction of alleles, influences the expression of genetic traits					1	2	3	4

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Bio.3.2.3 Explain how the environment can influence the expression of genetic traits.	X	X	3	X
Bio.3.3 Understand the application of DNA technology.	1	2	3	4
Bio.3.3.1 Interpret how DNA is used for comparison and identification of organisms.	X	X	X	4
Bio.3.3.2 Summarize how transgenic organisms are engineered to benefit society.	X	X	X	4
Bio.3.3.3 Evaluate some of the ethical issues surrounding the use of DNA technology (including cloning, genetically modified organisms, stem cell research, and Human Genome Project).	X	X	X	4
Bio.3.4 Explain the theory of evolution by natural selection as a mechanism for how species change over time.	1	2	3	4
Bio.3.4.1 Explain how fossil, biochemical, and anatomical evidence support the theory of evolution.	X	X	X	4
Bio.3.4.2 Explain how natural selection influences the changes in species over time.	X	X	X	4
Bio.3.4.3 Explain how various disease agents (bacteria, viruses, chemicals) can influence natural selection.	X	X	X	4
Bio 3.5 Analyze how classification systems are developed based upon speciation.	1	2	3	4
Bio.3.5.1 Explain the historical development and changing nature of classification systems.	X	X	X	4
Bio.3.5.2 Analyze the classification of organisms according to their evolutionary relationships (including dichotomous keys and phylogenetic trees).	X	X	X	4
Molecular Biology	Quarters			
Bio.4.1 Understand how biological molecules are essential to the survival of living organisms	1	2	3	4
Bio.4.1.1 Compare the structures and functions of the major biological molecules (carbohydrates, proteins, lipids, and nucleic acids) as related to the survival of living organisms.	1	X	X	X
Bio.4.1.2 Summarize the relationship among DNA, proteins and amino acids in carrying out the work of cells and how this is similar in all organisms. .	1	X	X	X
Bio.4.1.3 Explain how enzymes act as catalysts for biological reactions	1	X	X	X
Bio 4.2 Analyze the relationships between biochemical processes and energy use in the cell.	1	2	3	4
Bio.4.2.1 Analyze photosynthesis and cellular respiration in terms of how energy is stored, released, and transferred within and between these systems.	X	2	X	X
Bio.4.2.2 Explain ways that organisms use released energy for maintaining homeostasis (active transport).	X	2	X	X