

**APPENDIX B: SCIENCE CONTENT ASSESSED BY BIOLOGY 1 END-OF-COURSE ASSESSMENT**

<b>Body of Knowledge Nature of Science</b>	
<b>Standard 1</b>	<b>The Practice of Science</b>
<b>SC.912.N.1.1</b>	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: <ol style="list-style-type: none"> <li>pose questions about the natural world;</li> <li>conduct systematic observations;</li> <li>examine books and other sources of information to see what is already known;</li> <li>review what is known in light of empirical evidence;</li> <li>plan investigations;</li> <li>use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs);</li> <li>pose answers, explanations, or descriptions of events;</li> <li>generate explanations that explicate or describe natural phenomena (inferences);</li> <li>use appropriate evidence and reasoning to justify these explanations to others;</li> <li>communicate results of scientific investigations; and</li> <li>evaluate the merits of the explanations produced by others.</li> </ol> <p>Also assesses SC.912.N.1.4, SC.912.N.1.6, SC.912.L.14.4, LA.910.2.2.3, LA.910.4.2.2, MA.912.S.1.2, and MA.912.S.3.2.</p>
<b>AA</b>	<b>MC</b>
<b>SC.912.N.1.3</b>	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
<b>SC.912.N.1.4</b>	Identify sources of information and assess their reliability according to the strict standards of scientific investigation. Assessed as SC.912.L.14.1, SC.912.L.15.1, SC.912.L.15.6, SC.912.L.15.8, SC.912.L.15.13, and/or SC.912.L.17.20.
<b>SC.912.N.1.6</b>	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied. Assessed as SC.912.N.1.1, SC.912.L.15.1, SC.912.L.15.8, and/or SC.912.L.17.5.

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<b>Body of Knowledge</b>	<b>Nature of Science</b>
<b>Standard 2</b>	<b>The Characteristics of Scientific Knowledge</b>
<b>SC.912.N.2.1</b>	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).  Assessed as SC.912.L.14.1, SC.912.L.15.1, and/or SC.912.L.15.8.
<b>SC.912.N.2.2</b>	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
<b>Body of Knowledge</b>	<b>Nature of Science</b>
	Not Assessed.
<b>Standard 3</b>	<b>The Role of Theories, Laws, Hypotheses, and Models</b>
<b>SC.912.N.3.1</b>	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.  Assessed as SC.912.L.14.1 and/or SC.912.L.15.1.
<b>SC.912.N.3.4</b>	Recognize that theories do not become laws, nor do laws become theories; theories are well-supported explanations and laws are well-supported descriptions.  Assessed as SC.912.L.14.1 and/or SC.912.L.15.1.
<b>Body of Knowledge</b>	<b>Earth and Space Science</b>
<b>Standard 7</b>	<b>Earth Systems and Patterns</b>
<b>SC.912.E.7.1</b>	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.  Assessed as SC.912.L.17.9.

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Body of Knowledge Life Science	
Standard 14	Organization and Development of Living Organisms
<b>SC.912.L.14.1</b>	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.  Also assesses SC.912.N.1.3, SC.912.N.2.1, SC.912.N.3.1, and SC.912.N.3.4.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.14.2</b>	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).  Assessed as SC.912.L.14.3.
<b>SC.912.L.14.3</b>	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.  Also assesses SC.912.L.14.2.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.14.4</b>	Compare and contrast structure and function of various types of microscopes.  Assessed as SC.912.N.1.1.
<b>SC.912.L.14.6</b>	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.  Assessed as SC.912.L.14.52.
<b>SC.912.L.14.7</b>	Relate the structure of each of the major plant organs and tissues to physiological processes.
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<b>Body of Knowledge</b>	<b>Life Science</b>	
<b>Standard 14</b>	<b>Organization and Development of Living Organisms</b>	
<b>SC.912.L.14.26</b>	Identify the major parts of the brain on diagrams or models.	<b>MC</b>
<b>AA</b>		
<b>SC.912.L.14.36</b>	Describe the factors affecting blood flow through the cardiovascular system.	<b>MC</b>
<b>AA</b>		
<b>SC.912.L.14.52</b>	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.  Also assesses SC.912.L.14.6, HE.912.C.1.4, and HE.912.C.1.8.	<b>MC</b>
<b>AA</b>		
<b>Body of Knowledge</b>	<b>Life Science</b>	
<b>Standard 15</b>	<b>Diversity and Evolution of Living Organisms</b>	
<b>SC.912.L.15.1</b>	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.  Also assesses SC.912.L.15.10, SC.912.N.1.3, SC.912.N.1.4, SC.912.N.1.6, SC.912.N.2.1, SC.912.N.3.1, and SC.912.N.3.4.	<b>MC</b>
<b>AA</b>		
<b>SC.912.L.15.4</b>	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.	Assessed as SC.912.L.15.6.
<b>SC.912.L.15.5</b>	Explain the reasons for changes in how organisms are classified.	Assessed as SC.912.L.15.6.

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Body of Knowledge Life Science	
Standard 15	Diversity and Evolution of Living Organisms
<b>SC.912.L.15.6</b>	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.  Also Assesses SC.912.L.15.4, SC.912.L.15.5, SC.912.N.1.3, and SC.912.N.1.6.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.15.8</b>	Describe the scientific explanations of the origin of life on Earth.  Also assesses SC.912.N.1.3, SC.912.N.1.4, and SC.912.N.2.1.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.15.10</b>	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.  Assessed as SC.912.L.15.1.
<b>SC.912.L.15.13</b>	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.  Also assesses SC.912.L.15.14, SC.912.L.15.15, and SC.912.N.1.3.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.15.14</b>	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.  Assessed as SC.912.L.15.13.
<b>SC.912.L.15.15</b>	Describe how mutation and genetic recombination increase genetic variation.  Assessed as SC.912.L.15.13.

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<b>Body of Knowledge Life Science</b>	
<b>Standard 16 Heredity and Reproduction</b>	
<b>SC.912.L.16.1</b> Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.	Also assesses SC.912.L.16.2.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.16.2</b> Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.	Assessed as SC.912.L.16.1.
<b>SC.912.L.16.3</b> Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.	Also assesses SC.912.L.16.4, SC.912.L.16.5, and SC.912.L.16.9.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.16.4</b> Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.	Assessed as SC.912.L.16.3.
<b>SC.912.L.16.5</b> Explain the basic processes of transcription and translation, and how they result in the expression of genes.	Assessed as SC.912.L.16.3.
<b>SC.912.L.16.8</b> Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.	Assessed as SC.912.L.16.17.

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Body of Knowledge Life Science	
Standard 16	Heredity and Reproduction
<b>SC.912.L.16.9</b>	Explain how and why the genetic code is universal and is common to almost all organisms.  Assessed as SC.912.L.16.3.
<b>SC.912.L.16.10</b>	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.16.13</b>	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.16.14</b>	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.  Assessed as SC.912.L.16.17.
<b>SC.912.L.16.16</b>	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.  Assessed as SC.912.L.16.17.
<b>SC.912.L.16.17</b>	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.  Also assesses SC.912.L.16.8, SC.912.L.16.14, and SC.912.L.16.16.
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<b>Body of Knowledge</b> Life Science	
<b>Standard 17</b>	<b>Interdependence</b>
<b>SC.912.L.17.2</b>	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.  Assessed as SC.912.L.17.5.
<b>SC.912.L.17.4</b>	Describe changes in ecosystems resulting from seasonal variations, climate change, and succession.  Assessed as SC.912.L.17.5.
<b>SC.912.L.17.5</b>	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.  Also assesses SC.912.L.17.2, SC.912.L.17.4, SC.912.L.17.8, and SC.912.N.1.4.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.17.8</b>	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.  Assessed as SC.912.L.17.5.
<b>SC.912.L.17.9</b>	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.  Also assesses SC.912.E.7.1.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.17.11</b>	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.  Assessed as SC.912.L.17.20.

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<b>Body of Knowledge</b>	<b>Life Science</b>
<b>Standard 17</b>	<b>Interdependence</b>
<b>SC.912.L.17.13</b>	
Discuss the need for adequate monitoring of environmental parameters when making policy decisions.	Assessed as SC.912.L.17.20.
<b>SC.912.L.17.20</b>	
Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.	Also assesses SC.912.L.17.11, SC.912.L.17.13, SC.912.N.1.3, and HE.912.C.1.3.
<b>AA</b>	<b>MC</b>
<b>Body of Knowledge</b>	<b>Life Science</b>
<b>Standard 18</b>	<b>Matter and Energy Transformations</b>
<b>SC.912.L.18.1</b>	
Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.	Also assesses SC.912.L.18.11.
<b>AA</b>	<b>MC</b>
<b>SC.912.L.18.7</b>	
Identify the reactants, products, and basic functions of photosynthesis.	Assessed as SC.912.L.18.9.
<b>SC.912.L.18.8</b>	
Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.	Assessed as SC.912.L.18.9.
<b>SC.912.L.18.9</b>	
Explain the interrelated nature of photosynthesis and cellular respiration.	Also assesses SC.912.L.18.7, SC.912.L.18.8, and SC.912.L.18.10.
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<b>Body of Knowledge</b>		<b>Life Science</b>
<b>Standard 18</b>	<b>Matter and Energy Transformations</b>	
<b>SC.912.L.18.10</b>	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.	Assessed as SC.912.L.18.9.
<b>SC.912.L.18.11</b>	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.	Assessed as SC.912.L.18.1.
<b>SC.912.L.18.12</b>	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.	
<b>AA</b>		<b>MC</b>
<b>Strand</b>	<b>Health Literacy: CONCEPTS</b>	
<b>Standard 1</b>	<b>Comprehend concepts related to health promotion and disease prevention to enhance health</b>	
<b>HE.912.C.1.3</b>	Evaluate how environment and personal health are interrelated.	Assessed as SC.912.L.17.20.
<b>HE.912.C.1.4</b>	Analyze how heredity and family history can impact personal health.	Assessed as SC.912.L.14.52.
<b>HE.912.C.1.8</b>	Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.	Assessed as SC.912.L.14.52.

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<b>Body of Knowledge</b>	<b>Literary Analysis</b>
<b>Standard 2</b>	<b>Nonfiction</b>
<b>LA.910.2.2.3</b>	
The student will organize information to show understanding or relationships among facts, ideas, and events (e.g., representing key points within text through charting, mapping, paraphrasing, summarizing, comparing, contrasting, or outlining).	
	Assessed as SC.912.N.1.1.
<b>Body of Knowledge</b>	<b>Writing Applications</b>
<b>Standard 2</b>	<b>Informative</b>
<b>LA.910.4.2.2</b>	
The student will record information and ideas from primary and/or secondary sources accurately and coherently, noting the validity and reliability of these sources and attributing sources of information.	
	Assessed as SC.912.N.1.1.
<b>Body of Knowledge</b>	<b>Statistics</b>
<b>Standard 1</b>	<b>Formulating Questions</b>
<b>MA.912.S.1.2</b>	
Determine appropriate and consistent standards of measurement for the data to be collected in a survey or experiment.	
	Assessed as SC.912.N.1.1.

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Body of Knowledge Statistics	
Standard 3	Summarizing Data (Descriptive Statistics)
<b>MA.912.S.3.2</b>	<p>Collect, organize, and analyze data sets, determine the best format for the data, and present visual summaries from the following:</p> <ul style="list-style-type: none"> <li>• bar graphs;</li> <li>• line graphs;</li> <li>• stem and leaf plots;</li> <li>• circle graphs;</li> <li>• histograms;</li> <li>• box and whisker plots;</li> <li>• scatter plots; and</li> <li>• cumulative frequency (ogive) graphs.</li> </ul>
	Assessed as SC.912.N.1.1.

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