



Alignment Document  
State of Kansas and Aventa Learning Biology

**Biology**  
2005-2007 Benchmark Blueprint

Standards	Topics	Benchmarks	Unit Name	Course Topic Description
<b>1</b> The student will develop the abilities necessary to do scientific inquiry and develop an understanding of scientific inquiry.	<b>1.1</b> The student will demonstrate the abilities necessary to do scientific inquiry.	<b>1.1.1</b> actively engages in asking and evaluating research questions.	The Nature of Science and Biology  Photosynthesis and Cellular Respiration	The Scientific Method Lab  Enzyme Lab
		<b>1.1.2</b> actively engages in investigations, including developing questions, gathering and analyzing data, and designing and conducting research	The Nature of Science and Biology  Photosynthesis and Cellular Respiration	The Scientific Method Lab  Enzyme Lab
		<b>1.1.3</b> actively engages in using technological tools and mathematics in their own scientific investigations.	The Nature of Science and Biology  Photosynthesis and Cellular Respiration	The Scientific Method Lab  Enzyme Lab
		<b>1.1.4</b> actively engages in conducting an inquiry, formulating and revising his or her scientific explanations and models (physical, conceptual, or mathematical) using logic and evidence, and recognizing that potential alternative explanations and models should be considered.	The Nature of Science and Biology  Photosynthesis and Cellular Respiration	The Scientific Method Lab  Enzyme Lab
		<b>1.1.5</b> actively engages in communicating and defending the design, results, and conclusion of his/her investigation.	The Nature of Science and Biology	The Scientific Method Lab

			Photosynthesis and Cellular Respiration	Enzyme Lab
<p><b>3</b> The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.</p>	<p><b>3.1</b> The student will demonstrate an understanding of the structure and function of the cell.</p>	<p><b>3.1.1</b> understands cells are composed of a variety of specialized structures that carry out specific functions.</p>	Cell Structure	Section 1: Cell Features
		<p><b>3.1.2</b> understands cell functions involve specific chemical reactions.</p>	Photosynthesis and Cellular Respiration	Photosynthesis: Food Production
			Photosynthesis and Cellular Respiration	Cellular Respiration
		<p><b>3.1.3</b> understands cells function and replicate as a result of information stored in DNA and RNA molecules.</p>	Cell Structure	Chromosomes and Cell Reproduction
		<p><b>3.1.4</b> understands some plant cells contain chloroplasts, which are the sites of photosynthesis.</p>	Photosynthesis and Cellular Respiration	Photosynthesis: Food Production
		<p><b>3.1.5</b> understands cells can differentiate, thereby enabling complex multicellular organisms to form.</p>	Genetics	The Chromosome Theory of Inheritance
	<p><b>3.2</b> The student will demonstrate an understanding of chromosomes, genes, and the molecular basis of heredity.</p>	<p><b>3.2.1</b> understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms.</p>	Genetics	The Chromosome Theory of Inheritance
		<p><b>3.2.2</b> understands organisms usually have a characteristic number of chromosomes; one pair of these may determine the sex of individuals.</p>	Genetics	Human Genetic Traits
		<p><b>3.2.3</b> understands hereditary information is contained in genes, located in the chromosomes of each cell.</p>	Genetics	The Chromosome Theory of Inheritance
			Genetics	Mendel and Heredity
		<p><b>3.2.4</b> understands gametes carry the genetic information to the next generation.</p>	Cell Structure	Meiosis and Sexual Reproduction
<p><b>3.2.5</b> understands expressed mutations occur in DNA at very low rates.</p>	Genetics	Mendel and Heredity		

			Genetics	The Chromosome Theory of Inheritance
3.3 The student will understand biological evolution.	3.3.1 understands biological evolution, descent with modification, is a scientific explanation for the history of the diversification of organisms from common ancestors	Evolution		Descent With Modification
	3.3.2 understands populations of organisms adapt to environmental challenges and changes as a result of natural selection, genetic drift, and various mechanisms of genetic change.	Evolution		Descent With Modification
		Evolution		Evolution and Genetics
	3.3.3 understands biological evolution is used to explain the earth's present day biodiversity: the number, variety and variability of organisms.	Evolution		Descent With Modification
	3.3.4 understands organisms vary widely within and between populations. Variation allows for natural selection to occur.	Evolution		Evolution and Genetics
	3.3.5 understands the primary mechanism acting on variation is natural selection.	Evolution		Evolution and Genetics
	3.3.6 understands biological evolution is used as a broad, unifying theoretical framework for biology.	Evolution		Descent With Modification
		The Nature of Science and Biology	Section 1: Characteristics of Life	
3.4 The student will understand the interdependence of organisms and their interaction with the physical environment.	3.4.1 understands atoms and molecules on the earth cycle among the living and nonliving components of the biosphere.	Population Ecology		The Biosphere and Mass Extinctions
	3.4.2 understands energy is received, transformed and expended in ecosystems.	Population Ecology		The Biosphere and Mass Extinctions
	3.4.3 understands the distribution and abundance of organisms and populations in ecosystems are limited by the carrying capacity.	Population Ecology		Community and Ecosystem Dynamics
	3.4.4 understands organisms cooperate	Population Ecology		Community and Ecosystem

		and compete in complex, interdependent relationships		Dynamics
		<b>3.4.5</b> understands human beings live within and impact ecosystems.	Population Ecology	Community and Ecosystem Dynamics
			Population Ecology	The Biosphere and Mass Extinctions
<b>3.5</b> The student will develop an understanding of matter, energy, and organization in living systems.		<b>3.5.1</b> understands living systems require a continuous input of energy to maintain their chemical and physical organization.	Population Ecology	The Biosphere and Mass Extinctions
		<b>3.5.2</b> understands the sun is the primary source of energy for life through the process of photosynthesis.	Photosynthesis and Cellular Respiration	Photosynthesis: Food Production
		<b>3.5.3</b> understands food molecules contain biochemical energy, which is then available for cellular respiration.	Photosynthesis and Cellular Respiration	Photosynthesis: Food Production
			Photosynthesis and Cellular Respiration	Cellular Respiration
		<b>3.5.4</b> understands the structure and function of an organism serve to acquire, transform, transport, release, and eliminate the matter and energy used to sustain the organism.	Animal Organization	Animal Organ Systems and Homeostasis
<b>3.6</b> The student will understand the behavior of animals.		<b>3.6.1</b> understands animals have behavioral responses to internal changes and to external stimuli.	Animal Organization	Animal Organ Systems and Homeostasis
		<b>3.6.2</b> understands most multicellular animals have nervous systems that underlie behavior.	Animal Organization	The Nervous and Endocrine Systems
		<b>3.6.3</b> understands behaviors are often adaptive when viewed in terms of survival and reproductive success.		
<b>3.7</b> The student will demonstrate an understanding of the diversity of structure and function in organisms.		<b>3.7.1</b> understands differences in structure and function among organisms and can identify the characteristics of relevant life forms.	Biological Diversity	Section 1: Taxonomy and Classification

		<b>3.7.2</b> understands that homeostasis is the dynamic regulation and balance of an organisms internal environment to maintain conditions suitable for survival.	Animal Organization	Animal Organ Systems and Homeostasis
		<b>3.7.3</b> understands that living things change following a specific pattern of developmental stages called life cycles.	Animal Organization Plant Structure	The Reproductive System and Human Development Flowering Plant Reproduction
		<b>3.7.4</b> understands that in complex organisms there is a division of labor into specific body systems i.e., respiration, digestion, nervous, endocrine, excretion, circulatory, reproductive, immune, skeletal and muscle.	Animal Organization	Animal Organ Systems and Homeostasis
		<b>3.7.5</b> understands taxonomy is the systematic way in which organism are placed into a hierarchical classification system, according to their physical and genetic characteristics and their evolutionary history.	Biological Diversity	Section 1: Taxonomy and Classification
<b>5</b> The student will develop understandings about the relationship between science and technology.	<b>5.1</b> The student will develop an understanding that technology is applied science.	<b>5.1.1</b> understands technology is the application of scientific knowledge for functional purposes.		
		<b>5.1.2</b> understands creativity, imagination, and a broad scientific knowledge base are required to produce useful results.		
		<b>5.1.3</b> understands science advances new technologies. New technologies open new areas for scientific inquiry.	Genetics	Biotechnology and the Genetics Revolution
<b>7</b> The student will develop understanding of science as a human endeavor, the nature of scientific knowledge, and historical perspectives.	<b>7.1</b> The student will develop an understanding that science is a human endeavor that uses models to describe and explain the physical universe.	<b>7.1.1</b> demonstrates an understanding of science as both vocation and avocation.	The Nature of Science and Biology	Section 1: Who is a Biologist?
		<b>7.1.2</b> explains how science uses peer review, replication of methods, and norms of honesty.		
		<b>7.1.3</b> recognizes the universality of basic science concepts and the influence of	Evolution	Descent With Modification

	personal and cultural beliefs that embed science in society.	History of Life on Earth	Birth of a Planet and Establishment of Life
	<b>7.1.4</b> recognizes that society helps create the ways of thinking (mindsets) required for scientific advances, both toward training scientists and educating a populace to utilize benefits of science (e.g., standards of hygiene, attitudes toward forces of nature, etc.).	Genetics	Biotechnology and the Genetics Revolution
	<b>7.1.5</b> understands there are many issues which involve morals, ethics, values or spiritual beliefs that go beyond what science can explain, but for which solid scientific literacy is useful.	Genetics Genetics	Biotechnology and the Genetics Revolution Human Genetic Traits
	<b>7.1.6</b> recognizes society's role in supporting topics of research and determining institutions where research is conducted.		
<b>7.2</b> The student will develop an understanding of the nature of scientific knowledge.	<b>7.2.1</b> understands scientific knowledge describes and explains the physical world in terms of matter, energy, and forces. Scientific knowledge is provisional and is subject to change as new evidence becomes available.	Evolution The Nature of Science and Biology	Descent With Modification Science and the Scientific Method
	<b>7.2.2</b> understands scientific knowledge begins with empirical observations, which are the data (also called facts or evidence) upon which further scientific knowledge is built.	The Nature of Science and Biology	Science and the Scientific Method
	<b>7.2.3</b> understands scientific knowledge consists of hypotheses, inferences, laws, and theories.	The Nature of Science and Biology	Science and the Scientific Method
	<b>7.2.4</b> understands a testable hypothesis or inference must be subject to confirmation by empirical evidence	The Nature of Science and Biology	Science and the Scientific Method
<b>7.3</b> The student will understand	<b>7.3.1</b> demonstrates an understanding of		



	science from historical perspectives.	the history of science.		
		7.3.2 demonstrates a knowledge that scientific method historically proceeded from an inductive approach rather than a deductive approach.		