Biology TEKS Vertical Alignment

Created by Region 4 ESC to show the learning progressions for various concepts from Kindergarten to Biology.

Structure and Function

K-1(13) Organisms and environments. The student knows that organisms resemble their parents and have structures and undergo processes that help them interact and survive within their environments. The student is expected to:		**2(13) Organisms and environments. The student knows that organisms have structures and undergo processes that help them interact and survive within their environments. The student is expected to:**	**3-4(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that function to help them survive within their environments. The student is expected to:**		**5(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures and behaviors that help them survive within their environments. The student is expected to:**	**6(13) Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:**	**7(13) Organisms and environments. The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:**	**8(13) Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:**	**B(5) Science concepts--biological structures, functions, and processes. The student knows that multicellular organisms are composed of multiple systems that interact to perform complex functions. The student is expected to:** **B(12) Science concepts--biological structures, functions, and processes. The student knows that multicellular organisms are composed of multiple systems that interact to perform complex functions. The student is expected to:**
								B(5)(A) relate the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids, to the structure and function of a cell; ***(supporting standard)***
						6(13)(A) describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function; ***(supporting standard)***		8(13)(A) identify the function of the cell membrane, cell wall, nucleus, ribosomes, cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells; ***(readiness standard)***	B(5)(B) compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity; ***(readiness standard)***
						6(13)(B) identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic;			
K(13)(B) identify the different structures that animals have that allow them to interact with their environment such as seeing, hearing, moving, and grasping objects;	1(13)(A) identify the external structures of different animals and compare how those structures help different animals live, move, and meet basic needs for survival;	2(13)(B) record and compare how the structures and behaviors of animals help them find and take in food, water, and air;	3(13)(A) explore and explain how external structures and functions of animals such as the neck of a giraffe or webbed feet on a duck enable them to survive in their environment;		5(13)(A) analyze the structures and functions of different species to identify how organisms survive in the same environment; ***(readiness standard)***		7(13)(A) identify and model the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, urinary, reproductive, integumentary, nervous, immune, and endocrine systems; ***(supporting standard)***		B(12)(A) analyze the interactions that occur among systems that perform the functions of regulation, nutrient absorption, and reproduction. ***(supporting standard)***
K(13)(A) identify the structures of plants, including roots, stems, leaves, flowers, and fruits;		2(13)(A) identify the roots, stems, leaves, flowers, fruits, and seeds of plants and compare how those structures help different plants meet their basic needs for survival;		4(13)(A) explore and explain how structures and functions of plants such as waxy leaves and deep roots enable them to survive in their environment;			7(13)(B) describe the hierarchical organization of cells, tissues, organs, and organ systems within plants and animals;		B(12)(B) explain how the interactions that occur among systems that perform functions of transport, reproduction, and response in plants are facilitated by their structures. ***(readiness standard)***

Transport and Homeostasis

K-2(6) Matter and its properties. The student knows that objects have physical properties that determine how they are described and classified. The student is expected to:	**2(6) Matter and its properties. The student knows that matter has physical properties that determine how it is described, classified, and used. The student is expected to:**	**3-5(6) Matter and energy. The student knows that matter has measurable physical properties that determine how matter is identified, classified, changed, and used. The student is expected to:**		**6(6) Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. The student is expected to:**	**7(6) Matter and energy. The student distinguishes between elements and compounds, classifies changes in matter, and understands the properties of solutions. The student is expected to:**	**8(6) Matter and energy. The student understands that matter can be classified according to its properties and matter is conserved in chemical changes that occur within closed systems. The student is expected to:**	**B(12) Science concepts--biological structures, functions, and processes. The student knows that multicellular organisms are composed of multiple systems that interact to perform complex functions. The student is expected to:**
K-1(13) Organisms and environments. The student knows that organisms resemble their parents and have structures and undergo processes that help them interact and survive within their environments. The student is expected to:	**2(13) Organisms and environments. The student knows that organisms have structures and undergo processes that help them interact and survive within their environments. The student is expected to:**	**3-4(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that function to help them survive within their environments. The student is expected to:**	**5(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures and behaviors that help them survive within their environments. The student is expected to:**	**6(13) Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:**	**7(13) Organisms and environments. The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:**	**8(13) Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:**	**B(5) Science concepts--biological structures, functions, and processes. The student knows that multicellular organisms are composed of multiple systems that interact to perform complex functions. The student is expected to:**
					7(6)(D) describe aqueous solutions in terms of solute and solvent, concentration, and dilution;	8(6)(C) describe the properties of cohesion, adhesion, and surface tension in water and relate to observable phenomena such as the formation of droplets, transport in plants, and insects walking on water;	B(12)(B) explain how the interactions that occur among systems that perform functions of transport, reproduction, and response in plants are facilitated by their structures. ***(readiness standard)***

							7(13)(A) identify and model the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, urinary, reproductive, integumentary, nervous, immune, and endocrine systems; ***(supporting standard)***	8(13)(A) identify the function of the cell membrane, cell wall, nucleus, ribosomes, cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells; ***(supporting standard)***	B(5)(C) investigate homeostasis through the cellular transport of molecules; ***(not tested)***

DNA and Inheritance	**K-1(13) Organisms and environments. The student knows that organisms resemble their parents and have structures and undergo processes that help them interact and survive within their environments. The student is expected to:**		**2(13) Organisms and environments. The student knows that organisms have structures and undergo processes that help them interact and survive within their environments. The student is expected to:**	**3-4(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that function to help them survive within their environments. The student is expected to:**		**5(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures and behaviors that help them survive within their environments. The student is expected to:**	**6(13) Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:**	**7(13) Organisms and environments. The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:**	**8(13) Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:**	**(6) biological structures, functions, and processes. The student knows how an organism grows and the importance of cell differentiation** **B(7) The student knows the role of nucleic acids in gene expression. The student is expected to:** **B(8) The student knows the role of nucleic acids and the principles of inheritance and variation of traits in Mendelian and non-Mendelian genetics. The student is expected to:**
	K(13)(D) identify ways that young plants resemble the parent plant.	1(13)(C) compare ways that young animals resemble their parents.			4(13)(B) differentiate between inherited and acquired physical traits of organisms.					B(7)(A) identify components of DNA, explain how the nucleotide sequence specifies some traits of an organism, and examine scientific explanations for the origin of DNA; ***(supporting standard)***
							6(13)(A) describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function; ***(supporting standard)***	7(13)(C) compare the results of asexual and sexual reproduction of plants and animals in relation to the diversity of offspring and the changes in the population over time; ***(supporting standard)***	8(13)(B) describe the function of genes within chromosomes in determining inherited traits of offspring; ***(supporting standard)***	(B)(6)(A) explain the importance of the cell cycle to the growth of organisms, including an overview of the stages of the cell cycle and deoxyribonucleic acid (DNA) replication models; ***(supporting standard)***
										B(8)(A) analyze the significance of chromosome reduction, independent assortment, and crossing over during meiosis in increasing diversity in populations of organisms that reproduce sexually; ***(supporting standard)***
										B(8)(B) predict possible outcomes of various genetic combinations using monohybrid and dihybrid crosses, including non-Mendelian traits of incomplete dominance, codominance, sex-linked traits, and multiple alleles. ***(readiness standard)***

Fossil Record as Evidence of the Past	**K-1(13) Organisms and environments. The student knows that organisms resemble their parents and have structures and undergo processes that help them interact and survive within their environments. The student is expected to:**		**2(13) Organisms and environments. The student knows that organisms have structures and undergo processes that help them interact and survive within their environments. The student is expected to:**	**3-5(12) Organisms and environments. The student describes patterns, cycles, systems, and relationships within environments. The student is expected to:**		**5(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures and behaviors that help them survive within their environments. The student is expected to:**	**6(13) Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:**	**7(13) Organisms and environments. The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:**	**8(13) Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:**	**B(9) The student knows evolutionary theory is a scientific explanation for the unity and diversity of life that has multiple lines of evidence. The student is expected to:**
				3(12)(D) identify fossils as evidence of past living organisms and environments, including common Texas fossils. ***(supporting standard)***	4(12)(C) identify and describe past environments based on fossil evidence, including common Texas fossils.					B(9)(A) analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular and developmental ***(supporting standard)***
										B(9)(B) examine scientific explanations for varying rates of change such as gradualism, abrupt appearance, and stasis in the fossil record. ***(readiness standard)***
ural Selection			**2(13) Organisms and environments. The student knows that organisms have structures and undergo processes that help them interact and survive within their environments. The student is expected to:**			**5(13) Organisms and environments. The student knows that organisms undergo similar life processes and have structures and behaviors that help them survive within their environments. The student is expected to:**	**6(13) Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:**	**7(13) Organisms and environments. The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:**	**8(13) Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:**	**B(10))The student knows evolutionary theory is a scientific explanation for the unity and diversity of life that has multiple mechanisms. The student is expected to:**
							6(13)(C) describe how variations within a population can be an advantage or disadvantage to the survival of a population as environments change.	7(13)(D) describe and give examples of how natural and artificial selection change the occurrence of traits in a population over generations. ***(supporting standard)***	8(13)(C) describe how variations of traits within a population lead	B(10)(A) analyze and evaluate how natural selection produces change in populations and not in individuals; ***(supporting standard)***

Nat		2(13)(C) record and compare how being part of a group helps animals obtain food, defend themselves, and cope with changes;		5(13)(B) explain how instinctual behavioral traits such as turtle hatchlings returning to the sea and learned behavioral traits such as orcas hunting in packs increase chances of survival.		7(13)(C) compare the results of asexual and sexual reproduction of plants and animals in relation to the diversity of offspring and the changes in the population over time; (supporting standard)	to structural, behavioral, and physiological adaptations that influence the likelihood of survival and reproductive success of a species over generations. ***(readiness standard)***	B(10)(B) analyze and evaluate 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; ***(supporting standard)***

Changes in Matter and Conservation of Matter	**K-2(6) Matter and its properties. The student knows that objects have physical properties that determine how they are described and classified. The student is expected to:**	**2(6) Matter and its properties. The student knows that matter has physical properties that determine how it is described, classified, and used. The student is expected to:**	**3-5(6) Matter and energy. The student knows that matter has measurable physical properties that determine how matter is identified, classified, changed, and used. The student is expected to:**			**6(6) Matter and energy. The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. The student is expected to:**	**7(6) Matter and energy. The student distinguishes between elements and compounds, classifies changes in matter, and understands the properties of solutions. The student is expected to:**	**8(6) Matter and energy. The student understands that matter can be classified according to its properties and matter is conserved in chemical changes that occur within closed systems. The student is expected to:**	**B(11) Science concepts--biological structures, functions, and processes. The student knows the significance of matter cycling, energy flow, and enzymes in living organisms. The student is expected to:**
								8(6)(E) investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis. ***(readiness standard)***	B(11) A explain how matter is conserved and energy is transferred during photosynthesis and cellular respiration using models, including the chemical equations for these processes; ***(supporting standard)***

Cycling of Matter and Energy Transfer in Ecosystems	**K(12) Organisms and environments. The student knows that plants and animals depend on the environment to meet their basic needs for survival. The student is expected to:**	**1(12) Organisms and environments. The student knows that the environment is composed of relationships between living organisms and nonliving components. The student is expected to:**	**2(12) Organisms and environments. The student knows that living organisms have basic needs that must be met through interactions within their environment. The student is expected to:**	**3-5(12) Organisms and environments. The student describes patterns, cycles, systems, and relationships within environments. The student is expected to:**			**6(12) Organisms and environments. The student knows that interdependence occurs between living systems and the environment. The student is expected to:**	**7(12) Organisms and environments. The student understands that ecosystems are dependent upon the cycling of matter and the flow of energy. The student is expected to:**	**8(12) Organisms and environments. The student understands stability and change in populations and ecosystems. The student is expected to:**	**B(13) Science concepts--interdependence within environmental systems. The student knows that interactions at various levels of organization occur within an ecosystem to maintain stability. The student is expected to:**
									8(11) Earth and space. The student knows that natural events and human activity can impact global climate. The student is expected to:	**B(11) Science concepts--biological structures, functions, and processes. The student knows the significance of matter cycling, energy flow, and enzymes in living organisms. The student is expected to:**
		1(12)(C) identify and illustrate how living organisms depend on each other through food chains.	2(12)(B) create and describe food chains identifying producers and consumers to demonstrate how animals depend on other living things;	3(12)(B) identify and describe the flow of energy in a food chain and predict how changes in a food chain such as removal of frogs from a pond or bees from a field affect the ecosystem; ***(supporting standard)***	4(12)(A) investigate and explain how most producers can make their own food using sunlight, water, and carbon dioxide through the cycling of matter;	5(12)(B) predict how changes in the ecosystem affect the cycling of matter and flow of energy in a food web;		7(12)(A) diagram the flow of energy within trophic levels and describe how the available energy decreases in successive trophic levels in energy pyramids; ***(supporting standard)***	8(12)(A) explain how disruptions such as population changes, natural disasters, and human intervention impact the transfer of energy in food webs in ecosystems;	B(13)(B) analyze how ecosystem stability is affected by disruptions to the cycling of matter and flow of energy through trophic levels using models; ***(supporting standard)***
								7(12)(B) describe how ecosystems are sustained by the continuous flow of energy and the recycling of matter and nutrients within the biosphere.		
					4(12)(B) describe the cycling of matter and flow of energy through food webs, including the roles of the Sun, producers, consumers, and decomposers; ***(supporting standard)***				8(11)(A) use scientific evidence to describe how natural events, including volcanic eruptions, meteor impacts, abrupt changes in ocean currents, and the release and absorption of greenhouse gases influence climate;	B(13)(C) explain the significance of the carbon and nitrogen cycles to ecosystem stability and analyze the consequences of disrupting these cycles; ***(supporting standard)***
									8(11)(B) use scientific evidence to describe how human activities, including the release of greenhouse gases, deforestation, and urbanization, can influence climate;	
									8(11)(C) describe the carbon cycle.	
										B(11)(A) explain how matter is conserved and energy is transferred during photosynthesis and cellular respiration using models, including the chemical equations for these processes; ***(supporting standard)***

ndent Relationships in Ecosystems	**K(12) Organisms and environments. The student knows that plants and animals depend on the environment to meet their basic needs for survival. The student is expected to:**	**1(12) Organisms and environments. The student knows that the environment is composed of relationships between living organisms and nonliving components. The student is expected to:**	**2(12) Organisms and environments. The student knows that living organisms have basic needs that must be met through interactions within their environment. The student is expected to:**	**3-5(12) Organisms and environments. The student describes patterns, cycles, systems, and relationships within environments. The student is expected to:**			**6(12) Organisms and environments. The student knows that interdependence occurs between living systems and the environment. The student is expected to:**	**7(12) Organisms and environments. The student understands that ecosystems are dependent upon the cycling of matter and the flow of energy. The student is expected to:**	**8(12) Organisms and environments. The student understands stability and change in populations and ecosystems. The student is expected to:**	**(13) Science concepts--interdependence within environmental systems. The student knows that interactions at various levels of organization occur within an ecosystem to maintain stability. The student is expected to:**
	K(12)(A) observe and identify the dependence of plants on air, sunlight, water, nutrients in the soil, and space to grow;					5(12)(A) observe and describe how a variety of organisms survive by interacting with biotic and abiotic factors in a healthy ecosystem; ***(readiness standard)***	6(12)(A) investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition; ***(supporting standard)***			B(13)(A) investigate and evaluate how ecological relationships, including predation, parasitism, commensalism, mutualism, and

Interdepe	K(12)(B) observe and identify the dependence of animals on air, water, food, space, and shelter.	1(12)(B) describe and record examples of interactions and dependence between living and nonliving components in terrariums or aquariums;	2(12)(C) explain and demonstrate how some plants depend on other living things, wind, or water for pollination and to move their seeds around.				6(12)(B) describe and give examples of predatory, competitive, and symbiotic relationships between organisms, including mutualism, parasitism, and commensalism;		commensalism, mutualism, and competition influence ecosystem stability; ***(supporting standard)***
Change and Stability in Ecosystems			2(12)(A) describe how the physical characteristics of environments, including the amount of rainfall, support plants and animals within an ecosystem;	3(12)(C) describe how natural changes to the environment such as floods and droughts cause some organisms to thrive and others to perish or move to new locations;		5(12)(C) describe a healthy ecosystem and how human activities can be beneficial or harmful to an ecosystem.		8(12)(B) describe how primary and secondary ecological succession affect populations and species diversity after ecosystems are disrupted by natural events or human activity; ***(readiness standard)***	B(13)(D) explain how environmental change, including change due to human activity, affects biodiversity and analyze how changes in biodiversity impact ecosystem stability. ***(readiness standard)***
								8(12)(C) describe how biodiversity contributes to the stability and sustainability of an ecosystem and the health of the organisms within the ecosystem. ***(supporting standard)***	