

Alignment of Texas Pre-Admission Content Test (PACT) Life Science: Grades 7–12 (738) Framework with Texas Essential Knowledge and Skills

This alignment study identifies the Texas Essential Knowledge and Skills that are addressed in whole or in part by each competency of the exam framework. An indication of alignment does not necessarily imply complete congruence of the content of an exam competency with the relevant standard. The information in this document is subject to change if revisions are made to the exam framework. Any changes will fully supersede the information contained in this document.

Competencies		Texas Essential Knowledge and Skills
Field 738: TX PACT: Life Science: Grades 7–12		Texas Essential Knowledge and Skills for Science
<u>Content Domain I</u>		
NATURE OF SCIENCE		
001	Understand principles and procedures of scientific inquiry.	<p>Grades 7–8:</p> <p>112.19 b 1; 112.20 b 1 Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices.</p> <p>112.19 b 2; 112.20 b 2 Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations.</p> <p>112.19 b 3; 112.20 b 3 Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists.</p> <p>112.19 b 4; 112.20 b 4 Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry.</p> <hr/> <p>Grades 9–12:</p> <p>112.32 c 1; 112.34 c 1; 112.37 c 1 Scientific processes. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices.</p> <p>112.32 c 2; 112.34 c 2; 112.37 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>112.32 c 3; 112.34 c 3; 112.37 c 3 Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom.</p>

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002	Understand the history and nature of science.	<p>Grades 7–8:</p> <p>112.19 b 2; 112.20 b 2 Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations.</p> <p>112.19 b 3; 112.20 b 3 Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists.</p> <p>112.19 b 12 Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function.</p> <p>Grades 9–12:</p> <p>112.32 c 2; 112.34 c 2; 112.37 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>112.32 c 3; 112.34 c 3; 112.37 c 3 Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom.</p> <p>112.37 c 9 Science concepts. The student knows the impact of human activities on the environment.</p>
003	Understand the relationships among science, technology, engineering, mathematics, and society.	<p>Grades 7–8:</p> <p>112.19 b 3; 112.20 b 3 Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists.</p> <p>112.19 b 8 Earth and space. The student knows that natural events and human activity can impact Earth systems.</p> <p>112.20 b 11 Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems.</p>

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		<p>Grades 9–12:</p> <p>112.32 c 2; 112.34 c 2; 112.37 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>112.32 c 3; 112.34 c 3; 112.37 c 3 Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom.</p> <p>112.32 c 4 Science concepts. Students know that aquatic environments are the product of Earth systems interactions.</p> <p>112.32 c 5 Science concepts. The student conducts long-term studies on local aquatic environments. Local natural environments are to be preferred over artificial or virtual environments.</p> <p>112.32 c 12 Science concepts. The student understands how human activities impact aquatic environments.</p> <p>112.37 c 5 Science concepts. The student knows the interrelationships among the resources within the local environmental system.</p> <p>112.37 c 8 Science concepts. The student knows that environments change naturally.</p> <p>112.37 c 9 Science concepts. The student knows the impact of human activities on the environment.</p>
<p><u>Content Domain II</u></p> <p>BIOCHEMISTRY AND CELL BIOLOGY</p>		
004	Understand the chemistry of living systems.	<p>Grades 7–8: n/a</p> <p>Grades 9–12:</p> <p>112.34 c 9 Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.</p> <p>112.37 c 6 Science concepts. The student knows the sources and flow of energy through an environmental system.</p>

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005	Understand cell structure, function, and bioenergetics.	Grades 7–8: 112.19 b 12 Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function.
		Grades 9–12: 112.34 c 4 Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. 112.34 c 5 Science concepts. The student knows how an organism grows and the importance of cell differentiation. 112.34 c 9 Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.
<u>Content Domain III</u> GENETICS AND EVOLUTION		
006	Understand molecular genetics.	Grades 7–8: 112.19 b 14 Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material.
		Grades 9–12: 112.34 c 5 Science concepts. The student knows how an organism grows and the importance of cell differentiation. 112.34 c 6 Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. 112.34 c 7 Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life.

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007	Understand patterns and processes of inheritance.	<p>Grades 7–8:</p> <p>112.19 b 14 Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material.</p> <p>Grades 9–12:</p> <p>112.34 c 6 Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics.</p> <p>112.34 c 7 Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life.</p>
008	Understand the mechanisms of biological evolution.	<p>Grades 7–8:</p> <p>112.19 b 11 Organisms and environments. The student knows that populations and species demonstrate variation and inherit many of their unique traits through gradual processes over many generations.</p> <p>112.19 b 12 Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function.</p> <p>112.20 b 11 Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems.</p> <p>Grades 9–12:</p> <p>112.32 c 10 Science concepts. The student knows environmental adaptations of aquatic organisms.</p> <p>112.34 c 7 Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life.</p>
009		Grades 7–8: n/a

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	Understand the scientific explanations and evidence for the history of life on Earth.	Grades 9–12: 112.34 c 7 Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life.
<u>Content Domain IV</u> BIOLOGICAL UNITY AND DIVERSITY		
010	Understand the structures and functions of organisms and their life cycles.	Grades 7–8: 112.19 b 11 Organisms and environments. The student knows that populations and species demonstrate variation and inherit many of their unique traits through gradual processes over many generations. 112.19 b 12 Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function. 112.19 b 14 Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. 112.34 c 4 Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells.

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		<p>Grades 9–12:</p> <p>112.32 c 10 Science concepts. The student knows environmental adaptations of aquatic organisms.</p> <p>112.34 c 8 Science concepts. The student knows that taxonomy is a branching classification based on the shared characteristics of organisms and can change as new discoveries are made.</p> <p>112.34 c 10 Science concepts. The student knows that biological systems are composed of multiple levels.</p> <p>112.34 c 11 Science concepts. The student knows that biological systems work to achieve and maintain balance.</p> <p>112.37 c 4 Science concepts. The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes.</p>
011	Understand how organisms obtain, store, and use energy and matter to maintain homeostasis.	<p>Grades 7–8:</p> <p>112.19 b 5 Matter and energy. The student knows that matter has physical and chemical properties and can undergo physical and chemical changes.</p> <p>112.19 b 13 Organisms and environments. The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli.</p> <p>Grades 9–12:</p> <p>112.34 c 9 Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.</p> <p>112.34 c 10 Science concepts. The student knows that biological systems are composed of multiple levels.</p>
012	Understand the anatomy and physiology of human organ systems.	<p>Grades 7–8:</p> <p>112.19 b 12 Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function.</p>

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		Grades 9–12: 112.34 c 10 Science concepts. The student knows that biological systems are composed of multiple levels.
<u>Content Domain V</u> ECOLOGY AND ENVIRONMENT		
013	Understand populations and communities.	Grades 7–8: 112.20 b 11 Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems.

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		<p>Grades 9–12:</p> <p>112.32 c 4 Science concepts. Students know that aquatic environments are the product of Earth systems interactions.</p> <p>112.32 c 5 Science concepts. The student conducts long–term studies on local aquatic environments. Local natural environments are to be preferred over artificial or virtual environments.</p> <p>112.32 c 11 Science concepts. The student knows about the interdependence and interactions that occur in aquatic environments.</p> <p>112.34 c 11 Science concepts. The student knows that biological systems work to achieve and maintain balance.</p> <p>112.34 c 12 Science concepts. The student knows that interdependence and interactions occur within an environmental system.</p> <p>112.37 c 4 Science concepts. The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes.</p> <p>112.37 c 6 Science concepts. The student knows the sources and flow of energy through an environmental system.</p> <p>112.37 c 7 Science concepts. The student knows the relationship between carrying capacity and changes in populations and ecosystems.</p> <p>112.37 c 8 Science concepts. The student knows that environments change naturally.</p>
014	Understand ecosystems and biomes.	<p>Grades 7–8:</p> <p>112.19 b 8 Earth and space. The student knows that natural events and human activity can impact Earth systems.</p> <p>112.20 b 11 Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems.</p>

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		<p>Grades 9–12:</p> <p>112.32 c 4 Science concepts. Students know that aquatic environments are the product of Earth systems interactions.</p> <p>112.32 c 5 Science concepts. The student conducts long-term studies on local aquatic environments. Local natural environments are to be preferred over artificial or virtual environments.</p> <p>112.32 c 6 Science concepts. The student knows the role of cycles in an aquatic environment.</p> <p>112.32 c 7 Science concepts. The student knows the origin and use of water in a watershed.</p> <p>112.32 c 8 Science concepts. The student knows that geological phenomena and fluid dynamics affect aquatic systems.</p> <p>112.32 c 9 Science concepts. The student knows the types and components of aquatic ecosystems.</p> <p>112.32 c 11 Science concepts. The student knows about the interdependence and interactions that occur in aquatic environments.</p> <p>112.34 c 11 Science concepts. The student knows that biological systems work to achieve and maintain balance.</p> <p>112.34 c 12 Science concepts. The student knows that interdependence and interactions occur within an environmental system.</p> <p>112.37 c 4 Science concepts. The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes.</p> <p>112.37 c 6 Science concepts. The student knows the sources and flow of energy through an environmental system.</p>
015	Understand the effects of human activities on the biosphere.	<p>Grades 7–8:</p> <p>112.19 b 8 Earth and space. The student knows that natural events and human activity can impact Earth systems.</p>

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		<p>Grades 9–12:</p> <p>112.32 c 12 Science concepts. The student understands how human activities impact aquatic environments.</p> <p>112.37 c 9 Science concepts. The student knows the impact of human activities on the environment.</p>