

Alignment of Texas Pre-Admission Content Test (PACT) Chemistry: Grades 7–12 (740) 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 740: TX PACT: Chemistry: 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>

Competencies		Texas Essential Knowledge and Skills
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		<p>Grades 9–12:</p> <p>112.35 c 1; 112.38 c 1; 112.39 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>112.35 c 2; 112.38 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>112.35 c 3; 112.38 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>112.35 c 6 Science concepts. The student knows and understands the historical development of atomic theory.</p>
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> <hr/> <p>Grades 9–12:</p> <p>112.35 c 2; 112.38 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>112.35 c 3; 112.38 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>112.35 c 5 Science concepts. The student understands the historical development of the Periodic Table and can apply its predictive power.</p> <p>112.35 c 6 Science concepts. The student knows and understands the historical development of atomic theory.</p>

Competencies		Texas Essential Knowledge and Skills
Field 740: TX PACT: Chemistry: Grades 7–12		Texas Essential Knowledge and Skills for Science
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>Grades 9–12:</p> <p>112.35 c 2; 112.38 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>112.35 c 3; 112.38 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>112.35 c 12 Science concepts. The student understands the basic concepts of nuclear chemistry.</p> <p>112.38 c 7 Science concepts. The student knows that changes in matter affect everyday life.</p>
<p><u>Content Domain II</u></p> <p>MATTER AND ATOMIC STRUCTURE</p>		
004	Understand the properties of matter.	<p>Grades 7–8:</p> <p>112.19 b 6 Matter and energy. The student knows that matter has physical and chemical properties and can undergo physical and chemical changes.</p>
		<p>Grades 9–12:</p> <p>112.35 c 4 Science concepts. The student knows the characteristics of matter and can analyze the relationships between chemical and physical changes and properties.</p> <p>112.38 c 6 Science concepts. The student knows that relationships exist between the structure and properties of matter.</p>

Competencies		Texas Essential Knowledge and Skills
Field 740: TX PACT: Chemistry: Grades 7–12		Texas Essential Knowledge and Skills for Science
005	Understand atomic theory and the periodic table.	Grades 7–8: 112.20 b 5 Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties.
		Grades 9–12: 112.35 c 5 Science concepts. The student understands the historical development of the Periodic Table and can apply its predictive power. 112.35 c 6 Science concepts. The student knows and understands the historical development of atomic theory. 112.38 c 6 Science concepts. The student knows that relationships exist between the structure and properties of matter.
006	Understand the kinetic molecular theory, the nature of phase changes, and the gas laws.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 4 Science concepts. The student knows the characteristics of matter and can analyze the relationships between chemical and physical changes and properties. 112.35 c 9 Science concepts. The student understands the principles of ideal gas behavior, kinetic molecular theory, and the conditions that influence the behavior of gases. 112.35 c 10 Science concepts. The student understands and can apply the factors that influence the behavior of solutions. 112.38 c 6 Science concepts. The student knows that relationships exist between the structure and properties of matter. 112.38 c 7 Science concepts. The student knows that changes in matter affect everyday life.
<u>Content Domain III</u> ENERGY AND CHEMICAL BONDING		

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007	Understand the principles of thermodynamics and calorimetry.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 11 Science concepts. The student understands the energy changes that occur in chemical reactions.
008	Understand energy relationships in chemical bonding, chemical reactions, and physical processes.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 7 Science concepts. The student knows how atoms form ionic, covalent, and metallic bonds. 112.35 c 10 Science concepts. The student understands and can apply the factors that influence the behavior of solutions. 112.35 c 11 Science concepts. The student understands the energy changes that occur in chemical reactions. 112.38 c 7 Science concepts. The student knows that changes in matter affect everyday life.
009	Understand the nomenclature and structure of inorganic and organic compounds.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 7 Science concepts. The student knows how atoms form ionic, covalent, and metallic bonds.
010	Understand chemical bonding and intermolecular forces and their effect on the properties of substances.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 7 Science concepts. The student knows how atoms form ionic, covalent, and metallic bonds.

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Content Domain IV		
CHEMICAL REACTIONS		
011	Understand the nature of chemical reactions.	Grades 7–8: 112.20 b 5 Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties.
		Grades 9–12: 112.35 c 8 Science concepts. The student can quantify the changes that occur during chemical reactions. 112.35 c 11 Science concepts. The student understands the energy changes that occur in chemical reactions. 112.35 c 12 Science concepts. The student understands the basic processes of nuclear chemistry. 112.38 c 7 Science concepts. The student knows that changes in matter affect everyday life.
012	Understand the principles of chemical equilibrium.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 8 Science concepts. The student can quantify the changes that occur during chemical reactions.
013	Understand acid–base chemistry.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 8 Science concepts. The student can quantify the changes that occur during chemical reactions. 112.35 c 10 Science concepts. The student understands and can apply the factors that influence the behavior of solutions.

Competencies		Texas Essential Knowledge and Skills
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014	Understand oxidation–reduction reactions and electrochemistry.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 8 Science concepts. The student can quantify the changes that occur during chemical reactions.
<u>Content Domain V</u> STOICHIOMETRY AND SOLUTIONS		
015	Understand the mole concept.	Grades 7–8: n/a
		Grades 9–12: 112.35 c 8 Science concepts. The student can quantify the changes that occur during chemical reactions.
016	Understand stoichiometry.	Grades 7–8: 112.20 b 5 Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties.
		Grades 9–12: 112.35 c 8 Science concepts. The student can quantify the changes that occur during chemical reactions. 112.38 c 7 Science concepts. The student knows that changes in matter affect everyday life.
017	Understand the properties of solutions and colloidal suspensions.	Grades 7–8: n/a

Competencies		Texas Essential Knowledge and Skills
Field 740: TX PACT: Chemistry: Grades 7–12		Texas Essential Knowledge and Skills for Science
		<p>Grades 9–12:</p> <p>112.35 c 10 Science concepts. The student understands and can apply the factors that influence the behavior of solutions.</p> <p>112.38 c 6 Science concepts. The student knows that relationships exist between the structure and properties of matter.</p>