Alignment of Texas Pre-Admission Content Test (PACT) Physical Science 6–12 (737) 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 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
Content Domain I **NATURE OF SCIENCE**		
001	Understand principles and procedures of scientific inquiry.	**Grade 6:** **112.18 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. **112.18 b 2** Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. **112.18 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. **112.18 b 4** Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry.
		Grades 7–8: **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. **112.19 b 2; 112.20 b 2** Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. **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.

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
		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.
		Grades 9–12: **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. **112.35 c 2; 112.38 c 1; 112.39 c 1** Scientific processes. The student uses scientific methods during laboratory and field investigations. **112.35 c 3; 112.38 c 3; 112.39 c 3** Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. **112.35 c 6** Science concepts. The student knows and understands the historical development of atomic theory.
002	Understand the history of science, its connections with other sciences, and the relationships among science, technology, and society.	**Grade 6:** **112.18 b 2** Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. **112.18 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.
		Grades 7–8: **112.19 b 2; 112.20 b 2** Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations. **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.

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
		Grades 9–12: **112.35 c 2; 112.38 c 2; 112.39 c 2** Scientific processes. The student uses scientific methods during laboratory and field investigations. **112.35 c 3; 112.38 c 3; 112.39 c 3** Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. **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 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life.
Content Domain II **MECHANICS**		
003	Understand motion in one and two dimensions.	**Grade 6:** **112.18 b 8** Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy.
		Grades 7–8: **112.20 b 6** Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy.
		Grades 9–12: **112.38 c 4** Science concepts. The student knows concepts of force and motion evident in everyday life. **112.39 c 4** Science concepts. The student knows and applies the laws governing motion in a variety of situations.

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
004	Understand forces as interactions and their effects on motion.	**Grade 6:** **112.18 b 8** Force, motion, and energy. The student knows force and motion are related to potential and kinetic energy.
		Grades 7–8: **112.20 b 6** Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy.
		Grades 9–12: **112.38 c 4** Science concepts. The student knows concepts of force and motion evident in everyday life. **112.38 c 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 4** Science concepts. The student knows and applies the laws governing motion in a variety of situations. **112.39 c 5** Science concepts. The student knows the nature of forces in the physical world.
005	Understand the conservation of energy and linear momentum.	**Grade 6:** n/a
		Grades 7–8: n/a

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
		Grades 9–12: **112.38 c 4** Science concepts. The student knows concepts of force and motion evident in everyday life. **112.38 c 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 6** Science concepts. The student knows that changes occur within a physical system and applies the laws of conservation of energy and momentum.
006	Understand simple harmonic motion and rotational dynamics.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **112.39 c 4** Science concepts. The student knows and applies the laws governing motion in a variety of situations.
Content Domain III **ELECTRICITY AND MAGNETISM**		
007	Understand properties of the electric field.	**Grade 6:** n/a
		Grades 7–8: n/a

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		Grades 9–12: **112.38 c 4** Science concepts. The student knows concepts of force and motion evident in everyday life. **112.38 c 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 5** Science concepts. The student knows the nature of forces in the physical world.
008	Understand properties of the magnetic field and electromagnetic induction.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **112.38 c 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 5** Science concepts. The student knows the nature of forces in the physical world.
009	Understand properties of electric circuits.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **112.38 c 77** 5 Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 5** Science concepts. The student knows the nature of forces in the physical world.

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Content Domain IV **WAVES**		
010	Understand the fundamental properties of waves.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **112.38 c 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 7** Science concepts. The student knows the characteristics and behavior of waves.
011	Understand the characteristics of light and electromagnetic radiation.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **112.38 c 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 7** Science concepts. The student knows the characteristics and behavior of waves. **112.39 c 8** Science concepts. The student knows simple examples of atomic, nuclear, and quantum phenomena.
Content Domain V **MODERN PHYSICS**		

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
012	Understand thermal energy and the kinetic theory of matter.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **112.38 c 5** Science concepts. The student recognizes multiple forms of energy and knows the impact of energy transfer and energy conservation in everyday life. **112.39 c 6** Knowledge and skills. Science concepts. The student knows that changes occur within a physical system and applies the laws of conservation of energy and momentum.
013	Understand fundamental ideas of modern physics.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **112.38 c 7** Science concepts. The student knows that changes in matter affect everyday life. **112.39 c 8** Science concepts. The student knows simple examples of atomic, nuclear, and quantum phenomena.
014	Understand the fundamental principles of nuclear physics.	**Grade 6:** n/a
		Grades 7–8: n/a

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
		Grades 9–12: **112.38 c 7** Science concepts. The student knows that changes in matter affect everyday life. **112.39 c 5** Science concepts. The student knows the nature of forces in the physical world. **112.39 c 8** Science concepts. The student knows simple examples of atomic, nuclear, and quantum phenomena.
Content Domain VI **MATTER AND ATOMIC STRUCTURE**		
015	Understand the properties of matter.	**Grade 6:** **112.18 b 5** Matter and energy. The student knows the differences between elements and compounds. **112.18 b 6** Matter and energy. The student knows matter has physical properties that can be used for classification.
		Grades 7–8: **112.19 b 6** Matter and energy. The student knows that matter has physical and chemical properties and can undergo physical and chemical changes.
		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. **112.38 c 6** Knowledge and skills. Science concepts. The student knows that relationships exist between the structure and properties of matter.

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
016	Understand atomic theory and the periodic table.	**Grade 6:** **112.18 b 5** Matter and energy. The student knows the differences between elements and compounds. **112.18 b 6** Matter and energy. The student knows matter has physical properties that can be used for classification.
		Grades 7–8: **112.20 b 5** Matter and energy. 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.
017	Understand the kinetic molecular theory, the nature of phase changes, and the gas laws.	**Grade 6:** **112.18 b 9** Force, motion, and energy. The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form.
		Grades 7–8: n/a

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
		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.
Content Domain VII **ENERGY AND CHEMICAL BONDING**		
018	Understand the principles of thermodynamics and calorimetry.	**Grade 6:** n/a
		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.
019	Understand energy relationships in chemical bonding, chemical reactions, and physical processes.	**Grade 6:** n/a
		Grades 7–8: n/a

Competencies		Texas Essential Knowledge and Skills
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		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** Knowledge and skills. Science concepts. The student knows that changes in matter affect everyday life.
020	Understand the nomenclature and structure of inorganic and organic compounds.	**Grade 6:** n/a
		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.
021	Understand chemical bonding and intermolecular forces and their effect on the properties of substances.	**Grade 6:** n/a
		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.
Content Domain VIII **CHEMICAL REACTIONS**		

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
022	Understand the nature of chemical reactions.	**Grade 6:** **112.18 b 5** Matter and energy. The student knows the differences between elements and compounds.
		Grades 7–8: **112.20 b 5** Matter and energy. 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.
023	Understand the principles of chemical equilibrium.	**Grade 6:** n/a
		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.
024	Understand acid–base chemistry.	**Grade 6:** n/a
		Grades 7–8: n/a

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		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.
025	Understand oxidation–reduction reactions and electrochemistry.	**Grade 6:** n/a
		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.
Content Domain IX **STOICHIOMETRY AND SOLUTIONS**		
026	Understand the mole concept.	**Grade 6:** n/a
		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.
027	Understand stoichiometry.	**Grade 6:** n/a
		Grades 7–8: **112.20 b 5** Matter and energy. Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties.

Competencies		Texas Essential Knowledge and Skills
Field 737: TX PACT: Physical Science: Grades 6–12		**Texas Essential Knowledge and Skills for Science**
		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.
028	Understand the properties of solutions and colloidal suspensions.	**Grade 6:** n/a
		Grades 7–8: n/a
		Grades 9–12: **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.