

Alignment of Texas Pre-Admission Content Test (PACT) Physics: Grades 7–12 (739) 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 739: TX PACT: Physics: 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>112.20 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>112.20 b 2 Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations.</p> <p>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>112.20 b 4 Scientific investigation and reasoning. The student knows how to use a variety of tools and safety equipment to conduct science inquiry.</p> <p>Grades 9–12:</p> <p>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>112.38 c 2; 112.39 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>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.</p>

Competencies		Texas Essential Knowledge and Skills
Field 739: TX PACT: Physics: Grades 7–12		Texas Essential Knowledge and Skills for Science
002	Understand the history of science, its connections with other sciences, and the relationships among science, technology, and society.	<p>Grades 7–8:</p> <p>112.20 b 2 Scientific investigation and reasoning. The student uses scientific practices during laboratory and field investigations.</p> <p>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>112.38 c 2; 112.39 c 2 Scientific processes. The student uses scientific methods during laboratory and field investigations.</p> <p>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.</p> <p>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.</p>
<u>Content Domain II</u> MECHANICS		
003	Understand motion in one and two dimensions.	<p>Grades 7–8:</p> <p>112.20 b 6 Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy.</p> <p>Grades 9–12:</p> <p>112.38 c 4 Science concepts. The student knows concepts of force and motion evident in everyday life.</p> <p>112.39 c 4 Science concepts. The student knows and applies the laws governing motion in a variety of situations.</p>

Competencies		Texas Essential Knowledge and Skills
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004	Understand forces as interactions and their effects on motion.	<p>Grades 7–8:</p> <p>112.20 b 6 Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy.</p> <p>Grades 9–12:</p> <p>112.38 c 4 Science concepts. The student knows concepts of force and motion evident in everyday life.</p> <p>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.</p> <p>112.39 c 4 Science concepts. The student knows and applies the laws governing motion in a variety of situations.</p> <p>112.39 c 5 Science concepts. The student knows the nature of forces in the physical world.</p>
005	Understand the conservation of energy and linear momentum.	<p>Grades 7–8: n/a</p> <p>Grades 9–12:</p> <p>112.38 c 4 Science concepts. The student knows concepts of force and motion evident in everyday life.</p> <p>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.</p> <p>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.</p>
006	Understand simple harmonic motion and rotational dynamics.	Grades 7–8: n/a

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		Grades 9–12: 112.39 c 4 Science concepts. The student knows and applies the laws governing motion in a variety of situations.
<u>Content Domain III</u> ELECTRICITY AND MAGNETISM		
007	Understand properties of the electric field.	Grades 7–8: n/a 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.	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.	Grades 7–8: n/a

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		<p>Grades 9–12:</p> <p>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.</p> <p>112.39 c 5 Science concepts. The student knows the nature of forces in the physical world.</p>
<u>Content Domain IV</u>		
WAVES		
010	Understand the fundamental properties of waves.	Grades 7–8: n/a
		<p>Grades 9–12:</p> <p>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.</p> <p>112.39 c 7 Science concepts. The student knows the characteristics and behavior of waves.</p>
011	Understand the characteristics of light and electromagnetic radiation.	Grades 7–8: n/a
		<p>Grades 9–12:</p> <p>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.</p> <p>112.39 c 7 Science concepts. The student knows the characteristics and behavior of waves.</p> <p>112.39 c 8 Science concepts. The student knows simple examples of atomic, nuclear, and quantum phenomena.</p>

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Content Domain V		
MODERN PHYSICS		
012	Understand thermal energy and the kinetic theory of matter.	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.	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.	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 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.