



### Active Physics Correlation with Texas

<b>Correlation Key:</b> <b>Coverage</b> = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept. <b>Indepth Coverage</b> = Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept. <b>E=</b> Entire Chapter Coverage.	<u>Communication</u>			<u>Home</u>			<u>Medicine</u>			<u>Predictions</u>			<u>Sports</u>			<u>Transportation</u>		
	C1	C2	C3	H1	H2	H3	M1	M2	M3	P1	P2	P3	S1	S2	S3	T1	T2	T3
<b>Integrated Physics and Chemistry</b>																		
<b>Introduction</b>																		
(1) In Integrated Physics and Chemistry, students conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical-thinking and scientific problem-solving. This course integrates the disciplines of physics and chemistry in the following topics: motion, waves, energy transformations, properties of matter, changes in matter, and solution chemistry.	E	E	E	E	E	E					E	E	E	E	E	E	E	E
(2) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
(3) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.	SE 24-29 TE 48-57	SE 85-94 TE 172-188	SE 116-120 TE 248-254	SE 19-40 TE 44-93		E	SE 34-64 TE 66-118	E				SE 125-137 TE 250-269						SE 93-94 TE 192-197
(4) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
<b>Knowledge and Skills</b>																		
(1) Scientific processes. The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:																		
(A) Demonstrate safe practices during field and laboratory investigations; and	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E

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	C1	C2	C3	H1	H2	H3	M1	M2	M3	P1	P2	P3	S1	S2	S3	T1	T2	T3
(B) Make wise choices in the use and conservation of resources and the disposal or recycling of materials				SE 2-3 TE 6-8	SE 44-45 TE 108-110													
<b>(2) Scientific processes. The student uses scientific methods during field and laboratory investigations. The student is expected to:</b>																		
(A) Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
(B) Collect data and make measurements with precision	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
(C) Organize, analyze, evaluate, make inferences, and predict trends from data	SE 4-23, 30-53 TE 12-45, 60-106	E	SE 110-120, 126-149 TE 232-254, 266-307	SE 13-40 TE 32-43	SE 46-59 TE 114-141	E					E		E	E	SE 117-161 TE 245-323	E	SE 67-99 TE 140-205	SE 110-133 TE 234-272
(D) Communicate valid conclusions	SE 2-3 TE 6-10	SE 62-63 TE 128-132	SE 108-109 TE 224-228	SE 2-3 TE 6-8	SE 44-45 TE 108-110	SE 86-87 TE 196-198	SE 2-3 TE 6-9	SE 68-69 TE 136-140	SE 30-131 TE 268-272	SE 2-3 TE 6-9	SE 54-55 TE 108-113	SE 100-101 TE 200-203	SE 2-3 TE 6-10	SE 52-53 TE 122-126	SE 112-113 TE 236-240	SE 2-3 TE 6-12	SE 60-61 TE 126-131	SE 108-109 TE 228-233
<b>(3) Scientific processes. The student uses critical thinking and scientific problem-solving to make informed decisions. The student is expected to:</b>																		
(A) Analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information	SE 4-23, 30-53 TE 12-45, 60-106																	
(B) Draw inferences based in data related to promotional materials for products and services																SE 55-56 TE 105-106	SE 100-103 TE 206-211	
(C) Evaluate the impact of research on scientific thought, society, and the environment	SE 59 TE 115	SE 105 TE 213	SE 161 TE 325	SE 41 TE 95	SE 83 TE 183	SE 116 TE 254	SE 65 TE 119	SE 127 TE 251	SE 171 TE 349	SE 51 TE 95	SE 97 TE 188	SE 161 TE 303	SE 49 TE 109	SE 109 TE 223	SE 162 TE 324	SE 57 TE 107	SE 104 TE 212	SE 162 TE 324

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	C1	C2	C3	H1	H2	H3	M1	M2	M3	P1	P2	P3	S1	S2	S3	T1	T2	T3
(D) Describe connections between physics and chemistry and future careers	SE 59 TE 115	SE 105 TE 213	SE 161 TE 325	SE 41 TE 95	SE 83 TE 183	SE 116 TE 254	SE 65 TE 119	SE 127 TE 251	SE 171 TE 349	SE 51 TE 95	SE 97 TE 188	SE 161 TE 303	SE 49 TE 109	SE 109 TE 223	SE 162 TE 324	SE 57 TE 107	SE 104 TE 212	SE 162 TE 324
(E) Research and describe the history of physics, chemistry, and contributions of scientists												SE 138-160 TE 270-302						
<b>(4) Science concepts. The student knows concepts of force and motion evident in everyday life. The student is expected to:</b>																		
(A) Calculate speed, momentum, acceleration, work, and power in systems such as in the human body, moving toys, and machines											SE 61-68 TE 126-137		SE 4-8, 22-25, 38-48 TE 12-20, 54-63, 86-99	SE 73-80, 97-102 TE 161-168, 204-212	SE 129-139 156-161 TE 272-291 316-327	SE 10-21, 26-39 TE 28-49, 58-79		SE 124-133 TE 256-272
(B) Investigate and describe applications of Newton's laws such as in vehicle restraints, sports activities, geological processes, and satellite orbits											E		E				SE 67-99 TE 140-205	
(C) Analyze the effects caused by changing force or distance in simple machines as demonstrated in household devices, the human body, and vehicles																		
(D) Investigate and demonstrate mechanical advantage and efficiency of various machines such as levers, motors, wheels and axles, pulleys, and ramps.																		
<b>(5) Science concepts. The student knows the effects of waves on everyday life. The student is expected to:</b>																		
(A) Demonstrate wave types and their characteristics through a variety of activities such as modeling with ropes and coils, activating tuning forks, and interpreting data on seismic waves	SE 4-23 TE 12-45	SE 64-68 TE 134-141					SE 22-27 TE 46-53											
(B) Demonstrate wave interactions including interferences, polarization, reflection, refraction, and resonance within various materials	SE 30-53 TE 60-106		SE 133-144 TE 278-297									SE 132-137 TE 262-269						

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(C) Identify uses of electromagnetic waves in various technological applications such as fiber optics, optical scanners, and microwaves			SE 126-132 TE 266-277															
(D) demonstrate the application of acoustic principles such as echolocation, musical instruments, noise pollution, and sonograms	SE 12-23 TE 28-45						E		SE 142-170 TE 296-348									
<b>(6) Science concepts. The student knows the impact of energy transformations in everyday life. The student is expected to:</b>																		
(A) Describe the law of conservation of energy													SE 44-48 TE 104-108	SE 73-80 TE 161-168	SE 134-139 TE 286-291			
(B) Investigate and demonstrate the movement of heat through solids, liquids, and gases by convection, conduction, and radiation				SE 19-40 TE 44-93														
(C) Analyze the efficacy of energy conversions that are responsible for the production of electricity such as from radiant, nuclear, and geothermal sources, fossil fuels such as coal, gas, oil, and the movement of water or wind																		
(D) Investigate and compare economic and environmental impacts of using various energy sources such as rechargeable or disposable batteries and solar cells																		
(E) Measure the thermal and electrical conductivity of various materials and explain results				SE 24-28 TE 58-66														
(F) Investigate and compare series of parallel circuits					SE 50-54 TE 125-133													
(G) Analyze the relationship between an electric current and the strength of its magnetic fields using simple electromagnets						SE 88-101 TE 202-226							SE 102-107 TE 206-215					
(H) Analyze the effects of heating and cooling processes in systems such as weather, living, mechanical																		
<b>(7) Science concepts. The students knows the relationship exist between properties of matter and its components. The student is expected to:</b>																		
(A) Investigate and identify properties of fluids including density, viscosity, and buoyancy															SE 156-161 TE 316-325			

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(B) Research and describe the historical development of the atomic theory																		
(C) Identify constituents of various materials or objects such as metal salts, light sources, fireworks displays, and stars using spectral-analysis techniques																		
(D) Relate the chemical behavior of an element including bonding, to its placement on the periodic table																		
(E) Classify samples of matter from everyday life as being elements, compounds, or mixtures																		
<b>(8) Science concepts. The student knows that changes in matter affect everyday life. The student is expected to:</b>																		
(A) Distinguish between physical and chemical changes in matter such as oxidation, digestion, changes in states, and stages in the rock cycle																		
(B) Analyze energy changes that accompany chemical reactions such as those occurring in heat packs, cold packs, and glow sticks to classify them as endergonic or exergonic reactions																		
(C) Investigate and identify the law of conservation of mass																		
(D) Describe types of nuclear reactions such as fission and fusion and their roles in applications such as medicine and energy production																		
(E) Research and describe the environmental and economic impact of the end-products and chemical reactions																		
<b>(9) Science concepts. The students knows how solution chemistry is a part of everyday life. The student is expected to:</b>																		
(A) Relate the structure of water to its function as the universal solvent																		
(B) Relate the concentration of ions in a solution to physical and chemical properties such as pH, electrolytic behavior, and reactivity																		
(C) Simulate the effects of acid rain on soil, buildings, statues, or microorganisms																		
(D) Demonstrate how various factors influence solubility including temperature, pressure, and nature of the solute and solvent																		
(E) Demonstrate how factors such as particle size, influence the rate of dissolving																		
<b>Physics</b>																		
<b>Introduction</b>																		
(1) In Physics, students conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study a variety of topics that include: laws of motion; changes within physical systems and conservation of energy and momentum, force, thermodynamics, characteristics and behavior of waves, and quantum physics. This course provides students with a conceptual framework, factual knowledge, and analytical and scientific skills.	E	E	E	E	E	E						E	E	E	E	E	E	E

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(3) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.	SE 24-29 TE 48-57	SE 85- 94 TE 172-188	SE 116- 120 TE 248-254	SE 19-40 TE 44-93		E	SE 34- 64 TE 66-118	E				SE 125- 137 TE 250-269						SE 93- 94 TE 192- 197
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(A) Demonstrate safe practices during field and laboratory investigations; and	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
(B) Make wise choices in the use and conservation of resources and the disposal or recycling of materials				SE 2-3 TE 6-8	SE 44- 45 TE 108-110													
<b>(2) Scientific processes. The student uses scientific methods during field and laboratory investigations. The student is expected to:</b>																		
(A) Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
(B) Make quantitative observations and measurements with precision	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
(C) Organize, analyze, evaluate, make inferences, and predict trends from data	SE 4-23, 30-53 TE 12-45, 60 106	E	SE 110- 120, 126- 149 TE 232-254, 266-307	SE 13-40 TE 32-43	SE 46- 59 TE 114-141	E					E		E	E	SE 117- 161 TE 245-323	E	SE 67- 99 TE 140- 205	SE 110- 133 TE 234- 272

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(D) Communicate valid conclusions	SE 2-3 TE 6-10	SE 62- 63 TE 128-132	SE 108- 109 TE 224-228	SE 2-3 TE 6-8	SE 44- 45 TE 108-110	SE 86-87 TE 196- 198	SE 2-3 TE 6-9	SE 68- 69 TE 136- 140	SE 130- 131 TE 268-272	SE 2- 3 TE 6-9	SE 54-55 TE 108- 113	SE 100- 101 TE 200-203	SE 2-3 TE 6-10	SE 52- 53 TE 122- 126	SE 112- 113 TE 236-240	SE 2- 3 TE 6- 12	SE 60- 61 TE 126- 131	SE 108- 109 TE 228- 233
(E) Graph data to observe and identify relationships between variables	SE 30-53 TE 60- 106		SE 110- 115 139- 144 TE 232-243 288-297	SE 19-40 TE 44-93			SE 34- 39, 59- 61 TE 66-75, 108- 118				SE 61- 72, 79-88 te 126- 144 156- 174		SE 4-21 TE 12-52	SE 86- 91 TE 182- 190		SE 10-21 TE 28- 49		
(F) Read the scale on scientific instruments with precision	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
<b>(3) Scientific processes. The student uses critical thinking and scientific problem-solving to make informed decisions. The student is expected to:</b>																		
(A) Analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information	SE 4-23, 30-53 TE 12-45, 60, 106																	
(B) Express laws symbolically and employ mathematical procedures including vector addition and right-triangle geometry to solve physical problems																SE 55- 56 TE 105- 106	SE 100- 103 TE 206- 211	
(C) Evaluate the impact of research on scientific thought, society and the environment	SE 59 TE 115	SE 105 TE 213	SE 161 TE 325	SE 41 TE 95	SE 83 TE 183	SE 116 TE 254	SE 65 TE 119	SE 127 TE 251	SE 171 TE 349	SE 51 TE 95	SE 97 TE 188	SE 161 TE 303	SE 49 TE 109	SE 109 TE 223	SE 162 TE 324	SE 57 TE 107	SE 104 TE 212	SE 162 TE 324
(D) Describe the connection between physics and future careers.	SE 59 TE 115	SE 105 TE 213	SE 161 TE 325	SE 41 TE 95	SE 83 TE 183	SE 116 TE 254	SE 65 TE 119	SE 127 TE 251	SE 171 TE 349	SE 51 TE 95	SE 97 TE 188	SE 161 TE 303	SE 49 TE 109	SE 109 TE 223	SE 162 TE 324	SE 57 TE 107	SE 104 TE 212	SE 162 TE 324

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(E) Research and describe the history of physics, chemistry, and contributions of scientists												SE 138-160 TE 270-302						
<b>(4) Science concepts. The student knows the laws governing motion. The student is expected to:</b>																		
(A) Generate and interpret graphs describing motion including the use of real-time technology											SE 61-68, 79-88 TE 126-137		SE 4-8, 18-21 TE 12-20, 46-52				SE 10-21 TE 28-49	
(B) Analyze examples of uniform and accelerated motion including linear, projectile, and circular											SE 61-68, 79-88 TE 126-137		SE 34-43 TE 78-96	SE 103-108 TE 140-149	SE 129-133 TE 272-281		SE 10-21, 40-51 TE 28-49, 80-99	
(C) Demonstrate the effects of forces on the motion of objects											SE 69-93 TE 138-181			SE 61-67, 86-91 TE 140-149 182-190			SE 67-99 TE 140-205	
(D) Develop and interpret a free-body diagram for force analysis																		
(E) Identify and describe motion relative to different frames of reference												SE 138-160 TE 270-302						
<b>(5) Science concepts. The student knows that changes occur within a physical system and recognizes that energy and momentum are conserved. The student is expected to:</b>																		

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(A) Interpret evidence for the work-energy theorem													SE 44-48 TE 104-118	SE 73-80 TE 161-168	SE 134-139 TE 286-291			
(B) Observe and describe examples of kinetic and potential energy and their transformations													SE 44-48 TE 104-118	SE 73-80 TE 161-168	SE 134-139 TE 286-291			
(C) Calculate the mechanical energy and momentum in a physical system such as billiards, cars, and trains													SE 44-48 TE 104-118	SE 73-80 TE 161-168	SE 134-139 TE 286-291			
(D) Demonstrate the conservation of energy and momentum														SE 92-102 TE 196-212				
<b>(6) Science concepts. The student knows forces in nature. The student is expected to:</b>																		
(A) Identify the influence of mass and distance on gravitational forces													SE 108-114 TE 218-230					
(B) Research and describe the historical development of the concepts of gravitational, electrical, and magnetic force													SE 102-114 TE 208-230					
(C) Identify and analyze the influences of charge and distance on electric forces					X SE 52 TE 130													
(D) Demonstrate the relationship between electricity and magnetism		SE 74-84 TE 152-170					E											
(E) Design and analyze electric circuits					SE 50-54 TE 125-133													

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(F) Identify examples of electrical and magnetic forces in everyday life		SE 74-84 TE 152-170				E												
<b>(7) Science concepts. The student knows the laws of thermodynamics. The student is expected to:</b>																		
(A) Analyze and explain everyday examples that illustrate the laws of thermodynamics					SE 64-73, 79-82 TE 152-165 176-182													
(B) Evaluate different methods of heat energy transfer that result in an increasing amount of disorder				X SE 26 TE 62														
<b>(8) Science concepts. The student knows the characteristics and behavior of waves. The student is expected to:</b>																		
(A) Examine and describe a variety of waves propagated in various types of media and describe wave characteristics such as velocity, frequency, amplitude, and behaviors such as reflection, refraction, and interference	SE 4-23, 30-53 TE 12-45, 60 106	SE 64-68 TE 134-141	SE 133-144 TE 178-197				SE 22-27 TE 46-53											
(B) Identify the characteristics and behaviors of sound and electromagnetic waves			SE 126-132 TE 266-277															
(C) Interpret the role of wave characteristics and behaviors found in medicinal and industrial applications								SE 142-170 TE 296-348										
<b>(9) Science concepts. The student knows simple examples of quantum physics. The student is expected to:</b>																		
(A) Describe the photoelectric effect																		
(B) Explain the line spectra from different gas-discharge tubes			SE 133-138 TE 278-287															