

Active Physics Correlation to the Science Curriculum Framework for Connecticut

Correlation key:																		
"X" Coverage = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.																		
"XX" In-depth coverage = Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.	Communication			Home			Medicine			Predictions			Sports			Transportation		
	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3	Chapter 1	Chapter 2	Chapter 3

CONTENT STANDARD 1: The Nature Of Science
Students will experience an inquiry-based learning environment in which they are free to ask questions, seek information and validate explanations in Educational experiences in Grades 9 - 12 will assure that students:

Gather and synthesize information concerning a problem.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Generate and revise hypotheses based upon empirical data and the requirements of logical reasoning.	XX			XX	X							XX							
Interpret the results of experimentation using statistical reasoning.		XX								XX									
Critique scientific experiments or research by seeking out possible sources of bias in the design and analysis of data.										XX									
Suggest alternative ways of explaining data and criticize arguments in which data, explanations or conclusions are represented as the only ones worthy of consideration.										XX									
Prepare and present oral and written scientific reports that communicate in a logical sequence the process, results and validity of scientific experiments and research.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

CONTENT STANDARD 2: History Of Science
Students will learn the evolution of scientific thought, how science has influenced culture and society, and how groups from many countries have Educational experiences in Grades 9 - 12 will assure that students:

Recognize that many Western as well as non-Western cultures (e.g., Egyptian, Chinese, Hindu, Arabic, Mayan) have developed scientific ideas and solved human problems through technology;	X	X	X		X	X	X	X	X										X
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Recognize that changes in science usually occur as small modifications in existing knowledge and result in incremental advances in our understanding of the world and our ability to meet human needs and aspirations;																		
Recognize that occasionally there are advances in science and technology that have important and long-lasting effects on science and society (e.g., the Copernican revolution; plate tectonics; biological evolution; germ theory; industrial revolution; technological revolution); and		XX						XX			XX							
Recognize that a knowledge of the study of scientific explanations throughout history demonstrates how scientific knowledge changes and evolves over time, building on earlier knowledge.					X	X	X		X	X	X	X	X	X	X	X	X	X
Students will understand the composition and structure of the atmosphere, including energy transfers, the nature of weather and Educational experiences in Grades 9 - 12 will assure that students:																		
Describe heat and energy transfer as they are related to radiation, conduction and convection/advection.				XX														
Understand that, as water condenses, evaporates, melts or freezes, this heat energy transfer impacts weather phenomena.																		
Recognize and understand why rising air expands and decreases in temperature, while sinking air compresses and increases in temperature, and that this phenomenon has an impact on local weather and global climates.																		

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Describe fronts as boundaries between air masses and recognize their association with different weather patterns.																		
Explain the patterns and distributions of different climates as a function of the Earth's physical features (e.g., oceans and mountains) and latitude.																		
Explain how the inclination of the Earth's axis affects the seasons, amount of daylight, and the altitude of the sun in the sky.				X														
Explain the impact on human activities of global phenomena, such as El Niño, global warming and the depletion of ozone in the atmosphere.																		
Discuss cyclone, hurricane, thunderstorm and tornado formation as both weather phenomena and vehicles for the transfer of heat energy.																		
Create weather forecasts from data collected from various sources, including classroom instruments, television, newspapers, NOAA radio and information from sources via computer and modem.																		
CONTENT STANDARD 11: Structure Of Matter																		
Educational experiences in Grades 9 - 12 will assure that students:																		
Describe the nature of atoms and how atoms combine to form molecules;																		
Explain how the chemical and physical properties of substances are related to their atomic and molecular structures;																		

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Use the Periodic Table to predict common properties of elements;																		
Use chemical formulas and equations to obtain and communicate information about chemical changes;																		
Recognize that the ability of a reaction to occur and the extent to which it proceeds depends on the relative stability of the reactants compared to the products and the conditions under which the reaction occurs; and																		
Understand and apply mathematical concepts, including dimensional analysis, to explore and describe chemical changes.																		
<p>CONTENT STANDARD 12: Energy Students will know that energy is conserved, transferred, transformed, and appears in different forms. Educational experiences in Grades 9 - 12 will assure that students:</p>																		
Classify various forms of energy as either kinetic or potential.					X							X	XX	XX	XX			
Recognize that heat energy is related to the disordered motion of atoms or molecules.				X	X													
Understand that the total amount of disorder in the universe is increasing.																		
Explain that, although energy changes into different forms within a closed system, the total amount of energy remains unchanged, while the amount of useful energy is decreased.		X		X	X	X							XX	XX	XX			
Describe the nature of different types of waves, how they are produced, and how they transfer energy.	XX	XX	XX	X			XX	X	X			XX						X

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Understand that every object exerts a gravitational force on every other object.												XX	X	X	XX			X
Interpret the physical characteristics of sound, (including pitch and loudness) in terms of wave theory.	XX	X	X				XX		XX									X
CONTENT STANDARD 13: Interaction Of Matter And Energy																		
Students will know that interactions between matter and energy can produce changes in a system, although the total quantities of matter and energy																		
Educational experiences in Grades 9 - 12 will assure that students:																		
Explain how the interactions between various energy forms and matter can produce physical, chemical, and nuclear transformations.																		
Observe, measure and represent mathematically the changes in the various energy forms taking place during the physical and chemical transformation of substances.																		
Describe how energy changes can be related to structural processes and modifications at the atomic and molecular levels.																		
Recognize that energy changes in atoms and molecules occur in fixed increments.																		
Recognize that energy and new particles are released when the nuclei of heavy atoms (e.g., uranium, plutonium) split.																		
Explain how radiation and matter interact in terms of the absorption and emission of energy by individual atoms, molecules and their aggregates.																		
Recognize that waves may interact with the materials they enter.	XX	X	X	XX	X	X	XX	X	XX			XX						X

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Recognize the types of radiation (e.g., light, radio, microwave, X-ray) which comprise the electromagnetic spectrum.		X	XX	X	X	X		X				X						
Understand the differences in the flow of electrical energy in conductors, semi-conductors and insulators.				X	X													
Recognize that accelerating electrical charges produce electromagnetic waves.		X	X			XX												
<p>CONTENT STANDARD 14: Science And Technology Students will understand the relationships among mathematics, science and technology and the way they affect and are affected by society. Educational experiences in Grades 9 - 12 will assure that students:</p>																		
Analyze benefits and limit costs and consequences involved in using technology or resources (e.g., X-rays, agricultural chemicals, natural gas reserves).			XX	XX	XX		XX	XX	XX									XX
Analyze how the introduction of new technology has affected or could affect human activity (e.g., invention of the telescope, applications of modern telecommunications and bioengineering.		XX	XX		XX		XX	XX	XX									XX
Recognize that technological innovations (e.g., the automobile) may produce unanticipated problems of their own.																		XX
Apply their knowledge and understanding of chemical and physical interactions to explain present and anticipated technologies (e.g., lasers, ultrasound, superconducting materials, photocopy machines).		XX																XX

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Recognize that science and technology often develop faster than society can comprehend their ethical implications.			XX															
Explore the scientific and technological aspects of contemporary problems (e.g., issues related to nutrition, air quality, natural resources).	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Understand that science strives to understand the natural world and seeks explanations for natural phenomena, while technology seeks solutions to human problems and needs.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Understand that science, mathematics and technology are interdependent human endeavors with strengths and limitations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Recognize that technological problems often create a demand for new scientific knowledge, while new technologies make it possible for scientists to extend their research or to undertake entirely new lines of research.		XX	XX	XX						XX	XX						XX	