

# Active Physics Correlation to the Wisconsin Standards

<p><b>"X" = Coverage</b> Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.</p> <p><b>"XX" = In-depth Coverage</b> Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.</p> <p>In the text that follows, terms with an asterisk (*) are defined and/or exemplified in the Glossary of terms following the science standards</p>	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

## A. SCIENCE CONNECTIONS

### Content Standard

<p>Students in Wisconsin will understand that there are unifying themes: systems, order, organization, and interactions; evidence, models, and explanations; constancy, change, and measurement; evolution, equilibrium, and energy; form and function among scientific disciplines.</p>	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
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### Performance Standards

By the end of <b>grade twelve</b> , students will:																		
A.12.1 Apply* the underlying themes* of science to develop defensible visions of the future			XX								X					XX		XX

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A.12.2 Show* how conflicting assumptions about science themes* lead to different opinions and decisions about evolution*, health, population, longevity, education, and use of resources, and show* how these opinions and decisions have diverse effects on an individual, a community, and a country, both now and in the future				XX	XX		XX	XX							XX			
A.12.3 Give examples that show* how partial systems*, models*, and explanations* are used to give quick and reasonable solutions that are accurate enough for basic needs	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
A.12.4 Construct* arguments that show* how conflicting models* and explanations* of events can start with similar evidence*	XX		XX							XX	XX	XX						
A.12.5 Show* how the ideas and themes* of science can be used to make real-life decisions about careers, work places, life-styles, and use of resources	X	X		XX	XX		X	X	XX				X	XX		X	X	

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A.12.6 Identify* and, using evidence* learned or discovered, replace inaccurate personal models* and explanations* of science-related events	X	X	X	X	X	X	X	X	X	XX	XX	XX	X	X	X	X	X	X
A.12.7 Re-examine the evidence* and reasoning that led to conclusions drawn from investigations*, using the science themes*	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
<b>B. NATURE OF SCIENCE</b>																		
<b>Content Standard</b>																		
Students in Wisconsin will understand that science is ongoing and inventive, and that scientific understandings have changed over time as new evidence is found.	X		XX			X					XX	X	XX			X		X
<b>Performance Standards</b>																		
By the end of <b>grade twelve</b> , students will:																		
B.12.1 Show* how cultures and individuals have contributed to the development of major ideas in the earth and space, life and environmental, and physical sciences		X	X		X	X				XX	XX	X	X	X	X	X		X

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B.12.2 Identify* the cultural conditions that are usually present during great periods of discovery, scientific development, and invention										X								
B.12.3 Relate* the major themes* of science to human progress in understanding science and the world										XX		XX						
B.12.4 Show* how basic research and applied research contribute to new discoveries, inventions, and applications		XX	X						X	X					X		XX	X
B.12.5 Explain* how science is based on assumptions about the natural world and themes* that describe the natural world	XX		XX	X			X			XX	XX	XX			X			X
<b>C. SCIENCE INQUIRY</b>																		
<b>Content Standard</b>																		
Students in Wisconsin will investigate questions using scientific methods and tools, revise their personal understanding to accommodate knowledge, and communicate these understandings to others.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
<b>Performance Standards</b>																		
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C.12.1 When studying science content, ask questions suggested by current social issues, scientific literature, and observations* of phenomena, build hypotheses that might answer some of these questions, design possible investigations*, and describe results that might emerge from such investigations	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
C.12.2 Identify* issues from an area of science study, write questions that could be investigated*, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
C.12.3 Evaluate* the data collected during an investigation*, critique the data-collection procedures and results, and suggest ways to make any needed improvements	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
C.12.4 During investigations*, choose the best data-collection procedures and materials available, use them competently, and calculate the degree of precision of the resulting data	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

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C.12.5 Use the explanations* and models* found in the earth and space, life and environmental, and physical sciences to develop likely explanations* for the results of their investigations*	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
C.12.6 Present the results of investigations* to groups concerned with the issues, explaining* the meaning and implications of the results, and answering questions in terms the audience can understand	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
C.12.7 Evaluate* articles and reports in the popular press, in scientific journals, on television, and on the Internet, using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design												XX		XX				
<b>D. PHYSICAL SCIENCE</b>																		
<b>Content Standard</b>																		

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Students in Wisconsin will demonstrate an understanding of the physical and chemical properties of matter, the forms and properties of energy, and the ways in which matter and energy interact.	X	X	X	X	XX	X	X	X	X	XX		XX	X	X	X			X
<b>Performance Standards</b>																		
By the end of <b>grade twelve</b> , students will:																		
<b>STRUCTURE OF ATOMS AND MATTER</b>																		
D.12.1 Describe* atomic structure and the properties of atoms, molecules, and matter during physical and chemical interactions*													X					
D12.2 Explain* the forces that hold the atom together and illustrate* how nuclear interactions* change the atom																		
D.12.3 Explain* exchanges of energy* in chemical interactions* and exchange of mass and energy in atomic/nuclear reactions																		
<b>CHEMICAL REACTIONS</b>																		
D.12.4 Explain* how substances, both simple and complex, interact* with one another to produce new substances																		

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D.12.5 Identify* patterns in chemical and physical properties and use them to predict* likely chemical and physical changes and interactions																			
D.12.6 Through investigations*, identify* the types of chemical interactions*, including endothermic, exothermic, oxidation, photosynthesis, and acid/base reactions																			
<b>MOTIONS AND FORCES</b>																			
D.12.7 Qualitatively and quantitatively analyze* changes in the motion of objects and the forces that act on them and represent analytical data both algebraically and graphically	X	X	X		X	X	X	X	X			XX	XX	XX	XX	XX	XX	XX	
D.12.8 Understand* the forces of gravitation, the electromagnetic force, intermolecular force, and explain* their impact on the universal system									XX			X		XX	XX	X	XX	X	XX
D.12.9 Describe* models* of light, heat, and sound and through investigations* describe* similarities and differences in the way these energy* forms behave	XX	X	XX	XX	XX			XX	XX	XX								XX	
<b>CONSERVATION OF ENERGY AND THE INCREASE IN DISORDER</b>																			

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D.12.10 Using the science themes*, illustrate* the law of conservation of energy* during chemical and nuclear reactions																		
<b>INTERACTIONS OF MATTER AND ENERGY</b>																		
D.12.11 Using the science themes*, explain* common occurrences in the physical world	XX	XX	XX	XX	X	X	XX	XX	X	XX	XX	XX	XX	XX	XX	XX	XX	XX
D.12.12 Using the science themes* and knowledge of chemical, physical, atomic, and nuclear interactions*, explain* changes in materials, living things, earth's features, and stars										X		X						
<b>G. SCIENCE APPLICATIONS</b>																		
<b>Content Standard</b>																		
Students in Wisconsin will demonstrate an understanding of the relationship between science and technology and the ways in which that relationship influences human activities.	XX	XX	XX	X	X	X	X	X	XX	X	X	X	X	X	XX	X	XX	XX
<b>Performance Standards</b>																		
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G.12.1 Identify* personal interests in science and technology, implications that these interests might have for future education, and decisions to be considered	X	X	X		X	X		X	X						X		X	X
G.12.2 Design, build, evaluate, and revise models* and explanations related to the earth and space, life and environmental, and physical sciences	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
G.12.3 Analyze* the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual and the community		X	XX	XX	XX	X		XX	X						XX		XX	XX
G.12.4 Show* how a major scientific or technological change has had an impact on work, leisure, or the home		XX	XX	XX	X	X		X						XX	XX		XX	XX
G.12.5 Choose a specific problem in our society, identify* alternative scientific or technological solutions to that problem and argue it merits				XX	XX	X	XX	XX										

**H. SCIENCE IN SOCIAL AND PERSONAL PERSPECTIVES**  
**Content Standard**

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Students in Wisconsin will use scientific information and skills to make decisions about themselves, Wisconsin, and the world in which they live.			X	XX	XX							X						X
<b>Performance Standards</b>																		
By the end of <b>grade twelve</b> , students will:																		
H.12.1 Using the science themes* and knowledge of the earth and space, life and environmental, and physical sciences, analyze* the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal on life in the community and the region				XX	XX													
H.12.2 Evaluate* proposed policy recommendations (local, state, and/or national) in science and technology for validity, evidence, reasoning, and implications, both short and long-term			X									X						X

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H.12.3 Show* how policy decisions in science depend on social values, ethics, beliefs, and time-frames as well as considerations of science and technology						X				X		X						
H.12.4 Advocate a solution or combination of solutions to a problem in science or technology		XX	XX	XX	XX		XX		X			XX	X	X	XX		XX	XX
H.12.5 Investigate* how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region		XX	XX	XX	XX	X	XX	XX	X								XX	
H.12.6 Evaluate* data and sources of information when using scientific information to make decisions				XX	XX										XX	X	XX	XX
H.12.7 When making decisions, construct a plan that includes the use of current scientific knowledge and scientific reasoning	XX	XX	XX	XX	XX	X	XX	XX	X	X	X	X	X	X	XX	XX	X	XX