Alignment Study:
2010 Nebraska Science Standards
With
Excellence in Environmental Education:
Guidelines for Learning (K-12)

NEBRASKA
DEPARTMENT OF
EDUCATION

Matt Blomstedt, Ph.D., Commissioner
Scott Swisher, Ed.D., Deputy Commissioner

NEBRASKA DEPARTMENT OF EDUCATION
301 CENTENNIAL MALL SOUTH
LINCOLN, NE 68509-4987

Telephone: 402-471-2295 • Fax: 402-471-0117

Website: www.education.ne.gov

EDITORS

Sarah Winans
Lincoln Public Schools

Heather Dreibus
Omaha Public Schools

Erin Miles
Lincoln Public Schools

Kristi Bundy
Ashland-Greenwood Public Schools

Kristine Denton
Omaha Public Schools

Marilyn Klein Fisher
Scottsbluff Public Schools

Jordan Rhodes
Westside High School

PROJECT DIRECTOR

James Blake
Science Education Director
Nebraska Department of Education

Nebraska Alliance for Conservation and Environment Education (NACEE) provided funds for this work from an EPA Region 7 Building Environmental Education Communities Small Grant award administered by Earth Force. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the Environmental Protection Agency.

Contents

Introduction: How 2010 Nebraska Science Standards are addressed in Environmental Education Standards

The Excellence in Environmental Education: Guidelines for Learning (K-12) (referred to as the Environmental Education or EE standards) is a great resource available to teachers from the North American Association for Environmental Education (NAAEE) for no cost to increase the teaching of science in environmental context (Simmons, 2010). The work here shows how well 2010 Nebraska science standards align to the Environmental Education document. Through this match more resources are now available for Nebraska educators to incorporate concepts found in the Environmental Education standards. To illustrate, the Environmental Education document contains many sample indicators and instructional vignettes that provide examples of lesson ideas, tasks, and stories related to teaching the Environmental Education standards. In addition, NAAEE has a variety of related resources that can be found to accompany this document (Guidelines for Excellence, 2010). To fully appreciate the work of this alignment the EE document can be ordered from NAAEE or downloaded: http://resources.spaces3.com/89c197bf-e630-42b0-ad9a-91f0bc55c72d.pdf

How well 2010 Nebraska Science Standards are addressed in the Excellence in Environmental Education: Guidelines for Learning (K-12) standards is summarized by content alignment only. Content alignment characterizes the nature of the content match between the Environmental Education Standards and Nebraska science standards. A Strong match indicates EE fully addresses the content of the Nebraska indicator. A Partial match is assigned when the EE content does not offer the same level of Specificity as the Nebraska indicator, does not cover the complete Scope of the Nebraska indicator, differs importantly in its Emphasis and Phrasing, or provides only an Implied coverage of the content (McREL, 2013). If more than one of the issues just described characterizes the coverage of Nebraska content by EE, the alignment is identified as Weak. Finally, if the content in Nebraska is not found in the EE, it is marked as Not Addressed. Summary of this alignment by grade band is shown in Appendix A. In addition to level of alignment, reviewers made comments which include reference to bullet points from sample indicators in the Environmental Education document (Simmons, 2010). The bullet points referred to in the comments are not shown here but may be located using the full EE guidelines document.

References

Guidelines for Excellence. (2010). National Project for Excellence in Environmental Education. Retrieved April 20, 2014, from http://eelinked.naaee.net/n/guidelines/topics/National-Project-for-Excellence-in-EE

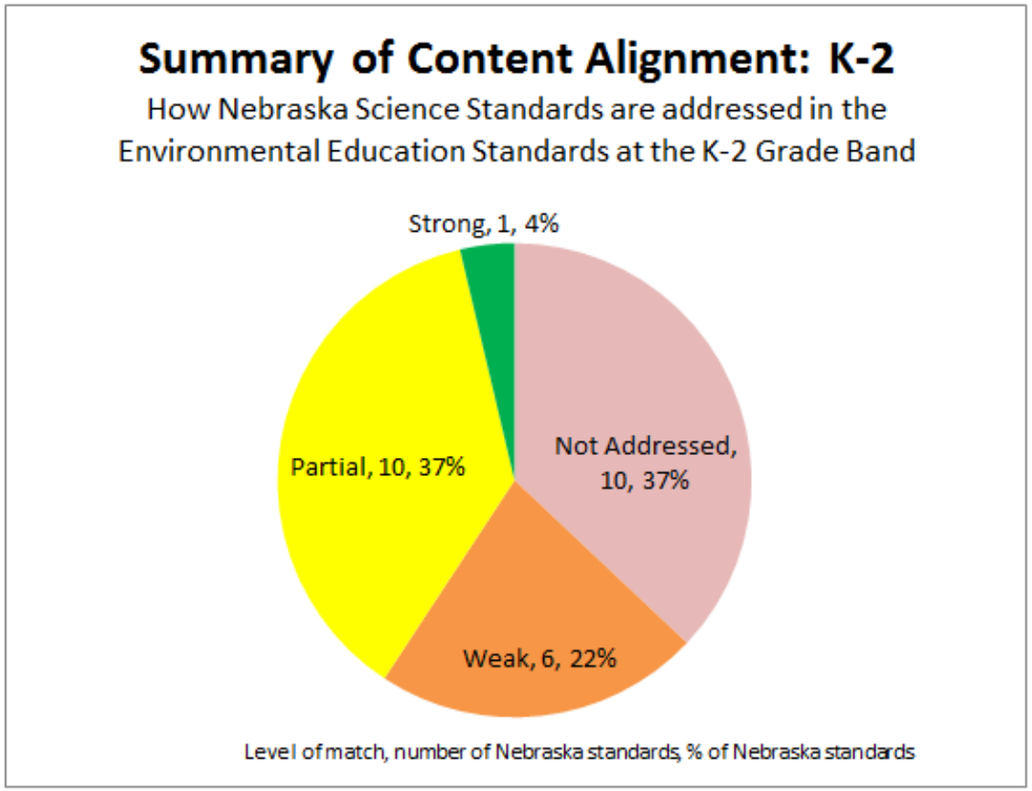
McREL. (2013). For the Nebraska department of education: Comparison of the common core state standards for English language arts to the Nebraska language arts standards, grades K-12. Retrieved April 29, 2014, from http://www.education.ne.gov/documents/HomePage/ELA_CC_to_NE.pdf

Nebraska Department of Education. (2010). Nebraska science standards: Grades K-12. Retrieved April 29, 2014, from http://www.education.ne.gov/science/Documents/ArticulatedScienceSinWord.pdf

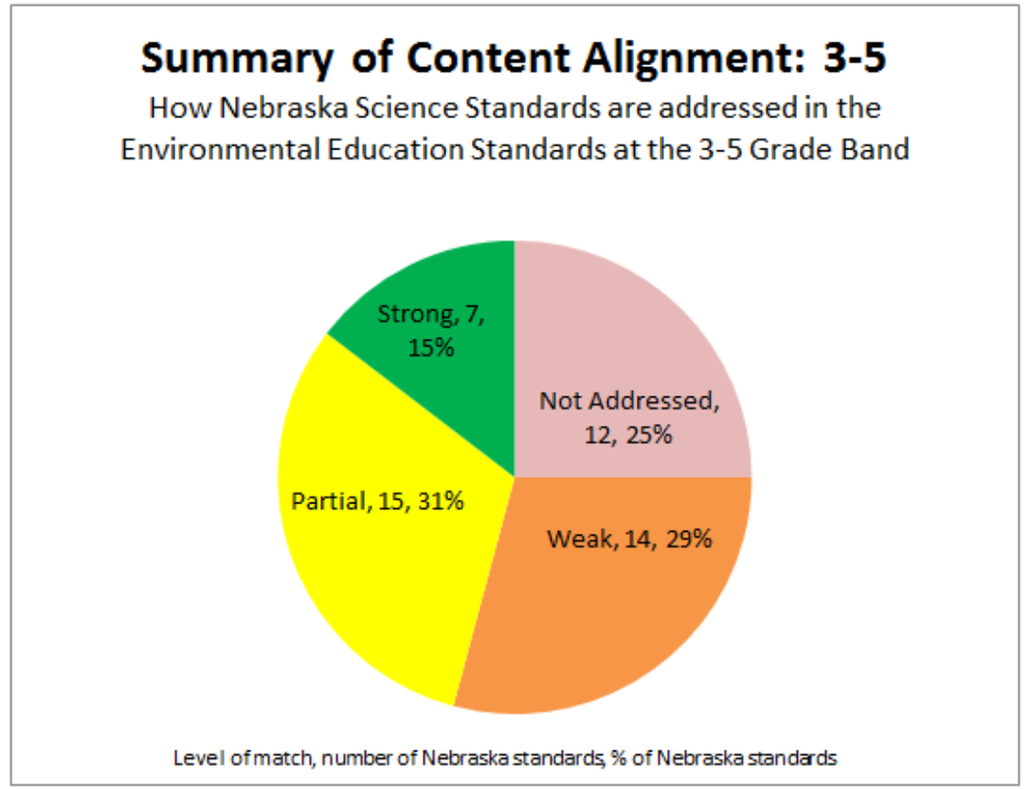
Simmons, B., et al. (2010). Excellence in environmental education: Guidelines for learning (K-12). Washington, DC/USA: North American Association for Environmental Education.

Appendix A

Summary of Content Alignment



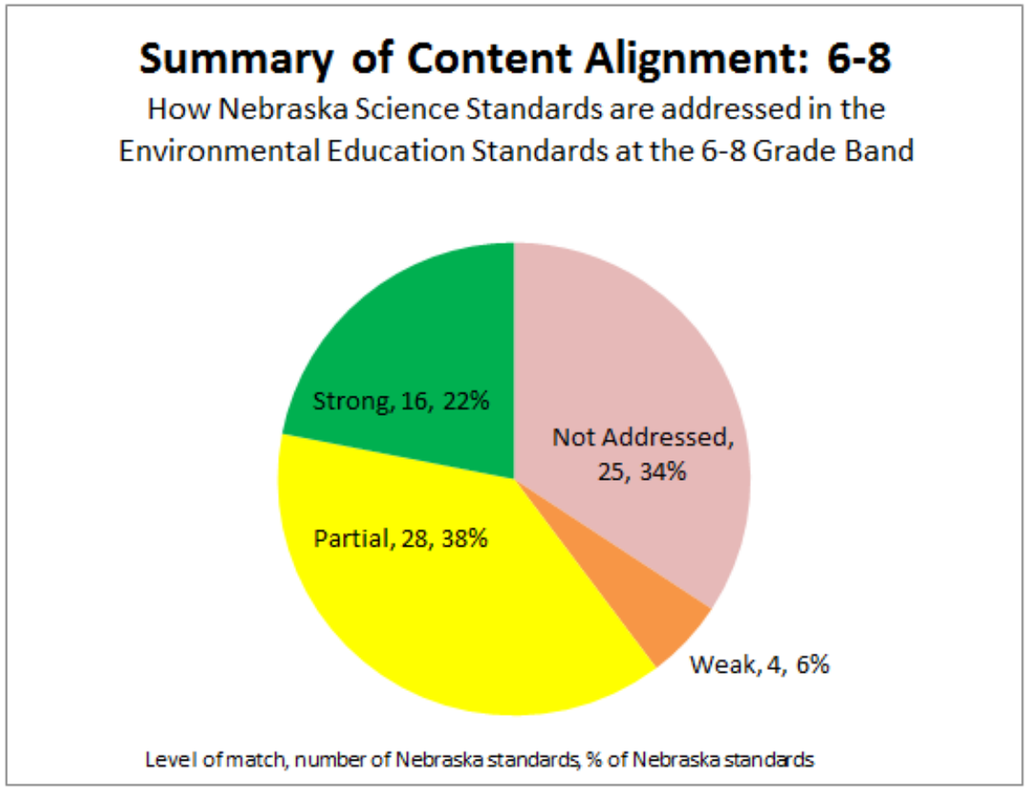
A summary of how well Nebraska standards at grade band K-2 matched with content found in the Environmental Education standards. See above for a discussion of the alignment categories.



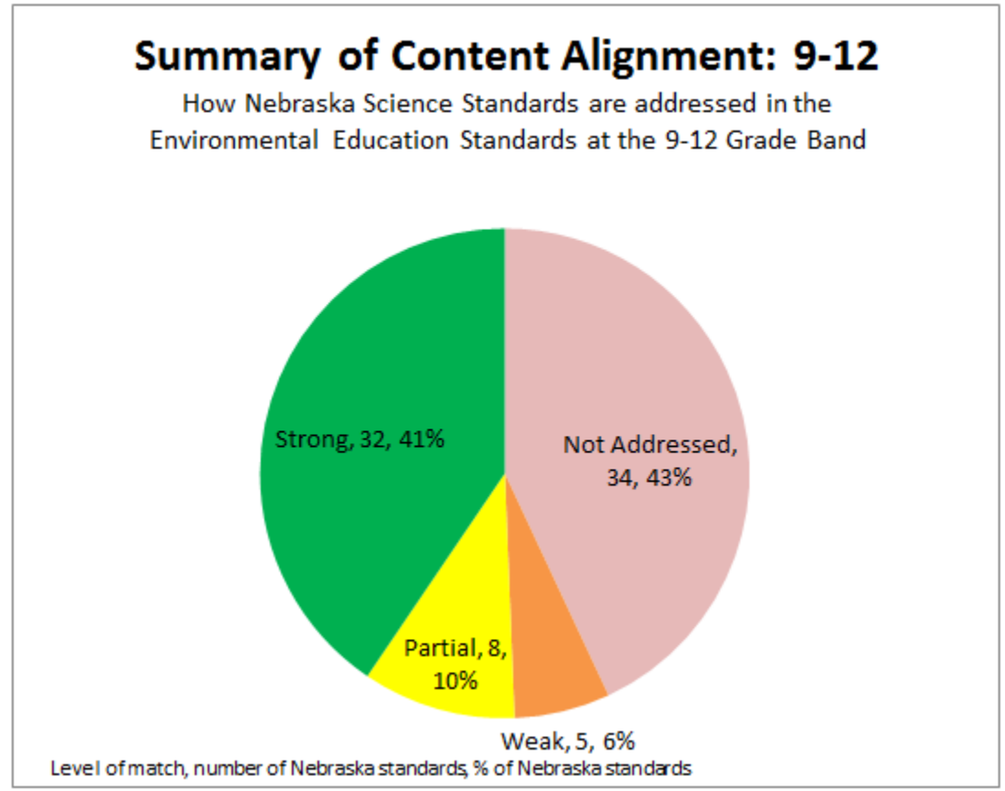
A summary of how well Nebraska standards at grade band 3-5 matched with content found in the Environmental Education standards. See above for a discussion of the alignment categories.

Appendix A, continued

Summary of Content Alignment



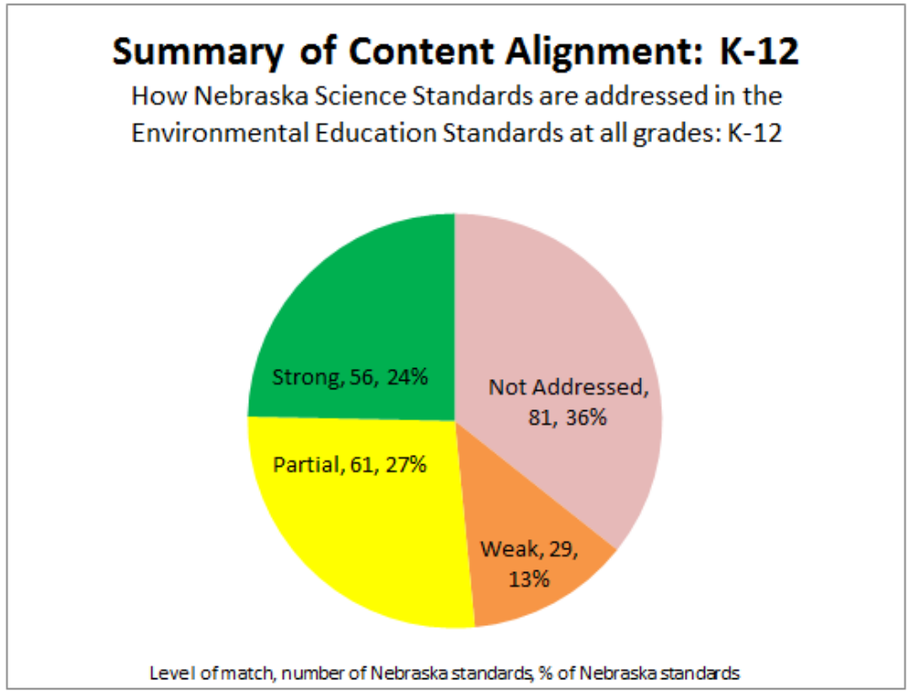
A summary of how well Nebraska standards at grade band 6-8 matched with content found in the Environmental Education standards. See above for a discussion of the alignment categories.



A summary of how well Nebraska standards at grade band 9-12 matched with content found in the Environmental Education standards. See above for a discussion of the alignment categories.

Appendix A, continued

Summary of Content Alignment



An overall summary of how well Nebraska standards at all grades (K-12) matched with content found in the Environmental Education standards. See above for a discussion of the alignment categories.

Grades K-2: Nebraska Science Standards

2010 Nebraska Science Standards Grades K-2		Content Alignment	Comments	4th Grade EE Guidelines	EE Strand
2.1 Inquiry, the Nature of Science and Technology					
2.1.1.a	Ask questions that relate to a science topic	partial	scope	A) Questioning—Learners are able to develop questions that help them learn about the environment and do simple investigations.	Strand 1—Questioning, Analysis and Interpretation Skills
2.1.1.b	Conduct simple investigations	partial	scope	B) Designing investigations—Learners are able to design simple investigations.	
2.1.1.c	Select and use simple tools appropriately	partial	scope	C) Collecting information—Learners are able to locate and collect information about the environment and environmental topics.	
2.1.1.d	Describe objects, organisms, or events using pictures, words, and numbers	weak	bullet point 1		
2.1.1.e	Collect and record observations	strong			
2.2.1.c	Measure objects using standard and non-standard units	partial	bullet point 4; (does not designate standard/non-standard)		
2.1.1.g	Use appropriate mathematics in all aspects of scientific inquiry	weak	bullet point 4	E) Organizing information—Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.	
2.4.3.c	Describe simple seasonal weather indicators and how they impact student choices (activities, clothing)	weak		A) Processes that shape the Earth—Learners are able to identify changes and differences in the physical environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
2.2.1.a	Observe physical properties of objects (freezing and melting, sinking and floating, color, size, texture, shape, weight)	partial	bullet point 1	B) Changes in matter—Learners are able to identify basic characteristics of and changes in matter.	
2.2.1.d	Identify solids and liquids and recognize that liquids take the shape of their container	partial	scope		
2.4.3.a	Observe that the Sun provides heat and light	partial	bullet point 2	A) Organisms, populations, and communities—Learners understand basic similarities and differences among a wide variety of living organisms. They understand the concept of habitat.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades K-2		Content Alignment	Comments	4th Grade EE Guidelines	EE Strand
2.3.1.a	Differentiate between living and nonliving things	weak	EE standard only addresses living organisms	A) Organisms, populations, and communities—Learners understand basic similarities and differences among a wide variety of living organisms. They understand the concept of habitat.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
2.3.1.b	Identify the basic needs of living things (food, water, air, space, shelter)	partial	scope		
2.3.1.d	Observe and match plants and animals to their distinct habitats	partial	bullet point 2		
2.3.2.a	Describe how offspring resemble their parents	partial	bullet point 2; scope	B) Heredity and evolution—Learners understand that plants and animals have different characteristics and that many of the characteristics are inherited.	
2.3.2.b	Describe how living things change as they grow	weak	bullet point 3		
2.1.1.f	Use drawings and words to describe and share observations with others	weak		D) Working with flexibility, creativity, and openness—Learners understand the importance of sharing ideas and hearing other points of view.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.1—Skills for Analyzing and Investigating Environmental Issues
2.2 Physical Science					
2.2.1.b	Separate and sort objects by physical attributes	not addressed			
2.2.2.a	State location and/or motion relative to another object or its surroundings (in front of, behind, between, over, under, faster, slower, forward and backward, up and down)	not addressed			
2.2.2.b	Describe how objects move in many different ways (straight, zigzag, round and round, back and forth, and fast and slow)	not addressed			
2.3 Life Science					
2.3.1.c	Identify external parts of plants and animals	not addressed			
2.3.4.a	Recognize seasonal changes in animals and plants	not addressed			
2.4 Earth and Space Sciences					
2.4.1.a	Identify objects in the sky (the Sun, the Moon, the stars) and when they are observable	not addressed			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades K-2		Content Alignment	Comments	4th Grade EE Guidelines	EE Strand
2.4.1.b	Identify objects that appear to move in the sky (the Sun, the Moon, stars)	not addressed			
2.4.2.a	Describe Earth materials (sand, soil, rocks, water)	not addressed			
2.4.2.b	Recognize ways in which individuals and families can conserve Earth's resources by reducing, reusing, and recycling	not addressed			
2.4.3.b	Observe and describe simple daily changes in weather	not addressed			
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the K-2 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			F) Working with models and simulations—Learners understand that relationships, patterns, and processes can be represented by models.	Strand 1—Questioning, Analysis and Interpretation Skills
				G) Drawing conclusions and developing explanations—Learners can develop simple explanations that address their questions about the environment.	
				D) Evaluating accuracy and reliability—Learners understand the need to use reliable information to answer their questions. They are familiar with some basic factors to consider in judging the merits of information.	
				C) Systems and connections—Learners understand basic ways in which organisms are related to their environments and to other organisms.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
				D) Flow of matter and energy—Learners know that living things need some source of energy to live and grow.	
				A) Individuals and groups—Learners understand that people act as individuals and as group members and that groups can influence individual actions.	Strand 2—Knowledge of Environmental Processes and Systems 2.3—Humans and Their Societies

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades K-2		Content Alignment	Comments	4th Grade EE Guidelines	EE Strand
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the K-2 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			B) Culture—Learners understand that experiences and places may be interpreted differently by people with different cultural backgrounds, at different times, or with other frames of reference.	Strand 2—Knowledge of Environmental Processes and Systems 2.3—Humans and Their Societies
				C) Political and economic systems—Learners understand that government and economic systems exist because people living together in groups need ways to do things such as provide for needs and wants, maintain order, and manage conflict.	
				D) Global connections—Learners understand how people are connected at many levels—including the global level—by actions and common responsibilities that concern the environment.	
				E) Change and conflict—Learners recognize that change is a normal part of individual and societal life. They understand that conflict is rooted in different points of view.	
				A) Human/environment interactions—Learners understand that people depend on, change, and are affected by the environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
				B) Places—Learners understand that places differ in their physical and human characteristics.	
				C) Resources—Learners understand the basic concepts of resource and resource distribution.	
				D) Technology—Learners understand that technology is an integral part of human existence and culture.	

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades K-2		Content Alignment	Comments	4th Grade EE Guidelines	EE Strand
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the K-2 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			E) Environmental issues—Learners are familiar with some local environmental issues and understand that people in other places experience environmental issues as well.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
				A) Identifying and investigating issues—Learners are able to identify and investigate issues in their local environments and communities.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.1—Skills for Analyzing and Investigating Environmental Issues
				B) Sorting out the consequences of issues—As learners come to understand that environmental and social phenomena are linked, they are able to explore the consequences of issues.	
				C) Identifying and evaluating alternative solutions and courses of action—Learners understand there are many approaches to resolving issues.	
				All EE standards from strand 4	Strand 4—Personal and Civic Responsibility

See introduction for discussion of alignment categories and comments.

Grades 3-5: Nebraska Science Standards

2010 Nebraska Science Standards Grades 3-5		Content Alignment	Comments	4th Grade EE Guidelines	Strand
5.1 Inquiry, the Nature of Science and Technology					
5.1.1.a	Ask testable scientific questions	strong		A) Questioning—Learners are able to develop questions that help them learn about the environment and do simple investigations.	Strand 1—Questioning, Analysis and Interpretation Skills
5.1.3.a	Identify a simple problem	partial	first bullet point		
5.1.1.b	Plan and conduct investigations and identify factors that have the potential to impact an investigation	partial	"identify factors that have the potential to impact..."		
5.1.3.b	Propose a solution to a simple problem	partial		B) Designing investigations—Learners are able to design simple investigations.	
5.1.3.c	Implement the proposed solution	weak			
5.2.1.c	Use appropriate metric measurements to describe physical properties	weak	bullet point 4	C) Collecting information—Learners are able to locate and collect information about the environment and environmental topics.	
5.1.1.c	Select and use equipment correctly and accurately	strong	bullet points 4 & 5		
5.1.1.d	Make relevant observations and measurements	strong	bullet points		
5.1.1.e	Collect and organize data	partial	EE includes "search for relationships and patterns"	(2 standards) C) Collecting information—Learners are able to locate and collect information about the environment and environmental topics. ********** E) Organizing information—Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.	
5.1.1.f	Develop a reasonable explanation based on collected data	partial	evaluating evidence is only implied in NeSS	(2 Standards) D) Evaluating accuracy and reliability—Learners understand the need to use reliable information to answer their questions. They are familiar with some basic factors to consider in judging the merits of information. ********** G) Drawing conclusions and developing explanations—Learners can develop simple explanations that address their questions about the environment.	
5.1.2.a	Recognize that scientific explanations are based on evidence and scientific knowledge	partial			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 3-5		Content Alignment	Comments	4th Grade EE Guidelines	Strand
5.1.1.i	Use appropriate mathematics in all aspects of scientific inquiry	weak	emphasis and phrasing	E) Organizing information—Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.	Strand 1—Questioning, Analysis and Interpretation Skills
5.1.3.d	Evaluate the implementation	weak		G) Drawing conclusions and developing explanations—Learners can develop simple explanations that address their questions about the environment.	
5.4.3.b	Observe, measure, and record changes in weather (temperature, wind direction and speed, precipitation)	weak	bullet 4	A) Processes that shape the Earth—Learners are able to identify changes and differences in the physical environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
5.4.3.c	Recognize the difference between weather, climate, and seasons	weak	bullet 3		
5.4.2.b	Identify weathering, erosion, and deposition as processes that build up or break down Earth's surface	**strong**	bullet 1, bullet 3	(2 Standards) A) Processes that shape the Earth—Learners are able to identify changes and differences in the physical environment. ********** B) Changes in matter—Learners are able to identify basic characteristics of and changes in matter.	
5.2.1.b	Identify physical properties of matter (color, odor, elasticity, weight, volume)	partial	bullet point 1; scope	B) Changes in matter—Learners are able to identify basic characteristics of and hinges in matter.	
5.2.1.d	Identify state changes caused by heating and cooling solids, liquids, and gases	partial	bullet point 2		
5.4.2.c	Identify how Earth materials are used (fuels, building materials, sustaining plant life)	partial	bullet point 1		
5.4.4.a	Describe how slow processes (erosion, weathering, deposition) and rapid processes (landslides, volcanic eruptions, earthquakes) change Earth's surface	weak	bullet 3; addresses slow process but not rapid processes		
5.2.3.b	Recognize that light travels in a straight line and can be reflected by an object (mirror)	partial	bullet point 2	C) Energy—While they may have little understanding of formal concepts associated with energy, learners are familiar with the basic behavior of some different forms of energy.	
5.2.3.c	Recognize that light can travel through certain materials and not others (transparent, translucent, opaque)	weak	bullet point 2		

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 3-5		Content Alignment	Comments	4th Grade EE Guidelines	Strand
5.2.3.d	Identify ways to generate heat (friction, burning, incandescent light bulb)	weak	bullet point 2	C) Energy—While they may have little understanding of formal concepts associated with energy, learners are familiar with the basic behavior of some different forms of energy.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
5.2.3.e	Identify materials that act as thermal conductors or insulators	weak	bullet point 2		
5.4.3.a	Describe the Sun's warming effect on the land and water	weak	bullet 1 (a) and bullet 2 (c)	(2 Standards) A) Processes that shape the Earth—Learners are able to identify changes and differences in the physical environment. ********* C) Energy—While they may have little understanding of formal concepts associated with energy, learners are familiar with the basic behavior of some different forms of energy.	
5.3.1.a	Compare and contrast characteristics of living and nonliving things	weak	bullet 1: EE addresses living things only	A) Organisms, populations, and communities—Learners understand basic similarities and differences among a wide variety of living organisms. They understand the concept of habitat.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
5.3.1.b	Identify how parts of plants and animals function to meet basic needs (e.g., leg of an insect helps an insect move, root of a plant helps the plant obtain water)	partial	bullets 2 and 3		
5.3.2.a	Identify inherited characteristics of plants and animals	**strong**	bullets 1 and 2	B) Heredity and evolution—Learners understand that plants and animals have different characteristics and that many of the characteristics are inherited.	
5.3.3.c	Recognize the living and nonliving factors that impact the survival of organisms in an ecosystem	partial	bullets 1 and 3	C) Systems and connections—Learners understand basic ways in which organisms are related to their environments and to other organisms.	
5.3.3.d	Recognize all organisms cause changes, some beneficial and some detrimental, in the environment where they live	**strong**	bullets 1 and 2		
5.3.2.b	Identify the life cycle of an organism	partial	bullet point 3	D) Flow of matter and energy—Learners know that living things need some source of energy to live and grow.	
5.3.3.a	Diagram and explain a simple food chain beginning with the Sun	**strong**	bullet point 1		

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 3-5		Content Alignment	Comments	4th Grade EE Guidelines	Strand
5.3.3.b	Identify the role of producers, consumers, and decomposers in an ecosystem	weak	does not use specific vocabulary	D) Flow of matter and energy—Learners know that living things need some source of energy to live and grow.	Strand 2, 2.2 (cont.)
5.1.1.g	Share information, procedures, and results with peers and/or adults	weak	EE-"sharing of information" but not procedures and results	D) Working with flexibility, creativity, and openness-Learners understand the importance of sharing ideas and hearing other points of view.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.1—Skills for Analyzing and Investigating Environmental Issues
5.1.3.e	Communicate the problem, design, and solution	partial			
5.1.1.h	Provide feedback on scientific investigations	not addressed			
5.1.2.b	Recognize that new discoveries are always being made which impact scientific knowledge	not addressed			
5.1.2.c	Recognize many different people study science	not addressed			
5.2 Physical Science					
5.2.1.a	Identify mixtures and pure substances	not addressed			
5.2.2.a	Describe motion by tracing and measuring an object's position over a period of time (speed)	not addressed			
5.2.2.b	Describe changes in motion due to outside forces (push, pull, gravity)	not addressed			
5.2.2.c	Describe magnetic behavior in terms of attraction and repulsion	not addressed			
5.2.3.a	Recognize that sound is produced from vibrating objects; the sound can be changed by changing the vibration	not addressed			
5.2.3.f	Recognize that the transfer of electricity in an electrical circuit requires a closed loop	not addressed			
5.3 Life Science					
5.3.4.a	Describe adaptations made by plants or animals to survive environmental changes	partial	see 8th grade EE standard	*See 8th Grade EE Standard:* D) Flow of matter and energy- Leaners understand how energy and matter flow among the abiotic and biotic components of the environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 3-5		Content Alignment	Comments	4th Grade EE Guidelines	Strand
5.4 Earth and Space Sciences					
5.4.1.a	Recognize that the observed shape of the Moon changes from day to day during a one month period	not addressed			
5.4.1.b	Recognize the motion of objects in the sky (the Sun, the Moon, stars) change over time in recognizable patterns	not addressed			
5.4.2.a	Describe the characteristics of rocks, minerals, soil, water, and the atmosphere	not addressed			
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the 3-5 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			F) Working with models and simulations—Learners understand that relationships, patterns, and processes can be represented by models.	Strand 1—Questioning, Analysis and Interpretation Skills
				A) Individuals and groups—Learners understand that people act as individuals and as group members and that groups can influence individual actions.	Strand 2—Knowledge of Environmental Processes and Systems 2.3—Humans and Their Societies
				B) Culture—Learners understand that experiences and places may be interpreted differently by people with different cultural backgrounds, at different times, or with other frames of reference.	
				C) Political and economic systems—Learners understand that government and economic systems exist because people living together in groups need ways to do things such as provide for needs and wants, maintain order, and manage conflict.	
				D) Global connections—Learners understand how people are connected at many levels—including the global level—by actions and common responsibilities that concern the environment.	
				E) Change and conflict—Learners recognize that change is a normal part of individual and societal life. They understand that conflict is rooted in different points of view.	
				A) Human/environment interactions—Learners understand that people depend on, change, and are affected by the environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 3-5		Content Alignment	Comments	4th Grade EE Guidelines	Strand
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the 3-5 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			B) Places—Learners understand that places differ in their physical and human characteristics.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
				C) Resources—Learners understand the basic concepts of resource and resource distribution.	
				D) Technology—Learners understand that technology is an integral part of human existence and culture.	
				E) Environmental issues—Learners are familiar with some local environmental issues and understand that people in other places experience environmental issues as well.	
				A) Identifying and investigating issues—Learners are able to identify and investigate issues in their local environments and communities.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.1—Skills for Analyzing and Investigating Environmental Issues
				B) Sorting out the consequences of issues—As learners come to understand that environmental and social phenomena are linked, they are able to explore the consequences of issues.	
				C) Identifying and evaluating alternative solutions and courses of action—Learners understand there are many approaches to resolving issues.	
				D) Working with flexibility, creativity, and openness—Learners understand the importance of sharing ideas and hearing other points of view.	
				A) Forming and evaluating personal views—Learners are able to examine and express their own views on environmental issues.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.2—Decision-Making and Citizenship Skills
				B) Evaluating the need for citizen action—Learners are able to think critically about whether they believe action is needed in particular situations and whether they believe they should be involved.	
				C) Planning and taking action—By participating in issues of their choosing mostly close to home—Learners learn the basics of individual and collective action.	
				D) Evaluating the results of actions—Learners understand that civic actions have consequences.	

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 3-5		Content Alignment	Comments	4th Grade EE Guidelines	Strand
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the 3-5 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			A) Understanding societal values and principles—Learners can identify fundamental principles of U.S. society and explain their importance in the context of environmental issues.	Strand 4—Personal and Civic Responsibility
				B) Recognizing citizens' rights and responsibilities—Learners understand the basic rights and responsibilities of citizenship.	
				C) Recognizing efficacy—Learners possess a realistic self-confidence in their effectiveness as citizens.	Strand 4—Personal and Civic Responsibility
				D) Accepting personal responsibility—Learners understand that they have responsibility for the effects of their actions.	

See introduction for discussion of alignment categories and comments.

Grades 6-8: Nebraska Science Standards

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
8.1 Inquiry, the Nature of Science and Technology					
8.1.1.a	Formulate testable questions that lead to predictions and scientific investigations	Strong		(2 Standards) A) Learners are able to develop, focus, and explain questions that help them learn about the environment and do environmental investigations. ****** B) Learners are able to design environmental investigations to answer particular questions—often their own questions	Strand 1—Questioning, Analysis and Interpretation Skills
8.1.1.b	Design and conduct logical and sequential investigations including repeated trials	Strong/Partial	Does not address repeated trials		
8.1.1.c	Determine controls and use dependent (responding) and independent (manipulated) variables	Partial	Emphasis and Phrasing	B) Learners are able to design environmental investigations to answer particular questions—often their own questions.	
8.1.1.d	Select and use equipment appropriate to the investigation, demonstrate correct techniques	Partial	Emphasis and Phrasing		
8.1.1.e	Make qualitative and quantitative observations	Partial	Implied	C) Learners are able to locate and collect reliable information about the environment or environmental topics using a variety of methods and sources.	
8.1.1.f	Record and represent data appropriately and review for quality, accuracy, and relevancy	Strong		E) Organizing information—Learners are able to classify and order data, and organize and display information in ways that help analysis and interpretation.	
8.1.1.g	Evaluate predictions, draw logical inferences based on observed patterns/relationships, and account for non-relevant information	Strong	If all three EE standards are combined	(3 Standards) D) Evaluate the strengths and weaknesses of the information they are using. ******* F) Understand many of the uses and limitations of models. ******* G) Synthesize their observations and findings into coherent explanations.	
8.1.1.h	Share information, procedures, results, and conclusions with appropriate audiences	Partial	Emphasis and Phrasing	E) Classify and order data, and organize and display information in ways that help analysis and interpretation.	
8.1.1.i	Analyze and provide appropriate critique of scientific investigations	Strong		G) Synthesize their observations and findings into coherent explanations.	
8.1.1.j	Use appropriate mathematics in all aspects of scientific inquiry	Weak		F) Understand many of the uses and limitations of models.	

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
8.1.2.a	Recognize science is an ongoing process and the scientific community accepts and uses explanations until they encounter new experimental evidence not matching existing explanations	Partial	Emphasis and Phrasing	D) Evaluate the strengths and weaknesses of the information they are using.	Strand 1—Questioning, Analysis and Interpretation Skills
8.1.2.b	Describe how scientific discoveries influence and change society	**Strong**		B) Gain an understanding of cultural perspectives on the environment and how the environment may, in turn, influence culture, as they become familiar with a wider range of cultures and subcultures.	Strand 2—Knowledge of Environmental Processes and Systems 2.3—Humans and Their Societies
8.1.2.c	Recognize scientists from various cultures have made many contributions to explain the natural world	Not addressed			
8.1.3.a	Identify problems for technical design	Partial	particular issue, not technical design	C) Identify and develop action strategies for addressing particular issues.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.1—Skills for Analyzing and Investigating Environmental Issues
8.1.3.b	Design a solution or product	Partial	particular issue, not technical design		
8.1.3.c	Implement the proposed design	Not addressed	Engineering		
8.1.3.d	Evaluate completed technological designs or products	Not addressed	Engineering		
8.1.3.e	Communicate the process of technical design	Not addressed	Engineering		
8.1.3.f	Distinguish between scientific inquiry (asking questions about the natural world) and technological design (using science to solve practical problems)	Not addressed			
8.1.3.g	Describe how science and technology are reciprocal	Partial	Implied	D) Link the human ability to shape and control the environment with our ability to create knowledge and develop new technologies.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
8.1.3.h	Recognize that solutions have intended and unintended consequences	Partial	Scope	B) Sorting out the consequences of issues-Learners are able to apply their knowledge of ecological and human processes and systems to identify the consequences of specific environmental issues.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.1—Skills for Analyzing and Investigating Environmental Issues

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
8.1.3.i	Compare and contrast the reporting of scientific knowledge and the reporting of technological knowledge	Not addressed			
8.2 Physical Science					
8.2.1.a	Compare and contrast elements, compounds, and mixtures	Not addressed			
8.2.1.b	Describe physical and chemical properties of matter	Not addressed			
8.2.1.c	Recognize most substances can exist as a solid, liquid, or gas depending on temperature	Not addressed			
8.2.1.d	Compare and contrast solids, liquids, and gases based on properties of these states of matter	Not addressed			
8.2.1.e	Distinguish between physical and chemical changes (phase changes, dissolving, burning, rusting)	Partial	Scope	B) Understand the properties of the substances that make up objects or materials found in the environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.2.1.f	Recognize conservation of matter in physical and chemical changes	Partial	Scope		
8.2.1.g	Classify substances into similar groups based on physical properties	Not addressed			
8.2.2.a	Describe motion of an object by its position and velocity	Partial	Scope	C) Begin to grasp formal concepts related to energy by focusing on energy transfer and transformations; and make connections among phenomena such as light, heat, magnetism, electricity, and the motion of objects.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.2.2.b	Recognize an object that is not being subjected to a force will continue to move at a constant speed in a straight line or stay at rest (Newton's 1st law)	Partial	Scope		
8.2.2.c	Compare the motion of objects related to the effects of balanced and unbalanced forces	Partial	Scope		
8.2.2.d	Recognize that everything on or around Earth is pulled towards Earth's center by gravitational force	Not addressed			
8.2.3.a	Recognize that vibrations set up wave-like disturbances that spread away from the source (sound, seismic, water waves)	Not addressed			
8.2.3.b	Identify that waves move at different speeds in different materials	Weak	seismic waves only	A) Understand the basics of most of the physical processes that shape the Earth, and relate differences in physical patterns to their causes.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
8.2.3.c	Recognize that light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection)	Not addressed			
8.2.3.d	Recognize that to see an object, light from the surface of the object must enter the eye; the color seen depends on the properties of the surface and the color of the available light sources	Not addressed			
8.2.3.e	Recognize that heat moves from warmer objects to cooler objects until both reach the same temperature	Partial	Scope	C) Begin to grasp formal concepts related to energy by focusing on energy transfer and transformations; and make connections among phenomena such as light, heat, magnetism, electricity, and the motion of objects.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.2.3.f	Describe transfer of energy from electrical and magnetic sources to different energy forms (heat, light, sound, chemical)	Partial	Scope		
8.2.3.g	Recognize all energy is neither created nor destroyed	Partial	Scope		
8.3 Life Science					
8.3.1.a	Recognize the levels of organization in living organisms (cells, tissues, organs, organ systems, organisms)	Not addressed			
8.3.1.b	Recognize that all organisms are composed of one or many cells; that these cells must grow, divide, and use energy; and that all cells function similarly	Not addressed			
8.3.1.c	Recognize specialized cells perform specialized functions in multicellular organisms	Not addressed			
8.3.1.d	Identify the organs and functions of the major systems of the human body and describe ways that these systems interact with each other	Not addressed			
8.3.1.e	Describe how plants and animals respond to environmental stimuli	Partial	Implied	C) Understand major kinds of interactions among organisms or populations of organisms.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
8.3.2.a	Recognize that hereditary information is contained in genes within the chromosomes of each cell	Not addressed			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
8.3.2.b	Compare and contrast sexual and asexual reproduction	Not addressed			
8.3.3.a	Diagram and explain the flow of energy through a simple food web	**Strong**		D) Understand how energy and matter flow among the abiotic and biotic components of the environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
8.3.3.b	Compare the roles of producers, consumers, and decomposers in an ecosystem	Partial	Specificity	A) Understand that biotic communities are made up of plants and animals that are uniquely adapted to live in particular environments.	
8.3.3.c	Recognize that producers transform sunlight into chemical energy through photosynthesis	Partial	Scope	C) Begin to grasp formal concepts related to energy by focusing on energy transfer and transformations; and make connections among phenomena such as light, heat, magnetism, electricity, and the motion of objects.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.3.3.d	Determine the biotic and abiotic factors that impact the number of organisms an ecosystem can support	Partial	Emphasis	A) Understand that biotic communities are made up of plants and animals that are uniquely adapted to live in particular environments.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
8.3.3.e	Recognize a population is all the individuals of a species at a given place and time	Weak	Population interactions	C) Understand major kinds of interactions among organisms or populations of organisms.	
8.3.3.f	Identify symbiotic relationships among organisms	**Strong**			
8.3.3.g	Identify positive and negative effects of natural and human activity on an ecosystem	**Strong**		A) Understand that human-caused changes have consequences for the immediate environment as well as for other places and future times.	Strand 2, 2.4 Environment and Society
8.3.4.a	Describe how an inherited characteristic enables an organism to improve its survival rate	**Strong**		A) Understand that biotic communities are made up of plants and animals that are uniquely adapted to live in particular environments.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
8.3.4.b	Recognize the extinction of a species is caused by the inability to adapt to an environmental change	Partial	Implied	B) Learners have a basic understanding of the importance of genetic heritage.	
8.3.4.c	Use anatomical features of an organism to infer similarities among other organisms	**Strong**		A) Understand that biotic communities are made up of plants and animals that are uniquely adapted to live in particular environments.	
8.4 Earth and Space Sciences					
8.4.1.a	Describe the components of the solar system (the Sun, planets, moons, asteroids, comets)	Not addressed			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
8.4.1.b	Describe the relationship between motion of objects in the solar system and the phenomena of day, year, eclipses, phases of the Moon and seasons	Partial	Scope	C) Begin to grasp formal concepts related to energy by focusing on energy transfer and transformations; and make connections among phenomena such as light, heat, magnetism, electricity, and the motion of objects.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.4.1.c	Describe the effects of gravity on Earth (tides) and the effect of gravity on objects in the solar system	Not addressed			
8.4.2.a	Describe the layers of Earth (core, mantle, crust, atmosphere)	Not addressed			
8.4.2.b	Describe the physical composition of soil	Partial	Specificity	B) Understand the properties of the substances that make up objects or materials found in the environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.4.2.c	Describe the mixture of gases in Earth's atmosphere and how the atmosphere's properties change at different elevations	Partial	Scope	A) Understand the basics of most of the physical processes that shape the Earth, and relate differences in physical patterns to their causes.	
8.4.2.d	Describe evidence of Earth's magnetic field	Not addressed			
8.4.2.e	Compare and contrast constructive and destructive forces (deposition, erosion, weathering, plate motion causing uplift, volcanoes, earthquakes) that impact Earth's surface	**Strong**		A) Understand the basics of most of the physical processes that shape the Earth, and relate differences in physical patterns to their causes.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.4.2.f	Describe the rock cycle	Partial	Specificity	B) Understand the properties of the substances that make up objects or materials found in the environment.	
8.4.2.g	Describe the water cycle (evaporation, condensation, precipitation)	Partial	Specificity		
8.4.2.h	Classify Earth materials as renewable or nonrenewable	Weak	3-5 band	*4th Grade Standard from EE* D) Flow of matter and energy—Learners know that living things need some source of energy to live and grow.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
8.4.3.a	Describe how energy from the Sun influences the atmosphere and provides energy for plant growth	**Strong**		A) Understand the basics of most of the physical processes that shape the Earth, and relate differences in physical patterns to their causes.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
8.4.3.b	Identify factors that influence daily and seasonal changes on Earth (tilt of the Earth, humidity, air pressure, air masses)	Strong		A) Understand the basics of most of the physical processes that shape the Earth, and relate differences in physical patterns to their causes.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
8.4.3.c	Describe atmospheric movements that influence weather and climate (air masses, jet stream)	Strong			
8.4.4.a	Recognize that Earth processes we see today are similar to those that occurred in the past (uniformity of processes)	Strong			
8.4.4.b	Describe how environmental conditions have changed through use of the fossil record	Partial	Scope		
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the 6-8 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			A) Understand that how individuals perceive the environment is influenced in part by individual traits and group membership or affiliation.	Strand 2—Knowledge of Environmental Processes and Systems 2.3—Humans and Their Societies
				B) Become more familiar with political and economic systems and how these systems take the environment into consideration.	
				D) Identify and explain ways in which the world's environmental, societal, economic, cultural, and political systems are linked.	
				E) Understand that human social systems change over time and that conflicts sometimes arise over differing viewpoints about the environment.	
				A) Understand that human-caused changes have consequences for the immediate environment as well as for other places and future times.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
				B) Describe, analyze, and make inferences about the characteristics of various places, and explore differences in perceptions and importance of places close to home and around the world.	
				C) Understand that uneven distribution of resources around the world influences their use and perceived value.	
				E) Describe a range of environmental issues at scales that range from local to national to global, and understand that people in other places around the world experience environmental issues similar to the ones they are concerned about locally.	

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 6-8		Content Alignment	Comments	8th Grade EE Guidelines	Strand
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the 6-8 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			A) Use primary and secondary sources of information, and apply their growing research and analytical skills to investigate environmental issues, beginning with those in their own community.	Strand 3- Analyzing, Investigating, & Addressing Environmental Issues 3.1-Skills for Analyzing AND Investigating Environmental Issues
				B) Apply their knowledge of ecological and human processes and systems to identify the consequences of specific environmental issues.	
				D) Consider the assumptions and interpretations that influence the conclusions they and others draw about environmental issues.	
				A) Identify, justify, and clarify their views on environmental issues and alternative ways to address them.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.2—Decision-Making and Citizenship Skills
				B) Evaluate whether they believe action is needed in particular situations, and decide whether they should be involved.	
				C) Begin to see themselves as citizens taking active roles in their communities; plan for and engage in citizen action at levels appropriate to their maturity and preparation.	
				D) Evaluate the effects of their own actions and actions taken by other individuals and groups.	
				A) Understand that societal values can be both a unifying and a divisive force.	Strand 4—Personal and Civic Responsibility
				B) Understand the rights and responsibilities of citizenship and their importance in promoting the resolution of environmental issues.	
				C) Possess a realistic self-confidence in their effectiveness as citizens.	
				D) Understand that their actions can have broad consequences and that they are responsible for those consequences.	

See introduction for discussion of alignment categories and comments.

Grades 9-12: Nebraska Science Standards

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.1 Inquiry, the Nature of Science and Technology					
12.1.1.a	Formulate a testable hypothesis supported by prior knowledge to guide an investigation	Strong/Partial	Specificity	A) Develop, modify, clarify, and explain questions that guide environmental investigations of various types, and identify factors that influence the questions they pose.	Strand 1—Questioning, Analysis and Interpretation Skills
12.1.1.b	Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations	**Strong**		B) Design investigations to answer particular questions about the environment—even developing approaches for investigating unfamiliar types of problems and phenomena.	
12.1.1.c	Identify and manage variables and constraints	**Strong**			
12.1.1.d	Select and use lab equipment and technology appropriately and accurately	**Strong**		C) Locate and collect reliable information for environmental investigations of many types. Know how to use sophisticated technology to collect information, including computer programs designed to address, gather, store, and display data.	
12.1.1.e	Use tools and technology to make detailed qualitative and quantitative observations	**Strong**			
12.1.1.f	Represent and review collected data in a systematic, accurate, and objective manner	Partial	Specificity, Emphasis & Phrasing	E) Organize and display information in ways appropriate to different types of environmental investigations and purposes.	
12.1.1.g	Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations	**Strong**		(2 Standards) D) Apply basic logic and reasoning skills to evaluate completeness and reliability in a variety of information sources. ***** F) Create, use, and evaluate models to understand environmental phenomena.	
12.1.1.h	Use results to verify or refute a hypothesis	Weak	lacking specificity & scope. Needs to incorporate use of logic and address initial questions as well as hypothesis	G) Use evidence and logic in developing proposed explanations that address their initial questions and hypotheses.	
12.1.1.i	Propose and/or evaluate possible revisions and alternate explanations	Partial	for better NE standard clarity, this standard could be rewritten to incorporate both EE standards listed	(2 Standards) D) Apply basic logic and reasoning skills to evaluate completeness and reliability in a variety of information sources. ***** G) Use evidence and logic in developing proposed explanations that address their initial questions and hypotheses.	

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.1.1.j	Share information, procedures, results, conclusions, and defend findings to a scientific community (peers, science fair audience, policy makers)	Strong		E) Organize and display information in ways appropriate to different types of environmental investigations and purposes.	Strand 1—Questioning, Analysis and Interpretation Skills
12.1.1.k	Evaluate scientific investigations and offer revisions and new ideas as appropriate	Strong (with reference to last bullet under EE12.1.g)		G) Use evidence and logic in developing proposed explanations that address their initial questions and hypotheses.	
12.1.1.l	Use appropriate mathematics in all aspects of scientific inquiry	Strong		C) Locate and collect reliable information for environmental investigations of many types. Know how to use sophisticated technology to collect information, including computer programs designed to address, gather, store, and display data.	
12.1.2.a	Recognize that scientific explanations must be open to questions, possible modifications, and must be based upon historical and current scientific knowledge	Strong		(2 Standards) D) Apply basic logic and reasoning skills to evaluate completeness and reliability in a variety of information sources. ***** G) Use evidence and logic in developing proposed explanations that address their initial questions and hypotheses.	
12.1.2.b	Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society	Strong		D) Apply basic logic and reasoning skills to evaluate completeness and reliability in a variety of information sources.	
12.1.2.c	Recognize that the work of science results in incremental advances, almost always building on prior knowledge, in our understanding of the world	Not addressed			
12.1.2.d	Research and describe the difficulties experienced by scientific innovators who had to overcome commonly held beliefs of their times to reach conclusions that we now take for granted	Not addressed			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.1.3.a	Propose designs and choose between alternative solutions of a problem	Strong		B) Design investigations to answer particular questions about the environment—even developing approaches for investigating unfamiliar types of problems and phenomena.	Strand 1—Questioning, Analysis and Interpretation Skills
12.1.3.b	Assess the limits of a technical design	Not addressed	Engineering		
12.1.3.c	Implement the selected solution	Not addressed			
12.1.3.d	Evaluate the solution and its consequences	Not addressed			
12.1.3.e	Communicate the problem, process, and solution	Not addressed			
12.1.3.f	Compare and contrast the reasons for the pursuit of science and the pursuit of technology	Partial	The assumption of this standard seems to be the foundation of the EE standards	*8th Grade EE Standard*: A) Understand that societal values can be both a unifying and a divisive force.	Strand 4-Personal and Civic Responsibility
12.1.3.g	Explain how science advances with the introduction of new technology	Not addressed	Engineering		
12.1.3.h	Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering	Not addressed			
12.2 Physical Science					
12.2.1.a	Recognize bonding occurs when outer electrons are transferred (ionic) or shared (covalent)	Strong	NE standard address more specially	B) Design investigations to answer particular questions about the environment—even developing approaches for investigating unfamiliar types of problems and phenomena.	Strand 1—Questioning, Analysis and Interpretation Skills
12.2.1.b	Describe the energy transfer associated with phase changes between solids, liquids, and gases	Strong			
12.2.1.c	Describe the three normal states of matter (solid, liquid, gas) in terms of energy, particle arrangement, particle motion, and strength of bond between molecules	Strong			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.2.1.d	Recognize a large number of chemical reactions involve the transfer of either electrons (oxidation/reduction) or hydrogen ions (acid/base) between reacting ions, molecules, or atoms	Strong	NE standard address more specially	B) Design investigations to answer particular questions about the environment—even developing approaches for investigating unfamiliar types of problems and phenomena.	Strand 1—Questioning, Analysis and Interpretation Skills
12.2.1.e	Identify factors affecting rates of chemical reactions (temperature, particle size, surface area)	Strong	NE standard addresses the WHY behind the EE standard (bullet 3)		
12.2.1.f	Recognize the charges and relative locations of subatomic particles (neutrons, protons, electrons)	Strong		*8th Grade EE Standard:* B) Understand the properties of the substances that make up objects or materials found in the environment.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
12.2.1.g	Describe properties of atoms, ions, and isotopes	Strong			
12.2.1.h	Describe the organization of the periodic table of elements with respect to patterns of physical and chemical properties	Not addressed			
12.2.2.a	Describe motion with respect to displacement and acceleration	Not addressed			
12.2.2.b	Describe how the law of inertia (Newton's 1st law) is evident in a real-world event	Not addressed			
12.2.2.c	Make predictions based on relationships among net force, mass, and acceleration (Newton's 2nd law)	Not addressed			
12.2.2.d	Recognize that all forces occur in equal and opposite pairs (Newton's 3rd law)	Not addressed			
12.2.2.e	Describe how Newton's 3rd law of motion is evident in a real-world event	Not addressed			
12.2.2.f	Describe gravity as a force that each mass exerts on another mass, which is proportional to the masses and the distance between them	Not addressed			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.2.2.g	Recognize that an attractive or repulsive electric force exists between two charged particles and that this force is proportional to the magnitude of the charges and the distance between them	Not addressed			
12.2.3.a	Describe mechanical wave properties (speed, wavelength, frequency, amplitude) and how waves travel through a medium	Not addressed			
12.2.3.b	Recognize that the energy in waves can be changed into other forms of energy	Not addressed			
12.2.3.c	Recognize that light can behave as a wave (diffraction and interference)	Not addressed			
12.2.3.d	Distinguish between temperature (a measure of the average kinetic energy of atomic or molecular motion) and heat (the quantity of thermal energy that transfers due to a change in temperature)	**Strong**	NE standards are basic science leading to understanding of EE standard	C) Apply their knowledge of energy and matter to understand phenomena in the world around them.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
12.2.3.e	Compare and contrast methods of heat transfer and the interaction of heat with matter via conduction, convection, and radiation	**Strong**	NE standards are basic science leading to understanding of EE standard		
12.2.3.f	Recognize that the production of electromagnetic waves is a result of changes in the motion of charges or by a changing magnetic field	Not addressed			
12.2.3.g	Compare and contrast segments of the electromagnetic spectrum (radio, micro, infrared, visible, ultraviolet, x-rays, gamma) based on frequency and wavelength	Not addressed			
12.2.3.h	Recognize that nuclear reactions (fission, fusion, radioactive decay) convert a fraction of the mass of interacting particles into energy, and this amount of energy is much greater than the energy in chemical interactions	**Strong**	NE standards are basic science leading to understanding of EE standard	C) Apply their knowledge of energy and matter to understand phenomena in the world around them.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.2.3.i	Interpret the law of conservation of energy to make predictions for the outcome of an event	Strong		B) Apply their understanding of chemical reactions to round out their explanations of environmental characteristics and everyday phenomena.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
12.2.3.j	Identify that all energy can be considered to be either kinetic, potential, or energy contained by a field (e.g. electromagnetic waves)	Not addressed			
12.2.3.k	Identify endothermic and exothermic reactions	Strong	NE standards are basic science leading to understanding of EE standard	(2 Standards) B) Apply their understanding of chemical reactions to round out their explanations of environmental characteristics and everyday phenomena. ***** C) Apply their knowledge of energy and matter to understand phenomena in the world around them.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
12.3 Life Science					
12.3.1.a	Identify the complex molecules (carbohydrates, lipids, proteins, nucleic acids) that make up living organisms	Not addressed			
12.3.1.b	Identify the form and function of sub-cellular structures that regulate cellular activities	Not addressed			
12.3.1.c	Describe the cellular functions of photosynthesis, respiration, cell division, protein synthesis, transport of materials, and energy capture/release	Strong		B) Apply their understanding of chemical reactions to round out their explanations of environmental characteristics and everyday phenomena.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
12.3.1.d	Describe how an organism senses changes in its internal or external environment and responds to ensure survival	Partial	Scope	A) Understand basic population dynamics and the importance of diversity in living systems.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.3.2.a	Identify that information passed from parents to offspring is coded in DNA molecules	Strong		*4th Grade EE Standard:* B) Heredity and evolution—Learners understand that plants and animals have different characteristics and that many of the characteristics are inherited.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
12.3.2.b	Describe the basic structure of DNA and its function in genetic inheritance	Not addressed			
12.3.2.c	Recognize how mutations could help, harm, or have no effect on individual organisms	Partial	NE standard focuses on MUTATIONS, whereas EE standard focuses on benefit/detriment of mutations	B) Understand the basic ideas and genetic mechanisms behind biological evolution.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
12.3.2.d	Describe that sexual reproduction results in a largely predictable, variety of possible gene combinations in the offspring of any two parents	Not addressed			
12.3.3.a	Explain how the stability of an ecosystem is increased by biological diversity	Partial	Scope	B) Understand the basic ideas and genetic mechanisms behind biological evolution.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
12.3.3.b	Recognize that atoms and molecules cycle among living and nonliving components of the biosphere	Partial (leaning towards weak)	Scope & Specificity	D) Account for environmental characteristics based on their knowledge of how matter and energy interact in living systems.	
12.3.3.c	Explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials	Strong			
12.3.3.d	Analyze factors which may influence environmental quality	Weak		C) Understand the living environment to be comprised of interrelated, dynamic systems.	

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.3.4.a	Identify different types of adaptations necessary for survival (morphological, physiological, behavioral)	Strong	NE standard focuses on types of adaptations, EE standard focuses on whole of Natural Selection	B) Understand the basic ideas and genetic mechanisms behind biological evolution.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
12.3.4.b	Recognize that the concept of biological evolution is a theory which explains the consequence of the interactions of: (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring	Strong		(2 Standards) A) Understand basic population dynamics and the importance of diversity in living systems. ***** B) Understand the basic ideas and genetic mechanisms behind biological evolution.	
12.3.4.c	Explain how natural selection provides a scientific explanation of the fossil record and the molecular similarities among the diverse species of living organisms	Not addressed			
12.3.4.d	Apply the theory of biological evolution to explain diversity of life over time	Strong		B) Understand the basic ideas and genetic mechanisms behind biological evolution.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
12.4 Earth and Space Sciences					
12.4.1.a	Describe the formation of the universe using the Big Bang Theory	Not addressed			
12.4.1.b	Recognize that stars, like the Sun, transform matter into energy by nuclear reactions which leads to the formation of other elements	Partial	Emphasis & Phrasing, scope	D) Account for environmental characteristics based on their knowledge of how matter and energy interact in living systems.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment
12.4.1.c	Describe stellar evolution	Not addressed			
12.4.2.a	Recognize how Earth materials move through geochemical cycles (carbon, nitrogen, oxygen) resulting in chemical and physical changes in matter	Strong		D) Account for environmental characteristics based on their knowledge of how matter and energy interact in living systems.	Strand 2—Knowledge of Environmental Processes and Systems 2.2—The Living Environment

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.4.2.b	Describe how heat convection in the mantle propels the plates comprising Earth's surface across the face of the globe (plate tectonics)	Not addressed			
12.4.2.c	Evaluate the impact of human activity and natural causes on Earth's resources (groundwater, rivers, land, fossil fuels)	Weak		**<u>Strand 2, 2.3, ALL standards</u>** **<u>Strand 2, 2.4 ALL Standards</u>**	(2 Strands) Strand 2—Knowledge of Environmental Processes and Systems 2.3—Humans and Their Societies **** Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
12.4.3.a	Describe how radiation, conduction, and convection transfer heat in Earth's systems	**Strong**		C) Apply their knowledge of energy and matter to understand phenomena in the world around them.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
12.4.3.b	Identify internal and external sources of heat energy in Earth's systems	Not addressed	EE focuses on energy within living systems, not in terms of heat		
12.4.3.c	Compare and contrast benefits of renewable and nonrenewable energy sources	weak		(2 Standards) A) Understand that humans are able to alter the physical environment to meet their needs and that there are limits to the ability of the environment to absorb impacts or meet human needs. **(3rd & 4th Bullet)** ****** C) Understand that the importance and use of resources change over time and vary under different economic and technological systems.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
12.4.3.d	Describe natural influences (Earth's rotation, mountain ranges, oceans, differential heating) on global climate	Not addressed			

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
12.4.4.a	Recognize that in any sequence of sediments or rocks that has not been overturned, the youngest sediments or rocks are at the top of the sequence and the oldest are at the bottom (law of superposition)	Not addressed			
12.4.4.b	Interpret Earth's history by observing rock sequences, using fossils to correlate the sequences at various locations, and using data from radioactive dating methods	Not addressed			
12.4.4.c	Compare and contrast the physical and biological differences of the early Earth with the planet we live on today	weak		(5 Standards) A) Understand that humans are able to alter the physical environment to meet their needs and that there are limits to the ability of the environment to absorb impacts or meet human needs. ****** B) Understand "place" as humans endowing a particular part of the Earth with meaning through their interactions with that environment. ****** C) Understand that the importance and use of resources change over time and vary under different economic and technological systems. ****** D) Examine the social and environmental impacts of various technologies and technological systems. ****** E) Converse, write about, and evaluate environmental issues at scales that range from local to national to global; understand that these scales and issues are often linked.	Strand 2—Knowledge of Environmental Processes and Systems 2.4—Environment and Society
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the 9-12 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards. .			A) Understand the major physical processes that shape the Earth; relate these processes, especially large-scale and long-term ones, to characteristics of the Earth's surface.	Strand 2—Knowledge of Environmental Processes and Systems 2.1—The Earth as a Physical System
				A) Understand the influence of individual and group actions on the environment and comprehend how groups can work to promote and balance interests.	Strand 2-2.3 Humans and Their Societies

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12	Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
Although no current 2010 Nebraska Science Standard addresses this EE standard at the 9-12 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards			B) Understand cultural perspectives and dynamics and apply their understandings to particular contexts.	Strand 2—Knowledge of Environmental Processes and Systems 2.3—Humans and Their Societies
			C) Understand how different political and economic systems account for, manage, and affect natural resources and environmental quality.	
			D) Analyze global social, cultural, political, economic, and environmental linkages.	
			E) Understand the functioning of public processes for promoting and managing change and conflict, and analyze their effects on the environment.	
			A) Apply their research and analytical skills to investigate environmental issues ranging from local issues to those that are regional or global in scope.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.1—Skills for Analyzing and Investigating Environmental Issues
			B) Evaluate the consequences of specific environmental changes, conditions, and issues for human and ecological systems.	
			C) Identify and propose action strategies that are likely to be effective in particular situations and for particular purposes.	
			D) Engage each other in peer review conducted in the spirit of open inquiry, knowing that environmental issues investigations can bring to the surface deeply held views.	
			A) Communicate, evaluate, and justify their own views on environmental issues and alternative ways to address them.	Strand 3—Analyzing, Investigating, & Addressing Environmental Issues 3.2—Decision-Making and Citizenship Skills
			B) Decide whether action is needed in particular situations, and whether they should be involved.	
			C) Plan for action based on their research and analysis of an environmental issue. If appropriate, take actions that are within the scope of their rights and consistent with their abilities and responsibilities as citizens.	
			D) Evaluate the effects of their own actions and actions taken by other individuals and groups.	

See introduction for discussion of alignment categories and comments.

2010 Nebraska Science Standards Grades 9-12		Content Alignment	Comments	12th Grade EE Guidelines	EE Strand
	Although no current 2010 Nebraska Science Standard addresses this EE standard at the 9-12 grade band, it is possible it may connect to other content areas such as Nebraska Social Studies Standards.			A) Analyze the influence of shared and conflicting societal values.	Strand 4—Personal and Civic Responsibility
				B) Understand the importance of exercising the rights and responsibilities of citizenship.	
				C) Possess a realistic self-confidence in their effectiveness as citizens.	
				D) Understand that their actions can have broad consequences and accept responsibility for recognizing those effects and changing their actions when necessary.	

See introduction for discussion of alignment categories and comments.