

# WISCONSIN STANDARDS FOR **Environmental Literacy & Sustainability**



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**Wisconsin Department of Public Instruction**

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# Foreword

On May 29, 2018, I formally adopted the Wisconsin Standards for Environmental Literacy and Sustainability. This revised set of academic standards provides a foundational framework that identifies what students should know and be able to do for environmental literacy and sustainability.

The adoption of the Wisconsin Standards for Environmental Literacy and Sustainability was part of a concerted effort led by Wisconsin educators and stakeholders who shared their expertise in education for the environment, sustainability and instructional practice from kindergarten through higher education. The public and legislature provided feedback for the writing committee to consider as part of Wisconsin’s Academic Standards review and revision process.

Environmental education focuses on the relationships between people and the planet. The field integrates concepts from a variety of other subject areas, such as, science, social studies, and health, to help students understand our complex natural and cultural systems. Our state’s natural resources are an integral part of our history, economy, and way of life. Environmental literacy and sustainability is an essential part of a comprehensive PK-12 education for all learners to be college, career, and community ready.

Seven standards across three interlocking strands—connect, explore, and engage—outline the knowledge and skills for students. The performance indicators emphasize the development of systems thinking while applying concepts from other subject areas and supporting social-emotional learning. The standards and performance indicators provide a framework to create indoor and outdoor experiences across four grade bands (K-2, 3-5, 6-8, and 9-12) to develop environmental literacy.

The Wisconsin Department of Public Instruction will continue to build on this work to support implementation of the standards with resources for the field. I am excited to share the Wisconsin Standards for Environmental Literacy and Sustainability that aim to build environmental skills, knowledge, and engagement opportunities for all Wisconsin students.

Tony Evers, PhD  
State Superintendent of Public Instruction



# Acknowledgements

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Section I

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**Wisconsin's Approach to Academic Standards**



## Purpose of the Document

The purpose of this guide is to improve environmental literacy and sustainability education for students and for communities. The Wisconsin Department of Public Instruction (DPI) has developed standards to assist Wisconsin educators and stakeholders in understanding, developing and implementing course offerings and curriculum in school districts across Wisconsin.

This publication provides a vision for student success and follows [The Guiding Principles for Teaching and Learning \(2011\)](#). In brief, the principles are:

1. Every student has the right to learn.
2. Instruction must be rigorous and relevant.
3. Purposeful assessment drives instruction and affects learning.
4. Learning is a collaborative responsibility.
5. Students bring strengths and experiences to learning.
6. Responsive environments engage learners.

Program leaders will find the guide valuable for making decisions about:

- Program structure and integration
- Curriculum redesign
- Staffing and staff development
- Scheduling and student grouping
- Facility organization
- Learning spaces and materials development
- Resource allocation and accountability
- Collaborative work with other units of the school, district and community

## **What Are the Academic Standards?**

Wisconsin Academic Standards specify what students should know and be able to do in the classroom. They serve as goals for teaching and learning. Setting high standards enables students, parents, educators, and citizens to know what students should have learned at a given point in time. In Wisconsin, all state standards serve as a model. Locally elected school boards adopt academic standards in each subject area to best serve their local communities. We must ensure that all children have equal access to high-quality education programs. Clear statements about what students must know and be able to do are essential in making sure our schools offer opportunities to get the knowledge and skills necessary for success beyond the classroom.

Adopting these standards is voluntary. Districts may use the academic standards as guides for developing local grade-by-grade level curriculum. Implementing standards may require some school districts to upgrade school and district curriculums. This may result in changes in instructional methods and materials, local assessments, and professional development opportunities for the teaching and administrative staff.

## **What is the Difference between Academic Standards and Curriculum?**

Standards are statements about what students should know and be able to do, what they might be asked to do to give evidence of learning, and how well they should be expected to know or do it. Curriculum is the program devised by local school districts used to prepare students to meet standards. It consists of activities and lessons at each grade level, instructional materials, and various instructional techniques. In short, standards define what is to be learned at certain points in time, and from a broad perspective, what performances will be accepted as evidence that the learning has occurred. Curriculum specifies the details of the day-to-day schooling at the local level.

## **Developing the Academic Standards**

DPI has a transparent and comprehensive process for reviewing and revising academic standards. The process begins with a notice of intent to review an academic area with a public comment period. The State Superintendent's Standards Review Council examines those comments and may recommend revision or development of standards in that academic area. The state superintendent authorizes whether or not to pursue a revision or development process. Following this, a state writing committee is formed to work on those standards for all grade levels. That draft is then made available for open review to get feedback from the public, key stakeholders, educators, and the Legislature with further review by the State Superintendent's Standards Review Council. The state superintendent then determines adoption of the standards.

## **Aligning for Student Success**

To build and sustain schools that support every student in achieving success, educators must work together with families, community members, and business partners to connect the most promising practices in the most meaningful contexts. The release of the standards provides a set of important academic standards for school districts to implement. This is connected to a larger vision of every child graduating college and career ready. Academic standards work together with other critical principles and efforts to educate every child to graduate college and career ready. Here, the vision and set

of Guiding Principles form the foundation for building a supportive process for teaching and learning rigorous and relevant content. The following sections articulate this integrated approach to increasing student success in Wisconsin schools and communities.

## **Relating the Academic Standards to All Students**

Grade-level standards should allow ALL students to engage, access, and be assessed in ways that fit their strengths, needs, and interests. This applies to the achievement of students with IEPs (individualized education plans), English learners, and gifted and talented pupils, consistent with all other students. Academic standards serve as the foundation for individualized programming decisions for all students.

Academic standards serve as a valuable basis for establishing concrete, meaningful goals as part of each student’s developmental progress and demonstration of proficiency. Students with IEPs must be provided specially designed instruction that meets their individual needs. It is expected that each individual student with an IEP will require unique services and supports matched to their strengths and needs in order to close achievement gaps in grade-level standards. Alternate standards are only available for students with the most significant cognitive disabilities.

Gifted and talented students may achieve well beyond the academic standards and move into advanced grade levels or into advanced coursework.

## **Our Vision: Every Child a Graduate, College and Career Ready**

We are committed to ensuring every child graduates from high school academically prepared and socially and emotionally competent. A successful Wisconsin student is proficient in academic content and can apply their knowledge through skills such as critical thinking, communication, collaboration, and creativity. The successful student will also possess critical habits such as perseverance, responsibility, adaptability, and leadership. This vision for every child as a college and career ready graduate guides our beliefs and approaches to education in Wisconsin.

## Guided by Principles

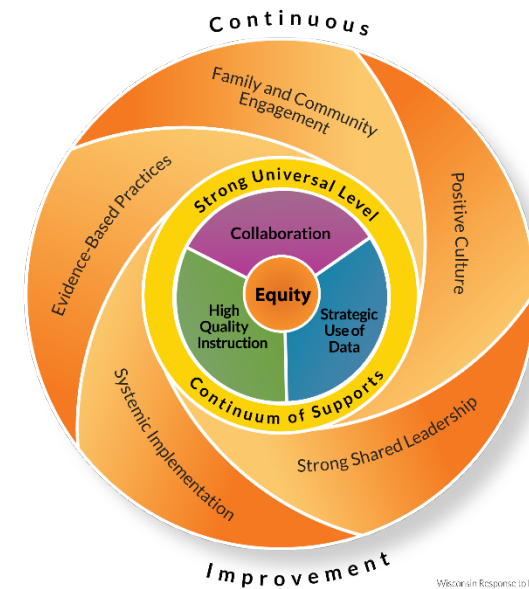
All educational initiatives are guided and impacted by important and often unstated attitudes or principles for teaching and learning. [The Guiding Principles for Teaching and Learning \(2011\)](#) emerge from research and provide the touchstone for practices that truly affect the vision of [Every Child a Graduate Prepared for College and Career](#). When made transparent, these principles inform what happens in the classroom, direct the implementation and evaluation of programs, and most importantly, remind us of our own beliefs and expectations for students.

## Ensuring a Process for Student Success

For Wisconsin schools and districts, implementing the [Framework for Equitable Multi-Level Systems of Supports \(2017\)](#) means providing equitable services, practices, and resources to every learner based upon responsiveness to effective instruction and intervention. In this system, high-quality instruction, strategic use of data, and collaboration interact within a continuum of supports to facilitate learner success. Schools provide varying types of supports with differing levels of intensity to proactively and responsibly adjust to the needs of the whole child. These include the knowledge, skills and habits learners need for success beyond high school, including developmental, academic, behavioral, social, and emotional skills.

## Connecting to Content: Wisconsin Academic Standards

Within this vision for increased student success, rigorous, internationally benchmarked academic standards provide the content for high-quality curriculum and instruction and for a strategic assessment system aligned to those standards. With the adoption of the standards, Wisconsin has the tools to design curriculum, instruction, and assessments to maximize student learning. The standards articulate what we teach so that educators can focus on how instruction can best meet the needs of each student. When implemented within an equitable multi-level system of support, the standards can help to ensure that every child will graduate college and career ready.



Wisconsin Response to Intervention Center  
IDEA C/P/IA #81.027

## References

*The Guiding Principles for Teaching and Learning*. 2011. Madison, WI: Wisconsin Department of Public Instruction. Retrieved from <https://dpi.wi.gov/standards/guiding-principles>.

*Framework for Equitable Multi-Level Systems of Supports*. 2017. Madison, WI: Wisconsin Department of Public Instruction. Retrieved from <https://dpi.wi.gov/rti>.

Section II

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**Wisconsin Standards for  
Environmental Literacy and Sustainability**

## What is environmental literacy and sustainability?

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Environmental literacy and sustainability stem from a person's relationship with their place. Environmental literacy is demonstrated when individuals have the knowledge, skills, and dispositions to engage, individually and collectively, to support sustainable natural and cultural systems.

Sustainability refers to a community's ability to “satisfy its needs and aspirations without diminishing the chances of future generations” (Stone & Barlow, 2005, p. xiii). Developing environmental literacy is foundational to achieving this goal.

## Wisconsin's Vision for Environmental Literacy and Sustainability

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*Conservation is a state of harmony between men and land...conservation still proceeds at a snail's pace... The usual answer to this dilemma is 'more conservation education.' No one will debate this, but is it certain that only the volume of education needs stepping up? Is something lacking in the content as well?*

— Aldo Leopold, A Sand County Almanac

The Wisconsin Standards for Environmental Literacy and Sustainability (ELS) strive to address this dilemma by outlining seven standards to help students **connect**, **explore**, and **engage** in the world around them.

### Connect

1. *Students develop and connect with their sense of place and well-being through observation and questioning.*

### Explore

2. *Students evaluate relationships and system structures to demonstrate the interdependence of natural and cultural systems.*
3. *Students assess how diversity influences health and resilience of natural and cultural systems.*

4. *Students examine the interactions and outcomes of cycles and flows in natural and cultural systems.*
5. *Students investigate and analyze how change and adaptation impact natural and cultural systems.*

### Engage

6. *Students analyze the dynamic balance between natural and cultural systems.*
7. *Students engage in experiences to develop stewardship for the sustainability of natural and cultural systems.*

Our world is ever-changing, and as educators, we are preparing students for a future that we cannot yet imagine. By focusing on interactions and patterns within and among systems and embedding systems thinking into environmental literacy, students develop skills to deepen understanding in any content area and develop knowledge, cognitive skills, and behaviors to be effectively engaged as citizens to foster sustainability.

This document outlines content standards and performance indicators intended to be integrated into a variety of curricular areas and support careers and postsecondary education in many fields,

while helping students develop a sense of self and understand their role in local and global communities.

The “environment” is the world in which we live, including both natural and built features. Humans are a part of, not apart from, the environment. This requires us to look at natural and human-created systems. Earth’s natural systems are most often included in environmental education. These standards require examining cultural systems, including social, political, and economic systems, in tandem with natural systems. For example, when exploring sustainability of food systems, it is impossible to separate the natural and cultural aspects. Understanding the interconnectedness of natural and cultural systems is critical to environmental literacy and sustainability.

## **Environmental Literacy and Sustainability at the Local Level**

In Wisconsin, all state standards serve as a model. Locally elected school boards adopt academic standards in each subject area to best serve their local community. Some schools use their place (e.g., the school grounds, the local environment, the community) as a context for learning in all subject areas, thereby fostering enthusiasm for other disciplines. Others integrate school gardens or service-learning opportunities to foster environmental stewardship. Infusing environmental education throughout the K-12 curriculum increases classroom learning for all students in science, social studies, math, and language arts (Liebermann & Hoody, 1998). Educators, community members, and parents will continue to develop curricula appropriate for their student population and location using the standards as guidelines against which they can

monitor the quality of education experiences that develop environmental literacy and sustainability.

Choosing a pedagogical approach that allows for local and relevant learning also encourages culturally relevant teaching, a term coined by Wisconsin scholar Gloria Ladson-Billings (1994) to describe “a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes” (p.20). Just as biodiversity is important to the health of an ecosystem, the diversity of our cultural approaches to ELS is critical. When the concept of environmental education was first being defined over 50 years ago, the shift of our nation from predominantly rural to urban had already begun. Urban educators have much to offer the field of environmental education, as they have been working to empower marginalized populations in meaningful ways for decades (Anyon, 1980; Freire, 1970; Ladson-Billings, 1994; Stapp, 1969; Ye, Valrelas & Guajardo, 2011). It is important that we consider all populations, urban and rural, and engage in real-world, relevant learning experiences that offer authentic, sustainable solutions for communities.

## **Wisconsin’s Environmental Education Legacy**

Wisconsin’s historical commitment to education advancing environmental literacy and sustainability is well known. The Great Law of the Iroquois Confederacy, of which the Oneida Nation of Wisconsin is a part, says, “In our every deliberation, we must consider the impact of our decisions on the next seven generations.” The Menominee Forest on the Menominee Reservation in northeastern Wisconsin has been noted as “one of the most historically significant working forests in the world” (Johnson & Johnson, 2012, para. 1). Legislation for conservation education has



been in the state since 1935, and teacher preparation programs must include environmental education. In 1985, Wisconsin adopted a requirement for every school district to develop and implement a kindergarten through grade 12 sequential curriculum plan (PI 8.01(2)(k)2.a), with implementation intended as an interdisciplinary approach, stating that “environmental education objectives and activities shall be integrated into K-12 curriculum plans, with the greatest emphasis in art, health, science and social studies education” (PI 8.01(2)(k)6.b). This interdisciplinary approach was also reflected in the department’s *Curriculum Planning Guide for Environmental Education* (1985).

This leadership in environmental education continued with the groundbreaking “Wisconsin Model Academic Standards for Environmental Education” in 1998.

*Wisconsin’s Plan to Advance Education for Environmental Literacy and Sustainability in PK-12 Schools* (2011) outlined three goals to:

1. Prepare students to understand, analyze, and address the major environmental and sustainability challenges facing Wisconsin, the United States, and the planet;
2. Provide field experiences as part of the regular school curriculum and create programs that contribute to healthy lifestyles through outdoor recreation and sound nutrition; and

3. Create opportunities for enhanced preparation and ongoing professional development for teachers and school leaders by improving environmental and sustainability subject matter knowledge and pedagogical skills in teaching about environmental and sustainability issues, including the use of interdisciplinary, field-based, and research-based learning; effective assessment practices; and innovative technology in the classroom.

The plan also identified the need to define what environmentally and sustainability literate graduates should know and be able to do, provide guidance to integrate Wisconsin standards and education for environmental literacy and sustainability, and include grade-level specificity. The *Wisconsin Standards for Environmental Literacy and Sustainability* support these goals.

The natural resources within the State of Wisconsin have provided a foundation for the economy, the life support systems, and are a source of great pride for the people of the state. Tribal Nations and Indigenous Peoples in Wisconsin have a relationship with the land and environment that is interwoven within cultures and cultural practices that have developed since time immemorial. Today, Wisconsinites have proven again and again a commitment to ensuring that a rich resource heritage, and the high quality of life it provides, is sustained for future generations. The *Wisconsin Standards for Environmental Literacy and Sustainability* support continuation of this legacy as students connect, explore, and engage in their local communities.

## An Interdisciplinary Approach to Environmental Literacy and Sustainability

*"When we try to pick out anything by itself, we find it hitched to everything else in the Universe." – John Muir*

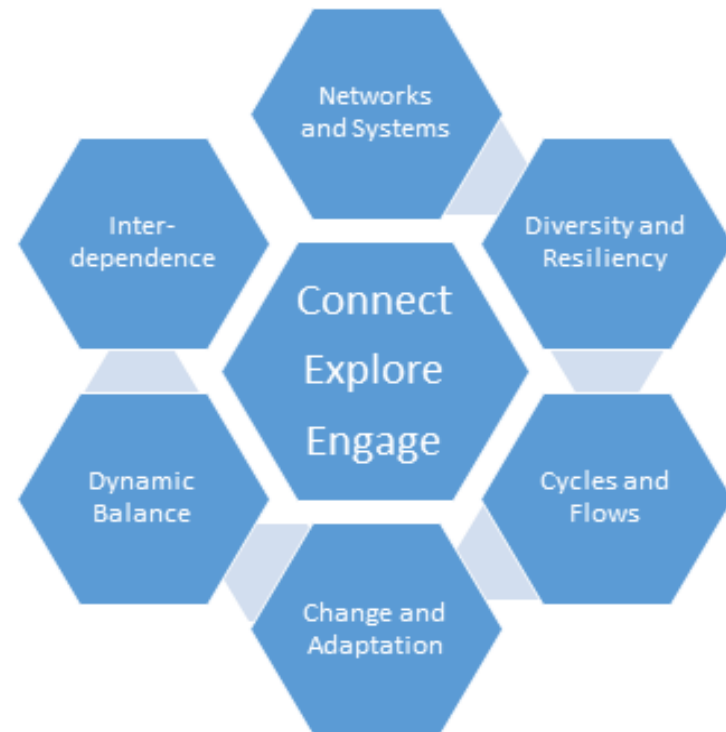
The seven standards are intended to be integrated across subject areas from kindergarten through grade 12. Developing environmental literacy and the skills needed to support sustainable communities is a shared responsibility.

Environmental literacy and sustainability is often associated with science. While environmental science is a key component for ecological understanding, environmental literacy and sustainability is about optimizing the health of natural and cultural systems and requires knowledge and skills in a number of areas, including, but not limited to, science, social studies, English language arts, mathematics, physical education, health, the arts, agriculture, family and consumer sciences, design and engineering, and other career and technical education fields. In these disciplines, students learn related concepts and skills that are needed to make decisions for a sustainable future. While other disciplines have environmental content, the discipline-specific content standards of these areas do not fully capture the interdisciplinary nature of environmental literacy and sustainability.

As has been demonstrated in effective STEM (Science-Technology-Engineering-Mathematics) education, an interdisciplinary approach supports development of authentic interdisciplinary thinking skills needed to design solutions for the future. The standards support this interdisciplinary nature by focusing on “big ideas” that cross content boundaries: networks, nested systems, and interdependence; diversity and resilience; cycles and flows; change and adaptation;

and dynamic balance (Stone & Barlow, 2005, p. 23) which are arranged in three interconnected strands:

1. [Connect](#)
2. [Explore](#)
3. [Engage](#)





**Connect** integrates the big ideas of systems and interdependence to provide a foundation for environmental literacy and sustainability by helping students develop and connect with their sense of place. By asking questions about themselves and the world around them, students

are mindful of how they affect their place and how their place affects them.



**Explore** draws upon skills and knowledge from many fields, including science and social studies. By developing understanding of natural and cultural systems through networks, nested systems, and interdependence; diversity and resilience; cycles and flows; change and

adaptation, students can begin to optimize health and find balance among systems to preserve, utilize, and sustain our environment for seven generations and beyond.

- California’s Environmental Principles and Concepts (CalEPA, 2005)
- Center for Ecoliteracy’s Ecological Principles (Stone & Barlow, 2005)
- Education for a Sustainable Future Benchmarks: For Individual and Social Learning (Cloud, 2017)
- Guidelines for Excellence: K-12 Learning (NAAEE, 2010)
- Oregon Environmental Literacy Plan: Toward a Sustainable Future (OELTF, 2013)
- US Partnership for Education for Sustainable Development National Education for Sustainability K-12 Student Learning Standards (2009)
- Washington State Learning Standards: K-12 Integrated Environmental and Sustainability (SPI, 2014)



**Engage** standards focus on dynamic balance and have students examine individual and collective rights and responsibilities related to models of sustainability and apply learning as stewards of their community.

Systems-thinking skills are integrated throughout all the standards. The ability to examine and respond to new information is critical to prepare students to understand, analyze, and address the major environmental and sustainability challenges facing Wisconsin, the United States, and the planet.

Numerous existing sets of standards and standards-related documents have been used in developing the *Wisconsin Standards for Environmental Literacy and Sustainability*, including:

- Wisconsin Standards for Science (WDPI, 2017)
- Wisconsin Standards for Social Studies (WDPI, under review)
- Wisconsin Standards for Information and Technology Literacy (WDPI, 2017)
- Maryland Environmental Literacy Standards (2009)
- Minnesota's Environmental Literacy Scope and Sequence (MOEA, 2002)
- Pennsylvania's Academic Standards for Environment and Ecology (PDE, 2009)
- Vermont's Framework of Standards and Learning Opportunities (Agne, 2005)

# Standards Structure

**Discipline:** Environmental Literacy and Sustainability

**Strand:** Connect (1)

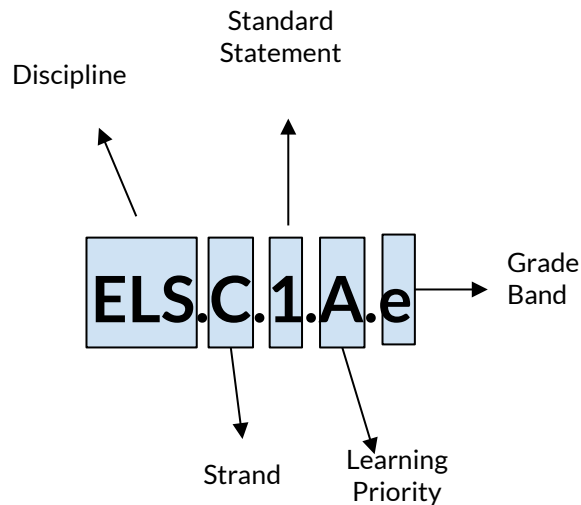
**Standard:** Broad statement that tells what students are expected to know or be able to do

**Learning Priority:** Breaks down the broad statement into manageable learning pieces

**Performance Indicator by Grade Band:** Measurable degree to which a standard has been developed and/or met

Discipline: Environmental Literacy and Sustainability (ELS)				
Strand: Connect (C)				
ELS.C1: Students develop and connect with their sense of place and well-being through observation, exploration, and questioning.				
Learning Priority	Performance Indicators			
	K-2 (e)	3-5 (l)	6-8 (m)	9-12 (h)
C1.A. Perspective	<p>ELS.C1.A.e</p> <p>Identify personal understandings, views, and beliefs, about how natural and cultural systems work within their community.</p>	<p>ELS.C1.A.i</p> <p>Explain how one's understanding of how the world works is developed from experience, and identify personal experiences that have shaped one's own <i>mental models</i>.</p>	<p>ELS.C1.A.m</p> <p>Integrate new <i>perspectives</i> into a <i>mental model</i>, and explain how new ways of thinking can lead to changing attitudes and behaviors.</p>	<p>ELS.C1.A.h</p> <p>Evaluate personal <i>mental models</i> of well-being, equity, social and environmental welfare, economic health, and concern for living beings.</p>
C1.B: Sense of Place	<p>ELS.C1.B.e</p> <p>Identify the natural and cultural parts that make up one's community (e.g., natural and built environments, habitats, family, school, cultural diversity), identify relationships between parts,</p>	<p>ELS.C1.B.i</p> <p>Describe natural and cultural histories of a locality, explain the relationship between the two from a variety of <i>perspectives</i>, and identify how that creates a sense of place. Examine how meeting one's needs for food, water, and</p>	<p>ELS.C1.B.m</p> <p>Identify the relationship between parts of <i>natural and cultural systems</i> in connecting communities into regional systems (e.g., watershed areas, political jurisdictions, ethnic communities).</p>	<p>ELS.C1.B.h</p> <p>Analyze relationships between parts of local and global <i>natural and cultural systems</i>. Compare and contrast historical and current resource use, and analyze the effects on</p>

**How to read the standards codes for a performance indicator:**



Strands in this code structure include:

- [C - Connect](#)
- [EX - Explore](#)
- [EN - Engage](#)

## How to Use the Standards

The standards and performance indicators are written to be accessible for any educator to guide curriculum design and lessons in the indoor or outdoor classroom. Educators new to environmental education might make explicit connections through existing lessons. Others might integrate the standards and performance indicators to design new units of study that bridge multiple subject areas.

These standards articulate end-of-grade level expectations. Some students - including students who receive special education services through an Individualized Education Program (IEP), students with gifts and talents, and English language learners - may benefit from additional supports or challenges. Some barriers to learning and engagement can be minimized through Universal Design for Learning (UDL). In addition, learning can be personalized through collaboration between educators, school staff, families, and students.

## Grade Band Performance Indicators

- Grade band K-2 and 3-5 performance indicators represent knowledge and skills that should be integrated throughout the elementary curriculum with a focus on students' local natural and built environments, including school grounds, neighborhood, and community. Connecting to local places helps students better understand the relativity of "local" when taking on different perspectives, such as comparing youth engagement in other places. Examining the interrelationships of natural and built environments helps students understand that everything is connected, which supports later career exploration.
- Grade band 6-8 performance indicators represent knowledge and skills that should be integrated throughout the middle school curriculum when students can engage in more abstract thinking and expand perspectives, looking at regional and world environmental and sustainability issues. Allowing students to study and engage in meaningful ways that connect to their lives and

make a difference deepen the learning experience and expand their understanding of career fields related to the environment and sustainability.

- Environmental literacy and sustainability at the high school level builds upon skills in earlier grade levels and expands the focus to earth systems-level thinking, including community, national and global networks, impact, and responsibilities. As students in grades 9-12 strive to develop independence, allowing them the opportunities to lead engagement and be part of the solution to issues they are passionate about creates powerful learning experiences. As students apply skills, they see how environmental literacy and sustainability relate to a vast number of [career clusters](#) (WDPI, 2018).

It is important to note that there are no performance indicators outlined for 4-year-old kindergarten (4K). Educators can use the [Wisconsin Model Early Learning Standards](#) (WMELESC, 2017) to guide their work as they take advantage of the natural connections to

environmental literacy and sustainability that come up every day in an effective 4K experience. Early childhood educators can also use the North American Association for Environmental Education’s [Guidelines for Excellence: Early Childhood Programs](#) (NAAEE, 2016) to help develop

authentic exploration experiences that allow young children to figure things out and develop their own sense of wonder as they interact with their world.

## Key Terms

The key terms outlined below are identified using *italic print* throughout the performance indicators.

<b>Term</b>	<b>Use</b>
“i.e.” and “e.g.”	The use of “i.e.” and “e.g.” in the indicators is in the manner of the original Latin. The abbreviation “i.e.”, from the Latin <i>id est</i> , means “that is”, and is used as a definition (required information). The abbreviation “e.g.” is from the Latin <i>exempli gratia</i> , and means “for example” (suggested information).
Change and Adaptation	Change and adaptation is one of the “big ideas” framing the standards which comes from the ecological principles outlined by Fritjof Capra in <i>Ecological Literacy</i> . Understanding that “all life – from individual organisms to species to ecosystems – changes over time. Individuals develop and learn, species adapt and evolve, and organisms in ecosystems coevolve” (Stone, 2012) is important for students to understand as they engage in systems thinking to understand the world around them.
Cultural Systems	In several standards, performance indicators are split into a “natural systems emphasis” or “cultural systems emphasis.” Cultural systems are human designed, such as educational, agricultural, economic, social, and political systems.
Cycles and Flows	Cycles and Flows is another “big idea” framing the standards which comes from the ecological principles outlined by Fritjof Capra in <i>Ecological Literacy</i> . Examining how “members of an ecological community depend on the exchange of resources in continual cycles” and “cycles within an ecosystem intersect with larger regional and global cycles” is an important building block for understanding systems. Flow works hand-in-hand with cycles. “Each organism needs a continual flow of energy to stay alive. The constant flow of energy from the sun to Earth sustains life and drives most ecological cycles” (Stone, 2012). Cycles and flows are present in all cultural and natural systems.

Term	Use
Diversity	Diversity is another “big idea” framing the standards. In <i>Ecological Literacy</i> , Fritjof Capra writes, “The role of diversity is closely connected with systems’ network structures. A diverse ecosystem will be resilient because it contains many species with overlapping ecological functions that can partially replace one another. When a particular species is destroyed by a severe disturbance so that a link in the network is broken, a diverse community will be able to survive and reorganize itself because other links can at least partially fulfill the function of the destroyed species. The more complex the network’s patterns of interconnections are, the more resilient it will be” (Stone & Barlow, 2005, p. 25). The standards examine the impact of diversity in both cultural and natural systems.
Dynamic Balance	Dynamic balance is another “big idea” framing the standards. Sustainability in natural or cultural systems is not static. Michael Stone writes, “Ecological communities act as feedback loops so that the community maintains a relatively steady state that also has continual fluctuations. This dynamic balance provides resiliency in the face of ecosystem change” (Stone, 2012). By engaging in systems thinking, students will analyze how system structures, change and adaptation, diversity, and cycles and flows impact the dynamic balance and sustainability of systems.
Feedback	Feedback is information taken from a situation or experience. As systems respond to change, the results or effects create feedback in various forms, such as biochemical changes or behavioral responses. In systems thinking, students analyze feedback to consider potential modifications to the system structure to receive different feedback.
Interdependence	Interdependence is another “big idea” framing the standards which comes from the ecological principles outlined by Fritjof Capra in <i>Ecological Literacy</i> . In natural systems, “the sustainability of individual populations and the sustainability of the entire ecosystem are interdependent. No individual organism can exist in isolation” (Stone & Barlow, 2005, p. 24). The same is true in cultural systems. Capra writes, “Sustainability always involves a whole community. This is the profound lesson we need to learn from nature” (Stone & Barlow, 2005, p. 24).
Leverage Points	Understanding leverage points is an important component in systems thinking. Meadows (1999) describes leverage points as, “places within a complex system (a corporation, an economy, a living body, a city, an ecosystem) where a small shift in one thing can produce big changes in everything” (p. 1).
Mental Model	A mental model is our understanding of how things work, or the schema we use to try to explain or relay some meaning about our reality. Mental models inform behavior and the results of the action/behavior then further inform our mental model— either by reinforcing the current model by getting the desired result, or by adjusting our model by learning from an undesired result. Understanding and identifying mental models is foundational to systems thinking.



<b>Term</b>	<b>Use</b>
Natural Systems	In several places, performance indicators are split into a “natural systems emphasis” or “cultural systems emphasis.” Natural systems refer to all of Earth’s systems which are not human designed, including both physical and living systems.
Networks	Networks is another “big idea” within the standards and a concept present in both systems thinking and Capra’s ecological principles. Networks in both natural and cultural systems are created through relationship. Michael Stone explains, “All living things in an ecosystem are interconnected through networks of relationship. They depend on this web of life to survive. For example: In a garden, a network of pollinators promotes genetic diversity; plants, in turn, provide nectar and pollen to the pollinators” (Stone, 2012).
Outcome	Throughout the standards, students are asked to examine impact to systems and outcomes. The outcome of a system is determined by the system’s structure. To achieve different outcomes, modifications to the system’s structure must be made.
Perspective	A perspective is comprised of both a point and a view. Understanding multiple stakeholder perspectives, (including where they are coming from — point — and what they are seeing — view) is a key piece of systems thinking and developing environmental literacy. Nonhuman living beings and nonliving objects can also be a point from which something is “viewed.” It can be challenging to know what that view is, but we, as humans, can estimate or imagine what that might be.
Place	Throughout these standards is reference to “place” and developing a “sense of place.” Place refers to the defining characteristics of a particular location, including natural features such as landscapes, watersheds, and relative location, and cultural aspects such as architecture, human-environment interaction, and economic activity.
Stakeholders	A stakeholder is any party (human or non-human) with an interest or concern in something.
Systems and Nested Systems	Systems and nested systems are additional “big ideas” within the standards and present in both systems thinking and Capra’s ecological principles. While Stone writes about it in terms of natural systems, the concept applies to cultural systems as well: “Nature is made up of systems that are nested within systems. Each individual system is an integrated whole and—at the same time — part of larger systems. Changes within a system can affect the sustainability of the systems that are nested within it as well as the larger systems in which it exists” (Stone, 2012).

<b>Term</b>	<b>Use</b>
Systems Thinking	<p>Systems thinking is about examining a system as a whole. Systems thinking is an emergent property (Cabrera &amp; Cabrera, 2015, p. 9) that results from using four simple rules together:</p> <p>Distinctions Rule: Any idea or thing can be distinguished from the other ideas or things it is with;</p> <p>Systems Rule: Any idea or thing can be split into parts or lumped into a whole;</p> <p>Relationships Rule: Any idea or thing can relate to other things or ideas; and</p> <p>Perspectives Rule: Any idea or thing can be the point or the view of a perspective.</p> <p>Through making distinctions, identifying relationships, organizing into parts and wholes, and considering perspectives, students gain the skills needed to understand their own mental models of how the world works, adjust those models based on feedback (learning), and create the desired outcome. Students who are able to address concepts and issues from a systems thinking approach will be able to design a more sustainable future.</p>

The key terms outlined above are identified using *italic print* throughout the performance indicators.

Section III

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**Discipline: Environmental Literacy and  
Sustainability Standards**

## At-A-Glance: Wisconsin Standards for Environmental Literacy and Sustainability

### Strand 1: Connect

**STANDARD 1:** Students develop and connect with their sense of place and well-being through observation, exploration, and questioning.

*Learning Priorities:*

- A. Perspective
- B. Sense of Place
- C. Curiosity and Wonder
- D. Well-being

### Strand 2: Explore

**STANDARD 2:** Students evaluate relationships and structures of natural and cultural systems and analyze their interdependence.

*Learning Priorities:*

- A. Systems Thinking
- B. Natural Systems Emphasis
- C. Cultural Systems Emphasis

**STANDARD 3:** Students assess how diversity influences health and resilience of natural and cultural systems.

*Learning Priorities:*

- A. Multiple Perspectives
- B. Natural Systems Emphasis
- C. Cultural Systems Emphasis

**STANDARD 4:** Students examine the interactions and outcomes of cycles and flows in natural and cultural systems.

*Learning Priorities:*

- A. Natural Systems Emphasis
- B. Cultural Systems Emphasis

**STANDARD 5:** Students investigate and analyze how change and adaptation impact natural and cultural systems.

*Learning Priorities:*

- A. Decision Making
- B. Natural Systems Emphasis
- C. Cultural Systems Emphasis

### Strand 3: Engage

**STANDARD 6:** Students analyze the dynamic balance between natural and cultural systems.

*Learning Priorities:*

- A. System Structure and Outcomes
- B. Rights and Responsibilities
- C. Models of Sustainability

**STANDARD 7:** Students engage in experiences to develop stewardship for the sustainability of natural and cultural systems.

*Learning Priorities:*

- A. Inquiry and Investigation
- B. Design and Implementation
- C. Evaluation and Reflection



## Connect

“It’s only after being aware of what’s around us that we develop an understanding of what nature is like.”

– Ruth Hine, Wisconsin Conservation Hall of Fame Inductee

### Discipline: Environmental Literacy and Sustainability (ELS)—Strand: Connect (C)

ELS.C1: Students develop and connect with their sense of place and well-being through observation, exploration, and questioning.

#### Performance Indicators (by Grade Band)

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<b>C1.A. Perspective</b>	<p>ELS.C1.A.e</p> <p>Identify personal understandings, views, and beliefs, about how natural and cultural systems work within their community.</p>	<p>ELS.C1.A.i</p> <p>Explain how one’s understanding of how the world works is developed from experience and identify personal experiences that have shaped one’s own <i>mental models</i>.</p>	<p>ELS.C1.A.m</p> <p>Integrate new <i>perspectives</i> into a <i>mental model</i> and explain how new ways of thinking can lead to changing attitudes and behaviors.</p>	<p>ELS.C1.A.h</p> <p>Evaluate personal <i>mental models</i> of well-being, equity, social and environmental welfare, economic health, and concern for living beings.</p>
<b>C1.B: Sense of Place</b>	<p>ELS.C1.B.e</p> <p>Identify the natural and cultural parts that make up one’s community (e.g., natural and built environments, habitats, family, school, cultural diversity), identify relationships between parts, and the role and...</p>	<p>ELS.C1.B.i</p> <p>Describe natural and cultural histories of a locality, explain the relationship between the two from a variety of <i>perspectives</i>, and identify how that creates a sense of place.</p>	<p>ELS.C1.B.m</p> <p>Identify the relationship between parts of <i>natural</i> and <i>cultural systems</i> in connecting communities into regional systems (e.g., watershed areas, political jurisdictions, ethnic communities). Understand the...</p>	<p>ELS.C1.B.h</p> <p>Analyze relationships between parts of local and global <i>natural</i> and <i>cultural systems</i>. Compare and contrast historical and current resource use, and...</p>

NOTE: This standard continued on next page.

(cont.) ELS.C1: Students develop and connect with their sense of place and well-being through observation, exploration, and questioning.

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>(cont.) C1.B: Sense of Place</b>	<p>ELS.C1.B.e</p> <p>Impact of humans in those systems.</p> <p>Identify where one’s food and water come from and where it goes.</p> <p>Identify different levels that make up one’s sense of place (local, regional, national, global).</p>	<p>ELS.C1.B.i</p> <p>Examine how meeting one’s needs for food, water, and shelter can impact <i>natural</i> and <i>cultural systems</i>.</p>	<p>ELS.C1.B.m</p> <p>Relationships between the environment and geography of a locality and its history, culture, and economy.</p> <p>Gather data from primary sources to identify local needs and compare to perceived local, regional, or global needs.</p> <p>Investigate alternatives to meeting one’s needs for food, water, and shelter.</p>	<p>ELS.C1.B.h</p> <p>Analyze the effects on local, regional, and global <i>natural</i> and <i>cultural systems</i>.</p>
<b>C1.C: Curiosity and Wonder</b>	<p>ELS.C1.C.e</p> <p>Explore outdoors, observing changes over time; describe and ask questions about patterns in natural and built environments.</p>	<p>ELS.C1.C.i</p> <p>Investigate and classify natural and designed objects, formulate questions about the relationship between physical and natural characteristics of the environment (e.g., soil/plants, water/animals), identify patterns, make predictions, and solve problems through sensory observations and active exploration outdoors.</p>	<p>ELS.C1.C.m</p> <p>Ask questions about patterns and cause and effect relationships in <i>natural</i> and <i>cultural systems</i> observed outdoors daily, seasonally, and over time.</p> <p>Examine how curiosity and wonder help formulate questions to pursue knowledge about everyday experiences.</p>	<p>ELS.C1.C.h</p> <p>Investigate and analyze one’s own curiosities about patterns that emerge from outdoor exploration to develop new questions, draw conclusions, or formulate new ideas or solutions.</p> <p>Reflect and share how one’s perspectives influence personal curiosity, the pursuit of knowledge, and respect for others and the environment.</p>

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(cont.) ELS.C1: Students develop and connect with their sense of place and well-being through observation, exploration, and questioning.

**Performance Indicators (by Grade Band)**

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<b>C1.D: Well-being</b>	<p>ELS.C1.D.e</p> <p>Recognize emotions relating to daily sensory observations and learning during integrated nature play.</p> <p>Recognize the mental, socio-emotional, and physical benefits of time spent outdoors, and explore strategies for self-regulation (e.g., practicing quiet time, bringing awareness to the process of breathing, choosing a natural object to focus on over time), gauging self-limits, and developing confidence.</p>	<p>ELS.C1.D.i</p> <p>Develop goals to promote personal wellness, mindfulness, confidence, and self-regulation, and stretch mental and physical limits through activities in and about nature.</p> <p>Compare and contrast creativity, personal wellness, and academics in indoor and outdoor environments.</p> <p>Identify areas in the community that promote well-being and explain why.</p>	<p>ELS.C1.D.m</p> <p>Reflect on and critique experiences related to personal wellness, creativity, and academics in indoor and outdoor environments.</p> <p>Design and implement a personal wellness plan that uses nature and outdoor activities to develop personal well-being, mindfulness, confidence, and self-regulation, and stretch mental and physical limits; describe how the plan mitigates safety risks inherent in outdoor activities.</p> <p>Compare approaches of areas in the community that promote well-being and explain how personal well-being impacts a society's well-being.</p>	<p>ELS.C1.D.h</p> <p>Analyze the effects of environment and time outdoors on mental, socio-emotional, and physical health.</p> <p>Design and implement a home, school, or community wellness improvement plan that integrates the outdoors to develop mindfulness, confidence, and self-regulation; evaluate the outcomes, and communicate the results.</p>



## Explore

*“The decisions we make today will impact seven generations. It is a heavy responsibility that our forefathers and foremothers undertook. We must keep this in mind as we proceed.”*

– Ada Deer, Menominee Indian Tribe of Wisconsin

### Discipline: Environmental Literacy and Sustainability (ELS)—Strand: Explore (EX)

ELS.EX2: Students evaluate relationships and structures of natural and cultural systems and analyze their interdependence.

#### Performance Indicators (by Grade Band)

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<b>EX2.A: Systems Thinking</b>	<p>ELS.EX2.A.e</p> <p>Recognize parts, wholes, and boundaries of an idea or thing.</p> <p>Identify a familiar natural system, name its parts, and identify relationships among the parts (e.g., the schoolyard has playground equipment, trees, a garden, and birds; birds use trees for homes and find food in the garden), and compare one’s identified system to others’ to explore similarities and differences.</p>	<p>ELS.EX2.A.i</p> <p>Analyze a system to break it down into its component parts to understand their interconnectedness in forming the whole system.</p> <p>Identify a familiar system, differentiate and relate ideas, identify nested systems, consider perspectives and alternative boundaries, and name parts of relationships.</p> <p>Describe how perspective is comprised of both a point and a view.</p>	<p>ELS.EX2.A.m</p> <p>Create a model of a system, identify hidden relationships and perspectives, and analyze nested systems of its parts and wholes.</p> <p>Reorganize a system through analyzing alternative boundaries, perspectives, and relationships.</p> <p>Compare the relationship between two wholes by comparing the relationships of the parts.</p>	<p>ELS.EX2.A.h</p> <p>Recommend alternative models of systems to address different perspectives, define new boundaries, and achieve new outcomes.</p> <p>Examine nested systems within identified relationships and sub-perspectives of individual and group perspectives.</p> <p>Identify and analyze limitations in our understanding of systems and the outcomes.</p>

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(cont.) ELS.EX2: Students evaluate relationships and structures of natural and cultural systems and analyze their interdependence.

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>EX2.B: Natural Systems Emphasis</b>	<p>ELS.EX2.B.e</p> <p>Identify species within an ecosystem and describe how the ecosystem provides resources and services necessary for survival.</p>	<p>ELS.EX2.B.i</p> <p>Explain how living and nonliving things can affect survival of organisms.</p> <p>Recognize ways that organisms depend on other organisms (e.g., plants depend on animals for pollination and seed dispersal) and that each has a role in the function of the ecosystem (e.g., producers, consumers, and decomposers).</p>	<p>ELS.EX2.B.m</p> <p>Analyze the relationships between living (biotic) and non-living (abiotic) parts in an ecosystem and examine the impact of each on the system.</p> <p>Describe how relationships among humans and organisms, species, populations, communities, ecosystems, and biomes affect the sustainability of natural and cultural systems.</p>	<p>ELS.EX2.B.h</p> <p>Compare and contrast the competitive, predatory, and mutually beneficial interactions between different species and ecosystems and evaluate the impacts of each on the system.</p>
<b>EX2.C: Cultural Systems Emphasis</b>	<p>ELS.EX2.C.e</p> <p>Identify ways in which people are dependent on natural resources and how access to resources can lead to conflict and cooperation.</p> <p>Identify rule makers and why rules are made related to the environment.</p>	<p>ELS.EX2.C.i</p> <p>Investigate how Wisconsin’s natural systems have shaped the state’s cultural systems.</p> <p>Investigate how access to renewable and nonrenewable natural resources necessary for survival influences human interactions between and within geographic regions.</p> <p>Identify the basic role of the legislative, executive, and judicial branches of ...</p>	<p>ELS.EX2.C.m</p> <p>Analyze the impact of security, resource scarcity, cooperation, competition, and conflict on natural and cultural systems at the local, state, tribal, and national levels.</p> <p>Compare and contrast the roles of government at local, state, tribal, national, and international levels in setting and enforcing environmental policies, and encouraging sustainability.</p>	<p>ELS.EX2.C.h</p> <p>Assess the roles of individuals, government, and special interest groups in setting policies at the local, state, tribal, national, and international level; analyze the cultural and environmental dimensions of the policy; and propose a strategy to address concerns related to the policy.</p> <p>Design a solution for a natural resource scarcity issue using available resources in a ...</p>

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(cont.) ELS.EX2: Students evaluate relationships and structures of natural and cultural systems and analyze their interdependence.

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>(cont.) EX2.C: Cultural Systems Emphasis</b>		government in regard to the environment and sustainability.		different way or developing a new resource, and analyze intended and unintended consequences on sustainability in natural and cultural systems.

ELS.EX3. Students assess how diversity influences health and resilience of natural and cultural systems.

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>EX3.A: Multiple Perspectives</b>	<p>ELS.EX3.A.e</p> <p>Recognize different perspectives about the environment and identify ways these perspectives could lead to collaboration or conflict.</p> <p>Review information from multiple perspectives and ask questions about books, photos, artifacts, websites, and other sources used to learn about natural and cultural systems.</p>	<p>ELS.EX3.A.i</p> <p>Compare and contrast the perspectives of people from various cultures who have had an impact on the environment and sustainability.</p> <p>Examine the accuracy, reliability, and biases of sources used to learn about environmental and sustainability-related topics.</p>	<p>ELS.EX3.A.m</p> <p>Evaluate sustainability issues from multiple perspectives, including unstated, absent, or under-represented perspectives, and assess how perspectives impact outcomes of the issue.</p> <p>Analyze and evaluate the logic, relevance, and accuracy of others' claims, taking into consideration potential bias and consider how sources influence perspectives and outcomes on environmental issues. ...</p>	<p>ELS.EX3.A.h</p> <p>Compare parallel historical and contemporary sustainability issues and articulate the perspectives, including unstated, absent, under-represented groups and future generations, critique the balance of stakeholder interests in the outcome, and propose alternative solutions.</p> <p>Analyze and weigh relevance of sources through a disciplinary lens to ...</p>

NOTE: This standard continued on next page.

(cont.) ELS.EX3. Students assess how diversity influences health and resilience of natural and cultural systems.

**Performance Indicators (by Grade Band)**

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
			Understand the role of cultural and science-based evidence in evaluating sustainability.	determine how the author, context, audience, and purpose affect the reliability, limitations, and usefulness of a source.
<b>EX3.B: Natural Systems Emphasis</b>	<p>ELS.EX3.B.e</p> <p>Recognize that environments are different based on location and time of year.</p> <p>Identify that producers are the basis of any food chain, and that a variety of producers is necessary to support the overall resilience of ecosystems.</p> <p>Discover and design ways to improve environmental quality.</p>	<p>ELS.EX3.B.i</p> <p>Evaluate how diversity influences the quality of ecosystem functions that provide resources and services necessary for survival and how different roles contribute to diversity (e.g., balance of producers and consumers needed for a healthy, diverse food chain or the impact of soil, water, and air quality on life).</p> <p>Examine discoveries and technologies that influence the characteristics and quality of natural systems and develop new solutions.</p>	<p>ELS.EX3.B.m</p> <p>Examine the relationships among resource use, environmental quality, and human health and well-being.</p> <p>Use data to explain how biodiversity can contribute to health and resilience as systems change over time.</p> <p>Assess and consider reasons for similarities and differences of characteristics and quality of natural systems in communities locally and bioregions globally.</p> <p>Analyze how new knowledge or technological solutions impact natural resource use, or improve environmental quality.</p>	<p>ELS.EX3.B.h</p> <p>Evaluate the impacts on health and quality of natural systems resulting from resource use at the global level and propose solutions to increase system resiliency.</p> <p>Evaluate and compare the characteristics of two communities and analyze how the diversity, health, and resilience of natural systems impact the quality and health of cultural systems.</p> <p>Design and evaluate solutions that improve environmental quality or implement sustainable practices, including but not limited to areas lacking desired resources.</p>

NOTE: This standard continued on next page.

(cont.) ELS.EX3. Students assess how diversity influences health and resilience of natural and cultural systems.

**Performance Indicators (by Grade Band)**

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<p><b>EX3.C: Cultural Systems Emphasis</b></p>	<p>ELS.EX3.C.e Discover differences in environments and cultural traditions and practices. Explain the concept of shared natural resources, and identify ways people can work together to maintain health of a common area. Identify and explain the difference between fair and equal.</p>	<p>ELS.EX3.C.i Describe how cultures relate to their environments. Examine different perspectives on shared natural resources, and identify ways to measure health. Describe the importance of creating equitable policies, rules, and laws. Discuss the idea of right and wrong and examine impacts of individual actions.</p>	<p>ELS.EX3.C.m Analyze how one’s cultural identity influences perspectives about shared natural resources and their role in maintaining the health and resilience of those resources. Analyze the environmental, social, and economic aspects of community health and sustainability. Analyze cases where historically marginalized groups have been impacted by environmental decisions. Examine ethics of societal actions and their effect on others.</p>	<p>ELS.EX3.C.h Evaluate, from a variety of cultural perspectives, the concept of shared natural resources and what is needed to maintain its health and accessibility for all. Evaluate how groups have addressed issues of equity in environmental health and sustainability. Analyze the use and distribution of resources worldwide and the impact on populations, including historically marginalized populations. Analyze, compare, and critique the ethics of societal actions and impacts of ethnocentrism.</p>

**ELS.EX4: Analyze the interactions and outcomes of cycles and flows in natural and cultural systems.**

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>EX4.A: Natural Systems Emphasis</b>	<p>ELS.EX4.A.e</p> <p>Recognize that animals (including humans) get the nutrients, energy, and hydration needed to grow and function from the food and water they consume.</p> <p>Identify places where water is found in different forms on Earth.</p>	<p>ELS.EX4.A.i</p> <p>Explain how energy can be converted from one form to another form (e.g., animals break down the food they eat to obtain energy and material to build body structures).</p> <p>Explain how water, in its different forms, moves through the water cycle.</p> <p>Illustrate the cycling of matter between living and nonliving systems.</p>	<p>ELS.EX4.A.m</p> <p>Develop and analyze models that describe cycles and flows of Earth’s systems, including the cycling of water driven by energy from the sun and the force of gravity; the cycling of carbon dioxide, methane, nitrogen, and oxygen among the hydrosphere, atmosphere, and geosphere; and cycling of matter and flow of energy through photosynthesis and cellular respiration.</p>	<p>ELS.EX4.A.h</p> <p>Apply the laws of conservation of mass and energy to analyze cycles and flows of Earth’s systems, including: the cycling of matter and flow of energy among the biotic and abiotic components in the biosphere, atmosphere, geosphere, and hydrosphere; the transfer and loss of energy and mass at each link in an ecosystem; and the roles of photosynthesis, cellular respiration, and carbon sequestration in the global carbon cycle.</p>
<b>EX4.B: Cultural Systems Emphasis</b>	<p>ELS.EX4.B.e</p> <p>Differentiate between a “want” and a “need.”</p> <p>Describe resources that are essential to the health of individuals, families, and communities.</p> <p>Differentiate between buyers (consumers) and sellers (producers).</p>	<p>ELS.EX4.B.i</p> <p>Examine the cycle of renewable and nonrenewable natural resources in a local community from resource production, to consumer acquisition and use, to disposal. Recognize the relationship between the environment providing resources, consumer’s demand for these resources, and employers who provide jobs and income.</p>	<p>ELS.EX4.B.m</p> <p>Analyze how the movement of renewable and nonrenewable natural resources through acquisition, production, consumption, and disposal creates systems of commerce, and examine the influence of supply and demand on the system.</p> <p>Demonstrate how the demand for natural resources connects businesses and industries.</p>	<p>ELS.EX4.B.h</p> <p>Examine the role of renewable and nonrenewable resources in creating sustainable economies.</p> <p>Analyze how the movement of natural resources through acquisition, production, consumption, and disposal impact sustainability of local, regional, and global systems.</p>

NOTE: This standard continued on next page.

**ELS.EX5: Investigate and analyze how change and adaptation impact natural and cultural systems.**

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>EX5.A: Decision Making</b>	<p>ELS.EX5.A.e</p> <p>Examine ways one’s own beliefs, views, and understanding, influence decision-making and actions.</p> <p>Explain the impact of one’s decisions on others.</p> <p>Identify how individuals and groups make choices that individually and collectively impact natural and cultural systems.</p>	<p>ELS.EX5.A.i</p> <p>Explain how one’s cultural identity and views can influence decision-making and sustainability in natural and cultural systems.</p> <p>Identify parts, relationships, and perspectives present in a local issue, and examine the impact of individual and group choices on natural and cultural systems.</p>	<p>ELS.EX5.A.m</p> <p>Compare and contrast various cultural systems’ viewpoints, actions, decisions, and behaviors related to sustainability.</p> <p>Analyze a sustainability issue by examining individual and group actions, critiquing the decision-making processes, and assessing the impact on natural and cultural systems.</p> <p>Understand the role of cultural and science-based evidence in evaluating sustainability.</p>	<p>ELS.EX5.A.h</p> <p>Argue a perspective regarding a sustainability issue by examining individual and group actions, critiquing the decision-making processes, describing shared and conflicting values and principles, and assessing the impact on natural and cultural systems.</p>
<b>EX5.B: Natural Systems Emphasis</b>	<p>ELS.EX5.B.e</p> <p>Identify changes that take place in natural systems (e.g., weather, water, day length).</p> <p>Identify how plants and animals are adapted to habitats that provide the food, water, and protection needed for their sustainability.</p> <p>Observe and identify patterns in weather and day length.</p>	<p>ELS.EX5.B.i</p> <p>Describe how living things respond to changes in natural systems.</p> <p>Explain how changes affect how organisms adapt and survive.</p> <p>Observe and compare changes in weather and climatic patterns and how each affects natural systems.</p>	<p>ELS.EX5.B.m</p> <p>Investigate short-term and long-term impacts of change and adaptation in natural systems.</p> <p>Explain how change and adaptation can enhance or limit the carrying capacity of a system. Analyze historic climate patterns to describe the impacts on natural and cultural systems.</p>	<p>ELS.EX5.B.h</p> <p>Evaluate how feedback loops impact natural systems over time and predict adaptive strategies.</p> <p>Create a model that demonstrates how to restore or increase the stability of a system in response to change.</p>

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(cont.) ELS.EX5: Investigate and analyze how change and adaptation impact natural and cultural systems.

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<p><b>EX5.C: Cultural Systems Emphasis</b></p>	<p>ELS.EX5.C.e Compare historical and contemporary natural resource use and practices. Identify how humans change the environment.</p>	<p>ELS.EX5.C.i Identify historical or contemporary cultural events that have shaped perspectives about a sustainability issue. Identify how humans have shaped and managed natural systems, cultural systems, and the impact of change on both systems.</p>	<p>ELS.EX5.C.m Examine how historical and contemporary factors shape a sustainability issue. Evaluate how historical and contemporary natural resource use, practices, and distribution has affected human geography and analyze the impact on natural systems.</p>	<p>ELS.EX5.C.h Analyze historical and contemporary strategies to solving sustainability issues to develop alternative approaches for addressing parallel issues in the future. Evaluate how natural resource use, practices, and technological advances impact natural and cultural systems.</p>



## Engage

*"Everybody should touch the soil. It really changes how you feel about everything in your life. It's therapeutic."*

– Will Allen, Growing Power

### Discipline: Environmental Literacy and Sustainability (ELS)—Strand: Engage (EN)

ELS.EN6: Students analyze the dynamic balance between natural and cultural systems.

#### Performance Indicators (by Grade Band)

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<b>EN6.A: System Structure and Outcomes</b>	<p>ELS.EN6.A.e</p> <p>Identify how positive and negative feedback impacts relationships and behavior.</p> <p>Recognize that there are short- and long-term consequences of choices.</p>	<p>ELS.EN6.A.i</p> <p>Identify cause and effect relationships and examine how a system's structure or behavior needs to change to achieve intended outcomes.</p> <p>Make connections between parts, systems, relationships, and perspectives in a system to identify how things work.</p>	<p>ELS.EN6.A.m</p> <p>Identify and analyze complexities of decisions on natural and cultural systems now and in the future and consider possible unintended consequences.</p> <p>Identify positive and negative feedback and leverage points within a system and suggest modifications to the structure to achieve intended outcomes.</p>	<p>ELS.EN6.A.h</p> <p>Analyze the role of feedback loops in reinforcing the interconnectedness of parts within a system and the consequences of actions by each of those parts on the whole.</p> <p>Identify and analyze leverage points and cause and effect relationships within a system.</p> <p>Demonstrate how ideas, parts, relationships, and perspectives change over time, generating patterns and trends.</p>

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(cont.) ELS.EN6: Students analyze the dynamic balance between natural and cultural systems.

**Performance Indicators (by Grade Band)**

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<p><b>EN6.B: Rights &amp; Responsibilities</b></p>	<p>ELS.EN6.B.e Describe the characteristics of personal responsibility and explain how a person’s choices can impact and affect the local community as well as the environment.</p>	<p>ELS.EN6.B.i Analyze the role of civic and personal ideals in enhancing natural and cultural systems. Analyze the short- and long-term impact of personal choices on the environment and sustainable communities. Investigate how individual and societal rights and responsibilities relate to healthy environments and sustainable communities.</p>	<p>ELS.EN6.B.m Analyze how individual and civic dispositions and different perspectives on personal and collective responsibility, rights, and equity influence decision-making and impact natural and cultural systems. Investigate individual and societal rights to and responsibility for a healthy environment, equity, and a sustainable community and describe tensions that may arise when making decisions for the common good. Explain how the decisions of one generation create opportunities for and impose constraints on future generations.</p>	<p>ELS.EN6.B.h Evaluate and justify one’s own civic ideals by providing examples of personal rights and responsibilities related to one’s place. Analyze and evaluate impacts of personal and collective responsibility on the environment and community and develop solutions to conflicts that arise to minimize the impact on natural and cultural systems. Analyze environmental laws created for local and global environments.</p>

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(cont.) ELS.EN6: Students analyze the dynamic balance between natural and cultural systems.

**Performance Indicators (by Grade Band)**

Learning Priority	K-2 (e)	3-5 (i)	6-8 (m)	9-12 (h)
<p><b>EN6.C: Models of Sustainability</b></p>	<p>ELS.EN6.C.e Identify resources, services, and jobs where people depend on the environment. Describe the importance of sustainability and identify characteristics of a sustainable society.</p>	<p>ELS.EN6.C.i Understand the differences between renewable and nonrenewable natural resources and the outcomes of using each type of resource on the environment and people.</p>	<p>ELS.EN6.C.m Investigate the concept of sustainability as a dynamic interconnection and interdependence between ecological, social, and economic systems. Identify and evaluate sustainable and renewable resource solutions such as biomimicry or renewable energy power solutions.</p>	<p>ELS.EN6.C.h Identify and propose solutions to sustainability issues through use of concepts such as biomimicry, cradle-to-cradle principles of manufacturing, “Triple Bottom Line” business framework, slow vs. fast economic or food systems, carbon sequestration, mitigation technologies, and carbon markets. Weigh related measures of supply, demand, impact, and payback.</p>

**ELS.EN7: Students engage in experiences to develop stewardship for the sustainability of natural and cultural systems.**

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>EN7.A: Inquiry and Investigation</b>	<p>ELS.EN7.A.e</p> <p>Explore ways people work together to create positive change and how their actions have made a difference.</p> <p>Discuss sustainability issues that need attention in a school or community and explore ways to address the issue.</p>	<p>ELS.EN7.A.i</p> <p>Describe and analyze ways that youth, acting as individuals or members of a group, create beneficial change, meet individual needs, and promote the common good.</p> <p>Investigate sustainability issues that need attention in a school or community, and brainstorm potential solutions, considering perspectives of multiple stakeholders.</p>	<p>ELS.EN7.A.m</p> <p>Explain the importance of civic responsibility and their duty to be advocates for change.</p> <p>Identify instances when citizen action and public opinion have influenced change, and evaluate the effect of citizen action on environmental quality and sustainability for the common good.</p> <p>Examine sustainability issues that need attention in the school or community, identify perspectives of various stakeholders, and consider how different perspectives could contribute to solutions.</p>	<p>ELS.EN7.A.h</p> <p>Research issues related to environmental sustainability, critiquing the economic, environmental, and societal aspects of the issue, and examine how citizen action and public opinion can influence outcomes.</p> <p>Evaluate the needs of a local community to identify potential projects related to environmental sustainability.</p> <p>Identify and describe perspectives of stakeholders in the issue.</p>

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(cont.) ELS.EN7: Students engage in experiences to develop stewardship for the sustainability of natural and cultural systems.

**Performance Indicators (by Grade Band)**

<b>Learning Priority</b>	<b>K-2 (e)</b>	<b>3-5 (i)</b>	<b>6-8 (m)</b>	<b>9-12 (h)</b>
<b>EN7.B: Design and Implementation</b>	<p>ELS.EN7.B.e</p> <p>Identify steps and engage in an experience to address a sustainability issue at school or in the community.</p>	<p>ELS.EN7.B.i</p> <p>Design and implement a plan to address a sustainability issue, weighing the pros and cons of proposed solutions.</p>	<p>ELS.EN7.B.m</p> <p>Demonstrate ability to work individually and collectively to resolve a sustainability issue through deliberation to consider alternatives, and balance interests for the sustainability of natural and cultural systems.</p> <p>Design and implement an individual or group experience to develop self-efficacy and address an issue affecting a community's natural and cultural systems. Identify potential partners and evaluate the short- and long-term results.</p>	<p>ELS.EN7.B.h</p> <p>Form and evaluate personal views, engage in informed deliberation, and use creativity to make previously unrecognized connections.</p> <p>Plan, execute, and evaluate a project that would bring awareness to a sustainability issue and contribute to creating a sustainable environment.</p> <p>Demonstrate civic leadership skills to make personal and collective decisions resulting in measures that promote healthy and sustainable communities.</p>
<b>EN7.C: Evaluation and Reflection</b>	<p>ELS.EN7.C.e</p> <p>Reflect on a stewardship experience and identify one action experience and related outcome.</p>	<p>ELS.EN7.C.i</p> <p>Reflect on the immediate and potential future outcomes of a stewardship experience and strategize options that would minimize risks while maximizing outcomes for sustainability of natural and cultural systems.</p>	<p>ELS.EN7.C.m</p> <p>Evaluate and share the outcomes of a stewardship project in meeting goals to improve natural and cultural system health and offer strategies for improving outcomes that will improve sustainability of natural and cultural systems.</p>	<p>ELS.EN7.C.h</p> <p>Analyze the outcomes of the stewardship experiences with a variety of audiences reflecting different perspectives; evaluate the effectiveness of the project in terms of balancing interests of natural and cultural systems.</p>

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