



Report on Environmental and Sustainability Education Standards for Washington State Students

Report Prepared by *Facing the Future*
for Washington State OSPI

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Facing the Future was contracted by OSPI to research national and international environmental and sustainability education standards, and then create a set of draft standards for Washington State. It is hoped that these draft standards will provide a solid starting point from which to create the final Washington State standards for environmental and sustainability education (ESE).

Facing the Future is a Seattle-based, nonprofit national environmental and sustainability education organization. We have been in existence for over 13 years, during which time we have produced 13 curriculum publications designed for teaching global sustainability in K-12 classrooms. These publications, in use all over the world and by educators in all 50 states, are in the form of standards-based student textbooks, teacher activity/lesson guides, and comprehensive curricular units designed for 1-2 week classroom periods. More information about *Facing the Future* is available in the appendix to this report.

Executive Summary

The Washington State Office of the Superintendent of Public Instruction contracted with *Facing the Future* to conduct a comprehensive review of existing state, national, and international K-12 environmental and sustainability education standards and then develop draft Environmental and Sustainability Education (ESE) standards (learning objectives) for Washington State. Three overarching strands (or Essential Academic Learning Requirements) were drafted and reviewed by various Washington State stakeholders involved with ESE. Current Washington State core subject area Grade Level Expectations were reviewed and aligned with the draft ESE learner outcomes. In addition, a set of recommendations to inform the further development of ESE standards for Washington State was developed. The new standards presented in this report represent an initial draft of ESE learning objectives.

As a starting point to be used by OSPI and its designated ESE advisory committee, the following three draft Essential Academic Learning Requirements were developed to articulate the major student objectives of ESE:

EALR 1: ENVIRONMENT AS A CONTEXT FOR LEARNING	The student understands the structure of both natural and human-constructed environments and is able to use information gained through direct experiences in the environment to engage in critical thinking and problem solving.
EALR 2: INTERCONNECTIONS AMONG SOCIAL, ECONOMIC, AND ENVIRONMENTAL SYSTEMS	The student understands how local and global environmental, social, and economic systems are interconnected and how their interconnections affect sustainability.
EALR 3: INTERGENERATIONAL PERSPECTIVE AND CIVIC RESPONSIBILITY	The student develops attitudes, perspectives, and skills necessary to consider how personal and collective decisions may impact the ability of current and future generations to meet their needs.

The following recommendations are offered and further explained in this report:

Recommendation 1	Create specific ESE K-12 GLEs in order to address gaps in existing core content GLEs identified in this report to ensure a complete set of grade level learning targets in ESE.
Recommendation 2	Review the science GLEs after they are revised in 2009 for potential alignment with ESE objectives.
Recommendation 3	Review E3 Washington's Goals and Strategies report on PreK-12 Education/Teacher Education after it is finalized in 2008 to further inform the development of ESE standards.
Recommendation 4	Review PEI's Environmental Education Frameworks to further inform the development of ESE standards.
Recommendation 5	Use project-based assessments to evaluate student understanding of environment and sustainability.
Recommendation 6	Incorporate a wide range of audiences and stakeholders in the ESE standards development process.
Recommendation 7	Provide professional development opportunities about the new ESE standards to teachers and to non-formal educators through a variety of avenues.
Recommendation 8	Consider the creation of a set of ESE early learning benchmarks.

Context of This Work

Environmental and Sustainability Education

Environmental and Sustainability Education (ESE) is the union of environmental education with education for sustainability. Education for sustainability is a broad concept that includes educating students about "environmental stewardship, economic viability and social justice." Sustainability is a concept that includes an intergenerational perspective – students learn to consider how human needs can be met now and into the indefinite future. It encourages students to examine the inextricable links among social, economic, and environmental systems and develop an awareness of how their personal and collective actions impact those systems. "Education for sustainability provides students with opportunities to gain skills, knowledge, character, and the vision to be productive citizens who contribute to a more sustainable future." ¹

Related Washington Policies

Two statutes support Environmental and Sustainability Education in Washington State:

- **RCW 28A.230.020 Common school curriculum - Fundamentals in conduct.** All common schools shall give instruction in...science with special reference to the environment.... All teachers shall stress...the worth of kindness to all living creatures and the land.
- **WAC 180-50-115 Mandatory areas of study in the common school.** (6) Pursuant to RCW 28A.230.020 instruction about conservation, natural resources, and the environment shall be provided at all grade levels in an interdisciplinary manner through science, the social studies, the humanities, and other appropriate areas with an emphasis on solving the problems of human adaptation to the environment.

Washington as a Leader in Environmental and Sustainability Education

Washington State has a rich history of environmental education. In 2000 OSPI published *Environmental Education Guidelines for Washington Schools*, a document that laid out broad goals and specific student objectives for all Washington students.

¹ E. Wuersten and G. Wheeler, "Contextual Learning: Education for Sustainability," paper prepared for the Washington State Office of the Superintendent of Public Instruction.

This interdisciplinary document links environmental education standards with Washington GLEs from all disciplines.

Since 2000, great strides have been taken toward ESE development in Washington State. In fact, Washington is fast becoming a national leader in effective and comprehensive Environmental and Sustainability Education.

Beginning in 2006, the Environmental Education Association of Washington has led the E3 Washington initiative to develop a comprehensive statewide environmental education plan that optimizes environmental education for everyone who lives, learns, works, and plays in Washington State. The E3 Washington process includes developing 18 regional networks and strategies to strengthen school and community environmental education programs.

In July of 2007 the Washington State Professional Educator Standards Board adopted **Teacher Preparation Standard 5.3** (Knowledge of Learners and their Development in Social Contexts), which includes **Criteria D** (Contextual community centered: All students are prepared to be responsible citizens for an environmentally sustainable, globally interconnected, and diverse society). This teacher preparation standard applies to teachers in all subjects and grade levels.

In 2008, a new Environmental and Sustainability Education specialty endorsement has been proposed to the Washington State Professional Educator Standards Board. An ESE specialty endorsement would support teacher preparation for ESE instruction, allowing teachers to integrate ESE into their curriculum using appropriate linkages to core subjects. This specialty endorsement is designed to complement Teacher Preparation Standard 5.3.

Process: Review of Standards and Key Resources

As a prelude to recommending draft ESE standards, a number of key resources were reviewed. Key resources include Washington State environmental education guidelines and core subject area standards, national environmental education and sustainability standards, and standards from states and nations "ahead of the curve" for environmental and sustainability education. A summary of relevant points from the majority of the sources is included in the following section of the report, "Summary: Review of Standards and Key Resources." The following documents and resources were consulted:

- WA OSPI, *Environmental Education Guidelines for Washington Schools*
- E3 Washington, draft *Goals & Strategies for PreK-12 Education/Teacher Education*
- Pacific Education Institute (PEI) website, "Pacific Environmental Institute Assessment Project (1998-2008)"
- PEI, *Environmental Education Frameworks that Integrate Washington State's Learning Standards*
- Washington EALRs and GLEs in the following content areas: science, social studies, reading, writing, communication, mathematics, health and fitness, and the arts
- David Heil & Associates, *Washington State Science Standards: An Independent Review, Interim Report*
- National Academy of Sciences, *National Science Education Standards*
- OSPI, "Education for Environment and Sustainability Initiatives and EE Study," Presentation for 2007 EEAW conference
- OSPI, *Working Draft: Curriculum Integration & Instructional Alignment Guide*
- Wuersten/Wheeler, *Contextual Learning: Education for Sustainability*
- Vermont Education for Sustainability, *The Vermont Guide to Education for Sustainability*
- Vermont Department of Education, Vital Results Standards
- Education and the Environment Initiative, *California's Environmental Principles and Concepts*
- California State Board of Education, science and social studies standards
- New Jersey Department of Education, K-12 core curriculum content standards
- NAAEE, *Excellence in Environmental Education – Guidelines for Learning (PreK-12)*
- U.S. Partnership for Education for Sustainable Development, *National Sustainability Education Standards – Version 1*
- Learning and Teaching Scotland, *Curriculum for Excellence: Draft Experiences and Outcomes*
- Learning and Teaching Scotland website, "Sustainable Development Education"

- Commonwealth of Australia, *Educating for a Sustainable Future: A National EE Statement for Australian Schools*
- Tilbury, et al., *A National Review of Environmental Education and its Contribution to Sustainability in Australia: School Education – Key Findings*
- Australian Sustainable Schools Initiative website, "About AuSSI" and "Key Elements of AuSSI in Schools"
- New South Wales Department of Education and Training website, "Curriculum Policy: Environmental Education and Sustainable Schools"
- The Cloud Institute website, "What Is Education for Sustainability?" and "Framework for Education for Sustainability"

Based on review of appropriate state, national, and international standards, and an understanding of the essence of sustainability education, three Essential Academic Learning Requirements (EALRs) were drafted. Washington State Grade Level Expectations (GLEs) for core subject areas were reviewed, in order to identify specific learner outcomes that correspond to Environmental and Sustainability Education. Gaps where a current GLE is not in existence to support a given ESE concept were also identified. Recommendations were made to assist in the further development of ESE standards.

The aforementioned state, national, and international standards were assessed for their applicability to the development of ESE standards for Washington State. The standards were evaluated to see which themes occurred most frequently and which concepts were most applicable to ESE in Washington. In addition, research and wisdom from expert groups such as The Cloud Institute for Sustainability Education, Pacific Education Institute, and the Environmental Education Association of Washington were incorporated. The result of this process was to draft three ESE EALRs with the purpose of defining essential student learning outcomes.

Feedback on the draft Environmental and Sustainability Education standards was received from the following educators:

- Abby Ruskey, Executive Director, Environmental Education Association of Washington (EEAW)
- Dr. Victor Nolet, Associate Professor of Secondary Education, Woodring College of Education (WWU)
- Dr. Lynda Paznokas, Associate Dean for School and Community Collaboration, College of Education (WSU)

- Gilda Wheeler, Program Coordinator, Education for Environment and Sustainability, Office of Superintendent of Public Instruction
- Marie Marrs, Social Studies Teacher, Eagle Harbor High School
- Nan Little, Cultural Competency Expert and Retired Educator

Summary: Review of Standards and Key Resources

Washington Environmental Education Guidelines

⇒ Washington State OSPI, *Environmental Education Guidelines for Washington Schools*, July 2000.

<http://www.k12.wa.us/CurriculumInstruct/EnvironmentSustainability/pubdocs/EEGuidelines2000.pdf>

The Environmental Education Guidelines for Washington Schools, published in 2000, set out four major goals for environmental education (EE) in Washington State:

- **EE Goal I:** The student will develop knowledge about the components of the environment and understand their interactions within natural systems.
- **EE Goal II:** The student will understand how social and natural systems are fundamental in supporting our lives, economy, and emotional well-being.
- **EE Goal III:** The student will recognize how individual decisions and actions impact the environment.
- **EE Goal IV:** The student will develop and utilize the knowledge and skills necessary for cooperative action to maintain or enhance the environment.

These goals emphasize knowledge and understanding of the natural environment; the human-environment interaction; the interconnections among ecosystems, social well-being, and economic viability; the influence of technology on our environment; the impact of individual decisions and actions on the environment; and the skills needed to undertake cooperative action to protect or enhance the environment. This is a comprehensive set of learning objectives to promote environmentally literate and responsible Washington citizens.

Specific objectives are enumerated for each of the four major EE goals. These goals can be achieved through existing core subject learning objectives framed around environmental themes. For example, certain communications standards may be met when students communicate concepts about the environment or current environmental problems. While this is an extremely useful guide for teachers eager to implement EE

while meeting core content standards, the development of separate ESE standards will ensure accountability for essential EE concepts to be taught in all classrooms.

E3 Washington's Goals & Strategies

⇒ E3 Washington website, <http://www.e3washington.org/>.

The E3 Washington Goals and Strategies for PreK-12 Education/Teacher Education are currently being revised. E3 Washington represents numerous stakeholders in Washington EE. It is recommended that the revised E3 goals and strategies be consulted when available in order to further inform development of ESE standards.

Pacific Education Institute's Environmental Education Frameworks

⇒ PEI, *Environmental Education Frameworks that Integrate Washington State's Learning Standards*, 2001 (revised 2004).

⇒ PEI website, <http://www.pacificeducationinstitute.org/>. Accessed 6/2/08.

The Pacific Education Institute is a nonprofit organization that seeks to bring real-world learning experiences to students in Washington State. In 2001 they developed a framework to describe what students should know and be able to do. They used Washington's EE guidelines and EALRs to develop a set of benchmarks for students in grades 5, 8, and 12. The following four themes are the basis for the framework:

- Systems Interactions
- Research-Based Inquiry
- Civic Participation
- Language, Visual, and Performing Arts

For each theme a performance benchmark is provided. These benchmarks explain ways in which students should be able to demonstrate their learning of a particular theme at a particular grade level. Each benchmark is aligned with EALRs in

core content subject areas. It is recommended that this extensive document be further reviewed in consideration of the development of ESE standards.

Washington State's EALRs and GLEs

⇒ Washington OSPI website,

http://www.k12.wa.us/CurriculumInstruct/EALR_GLE.aspx. Accessed 5/1/08.

Essential Academic Learning Requirements (EALRs) and Grade Level Expectations (GLEs) were reviewed for the following subject areas: science, social studies, mathematics, communication, health and fitness, the arts, reading, and writing. A number of current GLEs, especially those in social studies and science, are readily applicable to the proposed ESE EALRs. These are outlined in the "Alignment of Core Subject Area GLEs" section of this paper.

Vermont Education for Sustainability

⇒ Vermont Education for Sustainability website, <http://www.vtefs.org/about/index.html>. Accessed 5/9/2008.

⇒ Vermont Education for Sustainability, *The Vermont Guide to Education for Sustainability*, July 2004. <http://www.vtefs.org/resources/EFS%20GuideComplete-web.pdf>

⇒ Vermont Department of Education, *Vermont's Framework of Standards and Learning Opportunities*, Fall 2000. <http://education.vermont.gov/new/pdfdoc/pubs/framework.pdf>

The state of Vermont is currently the only U.S. state that has implemented mandatory K-12 learning standards related to sustainability. They also have strong EE standards. According to the Vermont Education for Sustainability Project, "Education for Sustainability (EFS) is learning that links knowledge, inquiry, and action to help students

build a healthy future for their communities and the planet.”² Vermont has incorporated place-based inquiry and service learning into the state’s required curriculum.

Two of Vermont’s Vital Results Standards, which are the responsibility of teachers in all subject areas, reflect Vermont’s focus on education for environment and sustainability:

- **Standard 3.9 Sustainability:** *Students make decisions that demonstrate understanding of natural and human communities, the ecological, economic, political, or social systems within them, and awareness of how their personal and collective actions affect the sustainability of these interrelated systems.*
- **Standard 4.6 Understanding Place:** *Students demonstrate understanding of the relationship between their local environment and community heritage and how each shapes their lives.*

Evidence of learning is described for three grade bands: PreK-4, 5-8, and 9-12. These learning objectives are exemplary, requiring students to think critically about issues that fall within ESE. Students at a very early age are asked to consider their consumption patterns, determine needs versus wants, examine the ecological footprint of items they consume, and identify requirements for sustaining natural and human communities. By high school grades, students are ready to conduct impact assessments, consider life-cycle impacts of consumer products, and examine how the interconnections among environment, economy, and society affect local and global sustainability. These learning targets aim to produce a critical, sustainability-conscious society.

Vermont is currently revising a learning standard about natural resources to incorporate EFS.

California’s Education and the Environment Initiative

⇒ California Environmental Protection Agency website,
<http://www.calepa.ca.gov/education/eei/>. Accessed 5/1/2008.

² Vermont Education for Sustainability website, <http://www.vtefs.org/about/index.html>. Accessed 5/9/2008.

California's Education and the Environment Initiative (EEI) was implemented by the California Environmental Protection Agency and the California Integrated Waste Management Board. California state law mandates that education about the environment be incorporated into primary and secondary schools. Additional partners in EEI include the State Board of Education, the Office of the Secretary for Education, the Curriculum and Supplemental Materials Commission, the State Department of Education, and the California Resources Agency. This large number of stakeholders ensures an uncommonly broad variety of perspectives on EE.

The Education and the Environment Initiative includes five major principles:

- **Principle I:** People Depend on Natural Systems
- **Principle II:** People Influence Natural Systems
- **Principle III:** Natural Systems Change in Ways that People Benefit from and can Influence
- **Principle IV:** There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing between systems.
- **Principle V:** Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors

These are solely EE standards and do not fully incorporate holistic sustainability concepts. The focus of these principles is primarily on the human-environment interaction, systems dynamics, and personal decision-making. Concepts for each of the five principles indicate specific things that all students should know. Specific grade levels are not indicated for the principles.

California's K-12 Science and Social Studies Standards

⇒ California State Board of Education, *Science Content Standards for California Public Schools* (Adopted October 1998).

<http://www.cde.ca.gov/be/st/ss/documents/sciencestnd.pdf>

⇒ California State Board of Education, *History-Social Science Content Standards for California Public Schools* (Adopted October 1998).

<http://www.cde.ca.gov/be/st/ss/documents/histsocscistnd.pdf>

The K-12 California Department of Education science standards include language more specifically related to ESE than Washington State's science standards. For example, an Ecology standard is included for grades 9-12, and language related to environmental carrying capacity is included in Life Sciences standards.

California's history-social studies standards also incorporate some language around sustainability and competing interests, most notably standard **11.11.5**: *Trace the impact of, need for, and controversies associated with environmental conservation, expansion of the national park system, and the development of environmental protection laws, with particular attention to the interaction between environmental protection advocates and property rights advocates.*

New Jersey's Core Curriculum Content Standards

⇒ State of New Jersey Department of Education, "Core Curriculum Content Standards," 2004. <http://www.state.nj.us/education/cccs/>.

The following three New Jersey standards applicable to ESE were identified:

- **Social Studies standard 6.6 Geography:** *All students will apply understanding knowledge of spatial relationships and other geographic skills to understand human behavior in relation to the physical and cultural environment.* The separation of "the physical and cultural environment" is applicable to student objectives related to understanding both natural and human-constructed environments. **Sub-standard 6.6 E (Environment and Society)** offers specific student outcomes related to the human-environment interaction.
- **Technological Literacy standard 8.2 Technology Education:** *All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual,*

society, and the environment. This standard provides excellent language around the impacts of technology on sustainability.

- **World Languages standard 7.2 Culture:** *All students will demonstrate an understanding of the perspectives of a culture(s) through experiences with its products and practices.* Cultural perspectives provide explanations for why a group of people do certain things or believe a particular way. This content standard could have applications to the creation of sustainable solutions. Not all solutions to sustainability challenges will work for all people in all places. Developing an understanding of cultural perspectives can help students to seek truly sustainable solutions.

North American Association for Environmental Education's Guidelines for Learning

⇒ NAAEE, *Excellence in Environmental Education Guidelines for Learning (PreK-12)*, 2004. <http://www.naaee.org/programs-and-initiatives/guidelines-for-excellence/materials-guidelines/learner-guidelines>.

The North American Association for Environmental Education established national preK-12 learning standards, called *Guidelines for Learning*. These learning standards are organized into four strands:

- **Strand 1:** Questioning, Analysis and Interpretation Skills
- **Strand 2:** Knowledge of Environmental Processes and Systems
- **Strand 3:** Skills for Understanding and Addressing Environmental Issues
- **Strand 4:** Personal and Civic Responsibility

The NAAEE Guidelines for Learning are organized into grade bands. In grades preK-4, students develop a sense of place with primary emphasis on the local environment. In grades 5-8, students develop a greater understanding of systems and the interconnections among environmental and human social systems. By grades 9-12, students should be able to utilize their knowledge and skills to understand and solve real-world problems. The two main strengths of these guidelines are their alignment with

national standards for core subject areas and the spiraling nature in which they encourage students to learn increasingly complex environmental phenomena and eventually apply their knowledge to real-world situations. Students are encouraged to learn not just "what" but "how."

U.S. Partnership for Education for Sustainable Development's National Sustainability Education Standards

⇒ U.S. Partnership for Education for Sustainable Development, *National Sustainability Education Standards – Version 1*. www.uspartnership.org.

The U.S. Partnership for Education for Sustainable Development seeks to imbed sustainability education into U.S. education. The K-12 Sector Team released draft *National Sustainability Education Standards* in early 2008. These focus on developing K-12 sustainability literacy. The draft standards are organized by grade band topics (K-4, 5-8, and 9-12) and the following elements:

- **Element 1.1** Intergenerational Responsibility
- **Element 2.1** Interconnectedness
- **Element 2.2** Environmental Systems
- **Element 2.3** Economic Systems
- **Element 2.4** Social Systems
- **Element 3.1** Personal Action
- **Element 3.2** Collective Action

These standards present sustainability as a tri-part concept, consisting of environmental, economic, and social systems interconnections. While environmental education concepts are included in elements 2.1, 2.2, 3.1, and 3.2, these standards allow much room for examining concepts and issues outside of the scope of traditional environmental education, with an eye to impacts on the long-term viability of humanity. This is a very holistic approach to education for sustainability. At present, these draft standards only address broad areas of study appropriate for each age band; specific learner outcomes are not presented.

Scotland's Curriculum for Excellence

⇒ Learning and Teaching Scotland, *Curriculum for Excellence – Draft Experiences and Outcomes*, 2007.

<http://www.curriculumforexcellencescotland.gov.uk/outcomes/index.asp>.

⇒ Learning and Teaching Scotland website, "Sustainable Development Education," <http://www.ltscotland.org.uk/sustainabledevelopment/index.asp>. Accessed 5/12/2008.

In 2004, the Scottish Executive began developing a single comprehensive curriculum for students ages 3-18 as part of a major educational reform.³ As a result of this educational reform Learning and Teaching Scotland, the main organization responsible for developing Scottish curriculum, developed draft Experiences and Outcomes for core subject areas. The following standards from the Experiences and Outcomes are directly applicable to development of outstanding ESE standards:

- **Science** standards include a **Sustainability** standard within a larger Planet Earth standard. This standard includes student outcomes for pre-school through the third year of high school that encompass resource conservation; sustainability of school, home, national, and global environments; creation of an action plan to improve an environment; the water cycle and water scarcity; raw materials extraction and processing; pollution; and understanding of how science can help protect the environment.
- **Social Studies** standards include a **People, place and environment** standard that includes language about sustainability. Specific concepts studied include sustainability as it relates to natural resources, land use, agriculture, and transportation; interdependence of different parts of the world; human-environment relationships; population growth; and rights and responsibilities of citizens.
- **Technologies** standards also include learning outcomes on sustainability. Students are expected to consider the impact of new technologies on societies

³ Scottish Executive, *A Curriculum for Excellence – The Curriculum Review Group*, November 2004.

and the environment, as well as understanding the need for sustainability as it relates to the production and use of computer technology and energy sources.

These standards are exemplary for sustainability education. They integrate sustainability concepts within major subject areas, rather than reducing sustainability education to an "add on" or supplemental field of study. These standards are extremely rigorous and require critical thinking of a high order.

Australia's National Environmental Education Statement

⇒ Australian Government Department of the Environment and Heritage, *Educating for a Sustainable Future: A National Environmental Education Statement for Australian Schools*, Commonwealth of Australia, 2005.

<http://www.environment.gov.au/education/publications/sustainable-future.html>

⇒ Australian Sustainable Schools Initiative website,

<http://www.environment.gov.au/education/aussi/index.html>. Accessed 5/16/2008.

Australia has promoted environmental education on a national scale for at least the past decade. Their *National Environmental Education Statement for Australian Schools* lays out goals, learning objectives, skills and capabilities, attitudes and values, action and participation, and a whole-school approach for environmental education. Yet none of these components is part of a mandated curriculum.

This report suggests adopting the framework "*about, in and for the environment*" as an approach to environmental education. The language in this report, as well as other government reports on environmental education, includes a strong emphasis on the broader concept of sustainability. In fact, they refer to EE as "environmental education for sustainability," which includes the concepts of interdependence, resource management, diversity, natural environment, cultural environment, values and lifestyle choices, and social participation. They further divide environmental education for sustainability into four main thematic areas: ecological, social, economic, and political sustainability. "Learning *for* sustainability aims to go beyond individual behaviour change or single actions often associated with education for the environment. It seeks

to implement systemic change within the school community and society." ⁴

The Australia Sustainable Schools Initiative (AuSSI) is a separate yet related project. Indicators of school sustainability were established as part of this initiative, and over 2000 schools are participating in the effort to increase sustainability of the physical school environs. Components of the AuSSI may be particularly useful during the development of the Washington Sustainable Design Project and other project-based learning opportunities.

New South Wales Department of Education and Training's Curriculum Policy

⇒ NSW Department of Education and Training website, "Environmental Education," <http://www.curriculumsupport.education.nsw.gov.au/policies/envired/index.htm>. Accessed 5/12/08.

The Australian state of New South Wales has a curriculum policy entitled "Environmental Education and Sustainable Schools," which includes an environmental education curriculum unit, the Sustainable Schools Project, Schools Climate Change Initiative, and the New South Wales Enviro Trust Project Education for Sustainability. One of the six primary key learning areas is Human Society and Its Environment (HSIE), which aims to develop in students the attitudes, skills, and knowledge necessary for place-based education and for participation in improving environmental and social well-being. HSIE is also one of eight secondary key learning areas.

⁴ Tilbury, D., V. Coleman, and D. Garlick. (2005). *A National Review of Environmental Education and its Contribution to Sustainability in Australia: School Education – Key Findings*. Canberra: Australian Government Department of the Environment and Heritage and Australian Research Institute in Education for Sustainability (ARIES).

Draft Environmental and Sustainability Education EALRs

One major deliverable of this project is a set of EALRs specifically constructed for ESE that encompasses both environmental education and education for sustainability learning objectives. The following three EALRs are drafts for consideration:

- **EALR 1: ENVIRONMENT AS A CONTEXT FOR LEARNING** -The student understands the structure of both natural and human-constructed environments and is able to use information gained through direct experiences in the environment to engage in critical thinking and problem solving.
- **EALR 2: INTERCONNECTIONS AMONG SOCIAL, ECONOMIC, AND ENVIRONMENTAL SYSTEMS** - The student understands how local and global environmental, social, and economic systems are interconnected and how their interconnections affect sustainability.
- **EALR 3: INTERGENERATIONAL PERSPECTIVE AND CIVIC RESPONSIBILITY** - The student develops attitudes, perspectives, and skills necessary to consider how personal and collective decisions may impact the ability of current and future generations to meet their needs.

These draft EALRs are a result of input from *Facing the Future* staff and the individuals mentioned in the previous section, "Process: Review of Standards and Key Resources." One reviewer indicated that the structure of the three draft ESE EALRs should match that of the current science EALRs – that is, one EALR outlining the content material that students should know, one EALR describing the process by which students should acquire that information, and one EALR dealing with the application of that knowledge. It was determined that this structure would not be sufficiently inclusive for ESE standards because they are applicable to many subject areas, including science.

Alignment of Core Subject Area Washington GLEs

A second major deliverable of this project is to identify specific learner outcomes for each ESE EALR. Core subject area GLEs were aligned with draft Environmental and Sustainability Education EALRs to facilitate cross-curricular implementation of ESE.

1. Science GLEs

In addition to the specific science GLEs aligned to the draft ESE EALRs, all inquiry language (Science EALR 2) supports ESE outcomes. Methods of inquiry could be learned and practiced within the context of environmental and sustainability content matter (e.g., a field observation of a local environment or determining impacts of a proposed solution to a problem).

Draft ESE EALR 1: Environment as a Context for Learning

Science GLE	Grades
1.1.5 Understand physical properties of Earth materials.	K-2
1.1.6 Understand characteristics of living organisms.	K-2
1.3.4 Know that rocks break down to form pebbles and sand.	K-2
1.3.6 Know common weather indicators and understand that weather conditions change from season to season.	K-2
1.3.8 Know that most living things need food, water, and air.	K-2
1.3.10 Know that plants and animals need a place to live	K-2
3.1.1 Know and understand problems that can be solved or have been solved by using scientific design.	K-2
3.1.2 Understand how to construct and test a solution to a problem.	K-2
3.1.3 Understand how well a design or a product solves a problem.	K-2
3.2.4 Understand how humans depend on the natural environment.	K-2
1.1.5 Understand physical properties of Earth materials including rocks, soil, water, and air.	3-5
1.1.6 Understand how to distinguish living from nonliving and how to use characteristics to sort common organisms into plant and animal groups	3-5
1.2.1 Analyze how the parts of a system go together and how these parts depend on each other.	3-5
1.2.4 Understand that Earth's system includes a mostly solid interior, landforms, bodies of water, and an atmosphere.	3-5
1.3.4 Know processes that change the surface of Earth.	3-5
1.3.6 Understand weather indicators and understand how water cycles through the atmosphere.	3-5
1.3.8 Understand that living things need constant energy and matter.	3-5
1.3.10 Understand that an organism's ability to survive is influenced by the organism's behavior and the ecosystem in which it lives.	3-5
3.1.1 Understand problems found in ordinary situations in which scientific design can be or has been used to design solutions.	3-5
3.1.2 Understand how the scientific design process is used to develop and implement solutions to human problems.	3-5
3.1.3 Analyze how well a design or a product solves a problem.	3-5

3.2.4 Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive.	3-5
1.1.5 Understand how to classify rocks, soils, air, and water into groups based on their chemical and physical properties.	6-8
1.1.6 Understand how to classify organisms by their external and internal structures	6-8
1.2.1 Analyze how the parts of a system interconnect and influence each other.	6-8
1.2.4 Understand the components and interconnections of Earth's systems.	6-8
1.3.4 Understand the processes that continually change the surface of the Earth.	6-8
1.3.6 Analyze the relationship between weather and climate and how ocean currents and global atmospheric circulation affect weather and climate.	6-8
1.3.8 Understand how individual organisms, including cells, obtain matter and energy for life processes.	6-8
1.3.10 Understand how organisms in ecosystems interact with and respond to their environment and other organisms.	6-8
3.1.1 Analyze common problems or challenges in which scientific design can be or has been used to design solutions.	6-8
3.1.2 Apply the scientific design process to develop and implement solutions to problems or challenges.	6-8
3.1.3 Analyze multiple solutions to a problem or challenge.	6-8
3.2.4 Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.	6-8
1.1.5 Understand and analyze how the chemical composition of Earth materials (rocks, soils, water, and air) is related to their physical properties.	9-10
1.1.6 Analyze structural, cellular, biochemical, and genetic characteristics in order to determine the relationships among organisms.	9-10
1.2.1 Analyze how systems function, including the inputs, outputs, transfers, transformations, and feedback of a system and its subsystems.	9-10
1.2.2 Analyze energy transfers and transformations within a system, including energy conservation.	9-10
1.2.4 Analyze the patterns and arrangements of Earth systems and subsystems including the core, the mantle, tectonic plates, the hydrosphere, and layers of the atmosphere.	9-10
1.3.4 Analyze processes that have caused changes to the features of Earth's surface, including plate tectonics.	9-10
1.3.6 Analyze the factors that influence weather and climate.	9-10
1.3.8 Understand how organisms, including cells, use matter and energy to sustain life and that these processes are complex, integrated, and regulated.	9-10
1.3.10 Analyze the living and nonliving factors that affect organisms in ecosystems.	9-10
3.1.1 Analyze local, regional, national, or global problems or challenges in which scientific design can be or has been used to design a solution.	9-10
3.1.2 Evaluate the scientific design process used to develop and implement solutions to problems or challenges.	9-10
3.1.3 Evaluate consequences, constraints, and applications of solutions to a problem or challenge.	9-10
3.2.4 Analyze the effects human activities have on Earth's capacity to sustain biological diversity.	9-10

Draft ESE EALR 2: Interconnections among Social, Economic,
and Environmental Systems

Science GLE	Grades
3.2.4 Understand how humans depend on the natural environment.	K-2
1.2.1 Analyze how the parts of a system go together and how these parts depend on each other.	3-5

2.2.5 Understand that scientific comprehension of systems increases through inquiry.	3-5
3.2.4 Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive.	3-5
1.2.1 Analyze how the parts of a system interconnect and influence each other.	6-8
2.2.5 Understand that increased comprehension of systems leads to new inquiry.	6-8
3.2.1 Analyze how science and technology have been developed, used, and affected by many diverse individuals, cultures, and societies throughout human history.	6-8
3.2.4 Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.	6-8
1.2.1 Analyze how systems function, including the inputs, outputs, transfers, transformations, and feedback of a system and its subsystems.	9-10
3.2.1 Analyze how scientific knowledge and technological advances discovered and developed by individuals and communities in all cultures of the world contribute to changes in societies.	9-10
3.2.2 Analyze how the scientific enterprise and technological advances influence are influenced by human activity.	9-10
3.2.4 Analyze the effects human activities have on Earth's capacity to sustain biological diversity.	9-10

Draft ESE EALR 3: Intergenerational Perspective and Civic Responsibility

Science GLE	Grades
3.1.1 Know and understand problems that can be solved or have been solved by using scientific design.	K-2
3.1.2 Understand how to construct and test a solution to a problem.	K-2
3.1.3 Understand how well a design or a product solves a problem.	K-2
3.1.1 Understand problems found in ordinary situations in which scientific design can be or has been used to design solutions.	3-5
3.1.2 Understand how the scientific design process is used to develop and implement solutions to human problems.	3-5
3.1.3 Analyze how well a design or a product solves a problem.	3-5
3.1.1 Analyze common problems or challenges in which scientific design can be or has been used to design solutions.	6-8
3.1.2 Apply the scientific design process to develop and implement solutions to problems or challenges.	6-8
3.1.3 Analyze multiple solutions to a problem or challenge.	6-8
3.1.1 Analyze local, regional, national, or global problems or challenges in which scientific design can be or has been used to design a solution.	9-10
3.1.2 Evaluate the scientific design process used to develop and implement solutions to problems or challenges.	9-10
3.1.3 Evaluate consequences, constraints, and applications of solutions to a problem or challenge.	9-10

2. Social Studies GLEs

*Note: K-5 GLEs are DRAFT at this time.

In addition to the specific social studies GLEs aligned to the draft ESE EALRs, all social studies skills (Social Studies EALR 5) also could be used to support ESE outcomes. In general, Social Studies EALR 3 (Geography) is closely tied to draft ESE EALR 1, and Social Studies EALR 4 (History) is aligned with draft ESE EALR 3.

Draft ESE EALR 1: Environment as a Context for Learning

Social Studies GLE	Grade
3.2.1 Understands that the way families live is shaped by the environment.	1
3.1.2 Understands the physical characteristics of places in the community.	2
3.2.1 Understands that people in communities affect the environment as they meet their needs and wants.	2
3.1.2 Understands the physical, political, and cultural characteristics of places, regions, and people in North America including the location of the fifty states within the regions of the U.S.	3
3.2.1 Understands how the environment affects cultural groups and how cultural groups affect the environment.	3
3.1.2 Understands the physical, political, and cultural characteristics of places, regions, and people in the Pacific Northwest including the difference between cities, states, and countries.	4
3.1.2 Identifies the location of places and regions in the world and understands their physical and cultural characteristics.	6
3.2.1 Understands and analyzes how the environment has affected people and how people have affected the environment in the past or present.	6
3.3.1 Understands that learning about the geography of the world helps us understand the global issue of sustainability .	6
3.1.2 Understands how human spatial patterns have emerged from natural processes and human activities in the past or present.	7
3.2.1 Understands and analyzes how the environment has affected people and how people have affected the environment in Washington State in the past or present.	7
3.1.2 Understands and analyzes physical and cultural characteristics of places and regions in the United States from the past or in the present.	8
3.2.1 Analyzes how the environment has affected people and how people have affected the environment in the United States in the past or present.	8
3.2.1 Analyzes and evaluates human interaction with the environment across the world in the past or present.	9/10
3.1.2 Analyzes how differences in regions and spatial patterns have emerged in the United States from natural processes and human activities.	11
3.2.1 Analyzes and evaluates human interaction with the environment in the United States in the past or present.	11
3.1.2 Evaluates the complexities of regions and problems involved in defining those regions.	12

Draft ESE EALR 2: Interconnections among Social, Economic, and Environmental Systems

Social Studies GLE	Grade
3.2.1 Understands that the way families live is shaped by the environment.	1
3.2.1 Understands that people in communities affect the environment as they meet their needs and wants.	2
3.1.2 Understands the physical, political, and cultural characteristics of places, regions, and people in North America including the location of the fifty states within the regions of the U.S.	3
3.2.1 Understands how the environment affects cultural groups and how cultural groups affect the environment.	3
3.3.1 Explains that learning about the geography of North America helps us understand cultures from around the world.	3
2.2.1 Understands the basic elements of Washington State's economic system, including agriculture, businesses, industry, natural resources, and labor.	4
2.4.1 Understands how geography, natural resources, climate, and available labor contribute to the sustainability of the economy of regions in Washington State.	4
3.1.2 Understands the physical, political, and cultural characteristics of places, regions, and	4

people in the Pacific Northwest including the difference between cities, states, and countries.	
3.2.3 Understands that the geographic features of Washington State have influenced the movement of people.	4
3.3.1 Explains that learning about the geography of Washington State helps us understand global trade.	4
3.2.3 Understands and analyzes the impact of the European colonist' movement to the Americas on the land and the indigenous peoples.	5
4.3.2 Analyzes the multiple causes of change and conflict in U.S. history.	5
2.2.1 Understands the production, distribution, and consumption of goods, services, and resources in societies from the past or in the present.	6
2.4.1 Understands the distribution of wealth and sustainability of resources in the world in the past or present.	6
3.2.1 Understands and analyzes how the environment has affected people and how people have affected the environment in the past or present.	6
3.2.3 Understands the geographic factors that influence the movement of groups of people in the past or present.	6
2.2.1 Analyzes the production, distribution, and consumption of goods, services, and resources in societies from the past or in the present.	7
2.4.1 Understands and analyzes the distribution of wealth and sustainability of resources in Washington State.	7
3.1.2 Understands how human spatial patterns have emerged from natural processes and human activities in the past or present.	7
3.2.1 Understands and analyzes how the environment has affected people and how people have affected the environment in Washington State in the past or present.	7
2.2.1 Analyzes how the forces of supply and demand have affected the production, distribution, and consumption of goods, services and resources in the United States in the past or present.	8
2.4.1 Understands and analyzes the distribution of wealth and sustainability of resources in the United States in the past or present.	8
3.2.1 Understands and analyzes how the environment has affected people and how people have affected the environment in the United States in the past or present.	8
2.2.1 Understands and analyzes how planned and market economies have shaped the production, distribution, and consumption of goods, services, and resources around the world in the past or present.	9/10
2.3.1 Analyzes the costs and benefits of government trade policies from around the world in the past or present.	9/10
2.4.1 Analyzes and evaluates how people cross the world have addressed issues involved with the distribution of resources and sustainability in the past or present.	9/10
3.2.1 Analyzes and evaluates human interaction with the environment across the world in the past or present.	9/10
4.3.2 Analyzes the multiple causal factors of conflicts in world history (1450 – present).	9/10
2.2.1 Understands that nations have competing philosophies about how best to produce, distribute, and consume goods, services, and resources.	11
2.4.1 Analyzes and evaluates how people in the United States have addressed issues involved with the distribution of resources and sustainability in the past or present.	11
3.1.2 Analyzes how differences in regions and spatial patterns have emerged in the United States from natural processes and human activities.	11
3.2.1 Analyzes and evaluates human interaction with the environment in the United States in the past or present.	11
4.3.2 Analyzes multiple causes of events in U.S. history, distinguishing between proximate and long-term causal factors (1890 – present).	11
2.2.1 Analyzes and evaluates the advantages and disadvantages of different economic systems for countries and groups of people.	12
2.3.1 Evaluates the costs and benefits of governmental fiscal and monetary policies.	12
2.4.1 Analyzes and evaluates how individuals affect and are affected by the distribution of resources and sustainability .	12

3.2.1 Evaluates how human interaction with the environment has affected economic growth and sustainability.	12
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Draft ESE EALR 3: Intergenerational Perspective and Civic Responsibility

Social Studies GLE	Grade
2.1.1 Understands that when individuals and families make choices about meeting their needs and wants, something is gained and something is given up.	1
1.1.2 Applies the key ideal of the public or common good to uphold rights and responsibilities within the context of the community.	2
1.4.1 Understands that citizenship and civic involvement in the neighborhood and community are the rights and responsibilities of individuals.	2
2.1.1 Understands that members of the community make choices among products and services that have costs and benefits.	2
4.1.1 Understands and creates timelines for events in a community to show how the present is connected to the past.	2
4.2.1 Understands individuals who have shaped history in the local community.	2
4.2.2 Understands how contributions made by various cultural groups have shaped the history of the community and world.	3
2.1.1 Understands and analyzes the costs and benefits of people's decisions to move and relocate to meet their needs and wants.	4
4.2.1 Understands and analyzes how individuals caused change in Washington State history.	4
4.4.1 Understands that significant historical events in Washington State have implications for current decisions.	4
1.4.1 Understands that civic participation involves being informed about how public issues are related to rights and responsibilities.	5
2.1.1 Analyzes the costs and benefits of decisions colonists made to meet their needs and wants.	5
4.2.1 Understands and analyzes how individuals caused change in U.S. history.	5
4.2.2 Analyzes how people from various cultural groups have shaped the history of the United States.	5
4.2.3 Understands how technology and ideas have affected the way people lived and changed their values, beliefs, and attitudes.	5
4.4.1 Understands that significant historical events in the United States have implications for current decisions and influence the future.	5
1.4.1 Understands the historical origins of civic involvement.	6
2.1.1 Analyzes the costs and benefits of economic choices made by groups and individuals in the past or present.	6
4.2.1 Understands and analyzes how individuals and movements from ancient civilizations have shaped world history.	6
4.2.2 Understands and analyzes how cultures and cultural groups in ancient civilizations contributed to world history.	6
4.2.3 Understands and analyzes how technology and ideas from ancient civilizations have impacted world history.	6
4.4.1 Analyzes how an event in ancient history helps us to understand a current issue.	6
1.4.1 Understands the effectiveness of different forms of civic involvement.	7
4.2.1 Understands and analyzes how individuals and movements have shaped Washington State or world history.	7
4.2.2 Understands and analyzes how cultures and cultural groups contributed to Washington State or world history.	7
4.2.3 Understands and analyzes how technology and ideas have impacted Washington state or world history.	7
4.4.1 Analyzes how an event in Washington State or world history helps us to understand a current issue.	7

1.4.1 Analyzes how a position on an issue attempts to balance individual rights and the common good.	8
2.1.1 Analyzes examples of how groups and individuals have considered profit and personal values in making economic choices in the past or present.	8
4.2.1 Understands and analyzes how individuals and movements have shaped U.S. history (1776-1900).	8
4.2.2 Understands and analyzes how cultures and cultural groups have shaped U.S. history (1776-1900).	8
4.2.3 Understands and analyzes how technology and ideas have impacted U.S. history (1776-1900).	8
4.4.1 Analyzes how a historical event in United States history helps us to understand a current issue.	8
1.3.1 Analyzes the relationship and tensions between national interests and international issues in the world in the past or present.	9/10
2.1.1 Analyzes how the costs and benefits of economic choices have shaped events in the world in the past or present.	9/10
4.2.1 Analyzes how individual and movements have shaped world history (1450-present).	9/10
4.2.2 Analyzes how cultures and cultural groups have shaped world history (1450-present).	9/10
4.2.3 Analyzes and evaluates how technology and ideas have shaped world history (1450-present).	9/10
4.4.1 Analyzes how an understanding of world history can help us prevent problems today.	9/10
1.3.1 Analyzes and evaluates the causes and effects of U.S. foreign policy on people in the United States and the world in the past or present.	11
1.4.1 Analyzes and evaluates ways of influencing local, state, and national governments to preserve individual rights and promote the common good.	11
2.1.1 Analyzes the incentives for people's economic choices in the United States in the past or present.	11
4.2.1 Evaluates how individuals and movements have shaped the United States (1890-present).	11
4.2.2 Evaluates how cultures and cultural groups have shaped the United States (1890-present).	11
4.2.3 Analyzes and evaluates how technology and ideas have shaped U.S. history (1890-present).	11
4.4.1 Analyzes how an understanding of United States history can help us prevent problems today.	11
1.3.1 Evaluates the impact of international agreements on contemporary world issues.	12
1.4.1 Analyzes and evaluates ways of influencing national governments and international organizations to establish or preserve individual rights and/or promote the common good.	12
2.1.1 Analyzes how economic choices made by groups and individuals in the global economy can impose costs and provide benefits.	12
4.2.1 Evaluates how individuals and movements have shaped contemporary world issues.	12
4.2.3 Evaluates the ethics of current and future uses of technology based on how technology has shaped history.	12
4.4.1 Evaluates positions on a current issue based on an analysis of history.	12
5.1.1 Analyzes the short-term and long-term implications of decisions affecting the global community.	12
5.1.2 Evaluates the plausibility of an analysis of decisions affecting the global community.	12

3. Reading GLEs

Several ESE EALRs could be met by reading materials that educate students on environmental and sustainability issues. For example, the following Reading EALRs and Components are especially supportive of ESE:

- EALR 1, Component 1.3: Build vocabulary through wide reading.
- EALR 2, Component 2.3: Expand comprehension by analyzing, interpreting, and synthesizing information and ideas in literacy and informational text.
- EALR 3, Component 3.1: Read to learn new information.
- EALR 3, Component 3.2: Read to perform a task.

The following GLEs specifically support draft ESE EALRs 2 (Interconnections among Social, Economic, and Environmental Systems) and 3 (Intergenerational Perspective and Civic Responsibility):

Reading GLE	Grades
1.3.2 Understand and apply content/academic vocabulary	K-1
3.1.1 Understand that resources contain information needed to answer questions and solve problems.	K
3.1.1 Understand that resources answer questions and solve problems.	1
3.2.1 Understand how to read for information.	1
3.1.1 Understand how to select and use appropriate resources.	2
1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text.	3
3.2.1 Understand information gained from reading to perform a specific task.	3-4
1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text.	5
3.1.1 Analyze appropriateness of a variety of resources and use them to perform a specific task or investigate a topic.	5-6
3.1.1 Evaluate appropriateness of a variety of resources and use them to perform a specific task or investigate a topic.	7
1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text, including vocabularies relevant to different contexts, cultures, and communities.	8
3.2.2 Apply understanding of complex information, including functional documents, to perform a task.	8
1.3.2 Understand and apply content/academic vocabulary critical to the meaning of the text, including vocabularies relevant to different contexts, cultures, and communities.	9-10
3.1.1 Analyze web-based and other resource materials (including primary sources and secondary sources) for relevance in answering research questions.	9-10

4. WA Writing GLEs

Several draft ESE EALRs could be met by writing documents on environmental and sustainability issues. For example, the following Writing EALRs and Components are particularly useful for ESE:

- EALR 1 (all components): The student understands and uses a writing process.
- EALR 3 (all components): The student writes clearly and effectively.
- EALR 4 (all components): The student analyzes and evaluates the effectiveness of written work.

The following GLEs specifically support draft ESE EALRs 1, (Environment as a Context for Learning), 2 (Interconnections among Social, Economic, and Environmental Systems) and 3 (Intergenerational Perspective and Civic Responsibility):

Writing GLE	Grades
2.2.1 Demonstrates understanding that writing has different purposes.	K-1
2.2.1 Demonstrates understanding of different purposes for writing.	2-10
2.3.1 Uses a variety of forms/genres.	2-10
2.4.1 Produces documents used in a career setting.	3-10
2.1.1 Applies understanding of multiple and varied audiences to write effectively.	4-10

5. Communication GLEs

Learning about environment and sustainability is in many cases compatible with communication student outcomes. For example, Communication EALR 3 (The student uses communication skills and strategies to present ideas and one's self in a variety of situations.) could easily be coordinated with a project in which students are learning about environment and sustainability.

The following GLEs specifically support draft ESE EALR 3 (Intergenerational Perspective and Civic Responsibility):

Communication GLE	Grades
1.2.2 Understands that mass media contains fact, fiction, and opinion.	2
1.2.2 Understands fact and opinion in mass media.	3
1.2.2 Recognizes and understands points of view and persuasion in mass media.	4
2.3.1 Understands that individuals may have differing opinions, perspectives, and meanings for communication.	4
1.2.2 Understands point of view and persuasion in mass media.	5
2.3.1 Understands what influences perspective and the way people communicate.	5
1.2.2 Analyzes mass media for bias and the use of persuasive techniques.	6-7
1.2.2 Analyzes mass media for bias and the use of persuasive techniques and evaluates their impact.	8
1.2.2 Evaluates the effect of bias and persuasive techniques in mass media.	9/10

6. Mathematics GLEs

New K-8 Mathematics GLEs were adopted April 28, 2008.⁵ New high school Mathematics GLEs are expected to be adopted by Summer 2008. A real-world application of all mathematics skills could be derived through the study of environment and sustainability. Two newly adopted K-8 strands, **Core Processes** (reasoning, problem solving, and communication) and **Data Analysis, Statistics, and Probability**, offer the greatest opportunity for overlap with draft ESE EALR 1. These two overarching mathematics strands are particularly applicable to field investigations and environmental science experiments.

7. Health and Fitness GLEs

The Health and Fitness GLEs are currently being revised; the draft GLEs available on the OSPI website were reviewed for potential alignment with draft ESE standards. Both personal and community well-being are important components of sustainability. In many cases, physical well-being is closely connected to economic, social, and environmental health. The following draft Health and Fitness EALRs and Components are particularly useful for ESE:

- EALR 2, Component 2.1: Recognizes dimensions and indicators of health.
- EALR 2, Component 2.3: Understands the concepts of prevention and control of disease.
- EALR 2, Component 2.4: Acquires the skills to live safely and reduce health risks.
- EALR 3, Component 3.1: Understands how family, culture, and environmental factors affect personal health.
- EALR 3, Component 3.5: Applies decision-making skills related to the promotion of health.

⁵ Charles A. Dana Center, "Adopted Washington State K-8 Mathematics Standards," April 28, 2008. <http://www.utdanacenter.org/wamathrevision/standards.php>

8. The Arts EALRs

The Arts GLEs are currently being revised, so we reviewed current EALRs and benchmarks. The following EALRs and Components may particularly support ESE:

- EALR 3, Component 3.1: Use the arts to express and present ideas and feelings.
- EALR 3, Component 3.2: Use the arts to communicate for a specific purpose.
- EALR 4, Component 4.2: Demonstrate and analyze the connections among the arts and other content areas.
- EALR 4, Component 4.3: Understand how the arts impact lifelong choices.
- EALR 4, Component 4.4: Understand that the arts shape and reflect culture and history.

Recommendations

Recommendation 1: Create specific ESE K-12 GLEs in order to address gaps in existing core content GLEs identified in this report to ensure a complete set of grade level learning targets in ESE.

The three draft ESE EALRs cannot be sufficiently met with existing Washington GLEs. In particular, several pieces are missing from the Science GLEs. One important concept reflected in both Vermont and Scotland's sustainability standards is impact assessment. These standards ask students to determine the impacts of consumable goods and technologies on the environment and on human communities, including economic and social systems, and to identify ways to reduce those impacts. This concept should be included in any sustainability standards, including Washington ESE grade level expectations.

Vermont's Standard 3.9 conveys the holistic nature of sustainability education, highlighting interconnections among social, economic, and environmental systems, as well as students' awareness of the impact of their actions. Scotland's Sustainability standard, a component of Scotland's science curriculum, includes language on natural resources and the impacts of resource use. Scotland's social studies curriculum includes a People, Place and Environment standard that focuses on the influence of human actions on environmental sustainability, differentiating between needs and wants, and human rights and responsibilities toward the environment. Scotland's Technologies standard asks students to evaluate the impact of technology on individuals, society, and the environment, and to become versed in solutions such as resource conservation and sustainable development. (See previous section, "Summary: Review of Standards and Key Resources," for the complete standards referred to here.)

We also recommend the incorporation of concepts found in Content Standard F (Science in Personal and Social Perspectives) of the National Academy of Sciences' National Science Education Standards into Washington ESE grade level expectations. The following fundamental concepts within Content Standard F are particularly relevant to the development of ESE standards:

- Characteristics and Changes in Populations (K-4)
- Types of Resources (K-4)
- Changes in Environments (K-4)
- Science and Technology in Local Challenges (K-4)
- Populations, Resources, and Environments (5-8)
- Natural Hazards (5-8)
- Science and Technology in Society (5-8)
- Population Growth (9-12)
- Natural Resources (9-12)
- Environmental Quality (9-12)
- Natural and Human-Induced Hazards (9-12)
- Science and Technology in Local, National, and Global Challenges (9-12)

One social studies concept particularly applicable to ESE but not explicit in existing Social Studies GLEs is that of social justice. It is recommended that specific grade-level expectation language be constructed around the contribution of social justice to sustainability.

Recommendation 2: Review the science GLEs after they are revised in 2009 for potential alignment with ESE objectives.

Washington State science standards are currently being reviewed. The interim report for the review process was released in March 2008.⁶ This document was consulted for the development of draft ESE standards. The revised Science GLEs should be reviewed in 2009 for potential alignment with ESE objectives.

⁶ David Heil & Associates, Inc., *Washington State Science Standards: An Independent Review, Interim Report*. Submitted to Washington State Board of Education March 14, 2008.

Recommendation 3: Review E3 Washington's Goals and Strategies report on PreK-12 Education/Teacher Education after it is finalized in 2008 to further inform the development of ESE standards.

E3 Washington represents numerous stakeholders in Washington State environmental education. Their Goals and Strategies for PreK-12 Education/Teacher Education should be consulted to inform further development of draft ESE standards. This report is expected to be released later this year.

Recommendation 4: Review PEI's Environmental Education Frameworks to further inform the development of ESE standards.

Pacific Education Institute authored an extensive 329-page document, *Environmental Education Frameworks that Integrate Washington State's Learning Standards*, outlining student benchmarks for environmental education in Washington State. This report was consulted during the development of draft ESE standards. However, extensive review of the document was beyond the scope of this project. These benchmarks should be considered during the further development of ESE standards.

Recommendation 5: Use project-based assessments to evaluate student understanding of environment and sustainability.

Learning objectives must be measurable so that educators may assess whether students have truly learned the material at hand. Project-based assessments allow the learner to apply many of the concepts of ESE simultaneously and to address real-world issues related to environment and sustainability. This type of assessment also allows students real interdisciplinary practice using their knowledge and skills from disciplines such as mathematics, reading, writing, communication, and technology. The Washington State Sustainable Design Project may be an appropriate vehicle for

assessing ESE learning outcomes. Additional project-based assessment opportunities might also be well suited for ESE.

Recommendation 6: Incorporate a wide range of audiences and stakeholders in the ESE standards development process.

As these draft standards are reviewed and further developed, a diverse array of stakeholders should be involved in the process. Stakeholders include K-12 educators in all core subject areas, faculty members from colleges of education in Washington State (especially in consideration of Teacher Preparation Standard V), sustainability experts and researchers, and non-formal or environmental educators who work with K-12 students in Washington. It would also be important to consult teachers who are interested in pursuing an ESE specialty endorsement.

Recommendation 7: Provide professional development opportunities about the new ESE standards to teachers and to non-formal educators through a variety of avenues.

It is recommended that the final set of ESE standards and learner outcomes be shared with teachers around Washington through professional development trainings that include examples of how these standards can be met through various curricula and projects.

It is also recommended that the final set of ESE standards be included in the proposed ESE specialty endorsement and that the standards be shared widely with colleges of education so that all teacher candidates may become familiar with them before entering the classroom. According to teacher preparation Standard V, all teachers entering K-12 classrooms will need to be able to prepare their students to “be responsible citizens for an environmentally sustainable, globally interconnected, and diverse society.”

Recommendation 8: Consider the creation of a set of ESE early learning benchmarks.

Awareness of natural and built environments and attitudes that support learning about environment and sustainability may be developed at a very early age. Early exposure to ESE concepts may facilitate comprehension of complex ESE concepts in later grades. It is recommended that early learning benchmarks be considered in conjunction with the development of ESE standards. A particularly useful document to consult is *Washington State Early Learning and Development Benchmarks*, available on the Washington State Department of Early Learning website.⁷ Domain 4, Cognition and General Knowledge, contains benchmarks for early learning in various subject areas.

⁷ Washington State Department of Early Learning, *Washington State Early Learning and Development Benchmarks*, <http://www.del.wa.gov/publications/development/docs/BenchmarksColor.pdf>.

Appendix

About *Facing the Future*

Facing the Future is a non-profit organization with a mission to develop young people's capacity and commitment to create thriving, sustainable, and peaceful local and global communities. Since its founding in 1995, *Facing the Future* has grown to reach over 500,000 students each year, in all 50 U.S. states and over 60 countries.

Facing the Future resources are rooted in a belief in the transformative power of widespread, systemic education to improve lives and communities. The positive, solutions-based programming is designed by and for teachers seeking to bring critical thinking about global sustainability issues to students in every walk of life. *Facing the Future* provides curriculum, teacher workshops, and service learning opportunities used by teachers, schools, and school districts.

In 2006 *Facing the Future* won the "Outstanding Service to Environmental Education by an Organization-Local Level" award from the North American Association for Environmental Education. In 2007 the Hewlett-Packard Company selected *Facing the Future* to produce a national climate change curriculum for middle and high school students. *Facing the Future* was mentioned as a significant K-12 educational resource in Science Magazine's "Education for a Sustainable Future," published July 2007.

Facing the Future is involved in systemic sustainability education efforts in Washington and the United States. *Facing the Future* staff co-chair the K-12 and Teacher Education Sector of the *U.S. Partnership for Education for Sustainable Development*, and have helped draft a first version of national sustainability standards. *Facing the Future* is also working at the collegiate level, and is currently involved in a partnership project with the Woodring School of Education at Western Washington University to embed sustainability education into teacher preparation programs in Washington State, and eventually around the country.