**DRAFT REVISION: December 2019**

**Environmental Education Materials: Guidelines for Excellence**

**INTRODUCTION**

*Environmental Education Materials: Guidelines for Excellence* describes a set of recommendations for developing and selecting environmental education instructional resources. These guidelines aim to help producers of activity guides, lesson plans, and other instructional materials create high quality products and to provide educators with a tool to evaluate the wide array of available environmental education materials.

Through the National Project for Excellence in Environmental Education, the North American Association for Environmental Education (NAAEE) is taking the lead in establishing guidelines for the development of coherent, cogent, and comprehensive environmental education materials and programs. These guidelines draw on best practices honed by scholars and practitioners in diverse fields including formal and nonformal education, curriculum development, instructional design, and environmental education. In an effort to assure that these *Guidelines for Excellence* reflect a widely shared understanding of environmental education, they were developed by a “writing team” comprised of environmental education professionals from a variety of backgrounds and organizational affiliations. This team took on the challenge of turning ideas about quality into usable guidelines. In addition, drafts of these guidelines were circulated widely to practitioners and scholars in the field (e.g., teachers, educational administrators, environmental scientists, and curriculum developers), and their comments were incorporated into successive revisions of the document.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**BOX: DEFINITIONS OF ENVIRONMENTAL EDUCATION & ENVIRONMENTAL LITERACY**

**Environmental Education (**1)

… is a process that helps individuals, communities, and organizations learn more about the environment, develop skills to investigate their environment and to make intelligent, informed decisions about how they can help take care of it. It has the power to transform lives and society. It informs and inspires. It motivates action. EE is a key tool in creating healthier and

more civically engaged communities.

**An Environmentally Literate Person (**2)

…is someone who, both individually and together with others, makes informed decisions

concerning the environment; is willing to act on these decisions to improve the well-being of other individuals, societies, and the global environment; and participates in civic life. Those who are environmentally literate possess, to varying degrees, the knowledge and understanding of a

wide range of environmental concepts, problems, and issues; a set of cognitive and affective

dispositions; a set of cognitive skills and abilities; and the appropriate behavioral strategies to

apply such knowledge and understanding in order to make sound and effective decisions in a

range of environmental contexts.

1 NAAEE (nd) About EE and Why it Matters, https://naaee.org/about-us/about-ee-and-why-it-matters

2 Hollweg, K. S., Taylor, J. R., Bybee, R. W., Marcinkowski, T. J., McBeth, W. C., & Zoido, P. (2011). Developing a framework for assessing environmental literacy. Washington, DC: North American Association for Environmental Education. https://naaee.org/our-work/

programs/environmental-literacy-framework.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**ENVIRONMENTAL EDUCATION AND LEARNING**

Environmental education is good education. Environmental education is learner-centered, providing participants with opportunities to construct their own understandings through hands-on, minds on investigations. Learners are engaged in direct experiences and are challenged to use higher-order thinking skills. Environmental education supports the development of an active learning community where participants share ideas and expertise, and prompt continued inquiry. Environmental education provides real-world contexts and issues from which concepts and skills can be learned.

Environmental education recognizes the importance of viewing the environment within the context of human influences, incorporating an examination of economics, culture, political structure, and social equity as well as natural processes and systems. As conceived in this document, the goal of environmental education is to develop an environmentally literate citizenry. Through comprehensive, cohesive programs,

learners explore how feelings, experiences, attitudes, and perceptions influence environmental concerns. They become knowledgeable about natural processes and systems and gain an understanding of human processes and systems. Learners are able to investigate and analyze environmental concerns using a variety of techniques. They also use basic science and math skills and explore the nature of bias. They develop a sense of their rights and responsibilities as members of a community, are able to understand the civic ideals, principles, and practices of our democracy, and they gain the skills necessary for active participation in civic life.

A knowledgeable, skilled, and active community member is key to resolving the environmental concerns that promise to become increasingly important into the next century. While our schools play a major role, cultivating environmental literacy is a task that neither begins nor ends with formal education. Environmental education is lifelong learning. Many parts of our society shape attitude toward and knowledge about the environment—family, peers, religion, community, interest groups, government, the media, etc.

Environmental education often begins close to home, encouraging learners to understand and forge connections with their immediate surroundings. The awareness, knowledge, and skills needed for these local connections and understandings provide a basis for moving out into larger systems, broader issues, and a more sophisticated comprehension of causes, connections, and consequences.

Environmental education fosters skills and habits that people can use throughout their lives to understand and act on environmental issues. It emphasizes critical and creative thinking skills along with other higher-level thinking processes that are key to identifying, investigating, and analyzing concerns, and formulating and evaluating alternative solutions. Environmental education builds the capacity of learners to work individually as well as cooperatively to improve environmental conditions.

For each environmental concern there is not just one right answer or solution—there are many perspectives and much uncertainty. Environmental education cultivates the ability to recognize uncertainty, envision alternative scenarios, and adapt to changing conditions and information.

Knowledge, skills, and habits of mind translate into a global citizenry that is better able to address its common problems and create advantage of opportunities, whether environmental concerns are involved or not.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**BOX: Sustainable Development Goals (SDGs)**

The core of the 2030 Agenda for Sustainable Development, adopted by world leaders, are 17

Sustainable Development Goals that call on all countries to mobilize efforts to

*…secure a sustainable, peaceful, prosperous and equitable life on earth for everyone now and in the future. The goals cover global challenges that are crucial for the survival of humanity. They set environmental limits and set critical thresholds for the use of natural resources. The goals recognize that ending poverty must go hand-in-hand with strategies that build economic development. They address a range of social needs including education, health, social protection, and job opportunities while tackling climate change and environmental protection. The SDGs address key systemic barriers to sustainable development such as inequality, unsustainable consumption patterns, weak institutional capacity and environmental degradation.* (United Nations, 2015)

Environmental education works towards a sustainable future for all where environmental and social responsibility drive individual and institutional choices. By using the Sustainable

Development Goals as a springboard, environmental education engages students in meaningful investigations of how to ensure environmental quality, social equity, and economic prosperity.

**Source:** United Nations. 2015. Transforming Our World: The 2030 Agenda for Sustainable Development. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20

Sustainable%20Development%20web.pdf

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**ESSENTIAL UNDERPINNINGS OF ENVIRONMENTAL EDUCATION**

Environmental education builds from a core of key principles that inform its approach to education. Some of these important underpinnings are:

**Systems and Systems Thinking**: Systems thinking helps make sense of a large

and complex world. A system is made up of parts. Each part can be understood

separately. The whole, however, is understood only by understanding the

relationships and interactions among the parts. Earth is a complex system of

interacting physical, chemical, and biological processes. Organizations, individual

cells, communities of animals and plants, and families can all be understood as

systems. And systems can be nested within other systems.

**Human Well-being**: Human well-being is inextricably bound with environmental

quality. Humans are a part of the natural order. Humans, and the systems they

create—societies, political systems, economies, religions, cultures, technologies—

impact the total environment and are impacted by the environment. Since

humans are a part of nature rather than outside it, they are challenged to

recognize the ramifications of their interdependence with Earth systems.

**Equity and Inclusion**: Environmental education instruction is inclusive, respectful,

and equitable, and designed to employ the talents of people with different

backgrounds, experiences, and perspectives.

**The Importance of Where One Lives**: Beginning close to home, learners connect

with, explore, and understand their immediate surroundings. The sensitivity,

knowledge, and skills needed for this local connection provides a base for moving

into larger systems, broader issues, and an expanding understanding of causes,

connections, and consequences.

**Roots in the Real World**: Learners develop knowledge and skills through direct

experience with the environment, current environmental issues, and society.

Investigation, analysis, and problem solving are essential activities and are most

effective when relevant to the real world.

**Integration and Infusion**: Disciplines from the natural sciences, social sciences,

and the humanities are connected through the environment and environmental

issues. Environmental education offers opportunities for integration and works

best when infused across the curriculum, rather than being treated as a separate

discipline or subject area.

**Lifelong Learning**: Critical and creative thinking, decision making, and

communication, as well as collaborative learning, are emphasized. These skills are

essential for active and meaningful learning, both in school and over a lifetime.

**Sustainability**: Learning is future oriented, and focused on environmental, social,

and economic responsibility as drivers of individual and institutional choices.

**HOW TO USE THE GUIDELINES**

*Environmental Education Materials: Guidelines for Excellence* points out six key characteristics of high-quality environmental education instructional materials. For each of these characteristics, there are listed some guidelines for environmental education materials to follow. Finally, each guideline is accompanied by several indicators listed under the heading. These indicators suggest ways of gauging whether the materials being evaluated or developed follow the guidelines. They are simply clusters of attributes you might look for to help you figure out whether the characteristic is embodied in the materials you are reviewing or developing.

The *Guidelines for Excellence* can help educators, administrators, curriculum designers, or activity guide developers evaluate the quality of environmental education materials. They provide direction while allowing flexibility to shape content, technique, and other aspects of instruction.

These guidelines offer a way of judging the relative merit of different instructional materials, a standard to aim for in developing new materials, and a set of ideas about what a well-rounded environmental education curriculum might be like. It is not reasonable to expect that all environmental education materials will follow all of the guidelines. For example, a set of materials might not present differing viewpoints, as outlined in guideline 1.3. (Balanced presentation of differing viewpoints and theories.)

This shortcoming does not necessarily mean that the materials should not be used. An instructor could work them into a larger set of activities that explores different viewpoints

and helps learners discern opinion and bias in individual presentations of the issue. In cases such as this one, the *Guidelines for Excellence* can point out a weakness that

instructors can compensate for in the way they use the materials.

Of course, no set of guidelines could be complete, and there are bound to be important characteristics missing. *Environmental Education Materials: Guidelines for Excellence*

provides a foundation on which to build evaluation systems that work for different people in different situations. As a tool to inform judgment, these *Guidelines for Excellence* can contribute to more effective environmental education.

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**BOX: Sample Format for the Guidelines**

#1: Key Characteristic

1.1) Guideline

• Indicator

• Indicator

1.2) Guideline

• Indicator

• Indicator

• Indicator

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Environmental Education Materials: Guidelines for Excellence Summary**

**#1 Accurate, unbiased and inclusive**

Environmental education instructional materials are accurate, unbiased and inclusive in describing environmental conditions, concepts, processes, challenges, and decisions, and in reflecting the diversity of perspectives on them.

1.1) Accuracy

1.2) Reflective of equity and inclusion

1.3) Balanced presentation of differing perspectives and theories

1.4) Encourage questioning

**#2 Emphasis on Skills Building**

Environmental education instructional materials build lifelong skills that enable learners to identify, analyze, discuss, deliberate, and make reasoned decisions about environmental challenges and opportunities.

2.1) Critical and creative thinking

2.2) Applying skills for decision-making

2.3) Skills for addressing environmental challenges and opportunities

**#3 Depth of Understanding**

Environmental education instructional materials foster awareness of the natural and built environments, an understanding of environmental concepts, conditions, vocabulary, and issues, and a mindfulness toward the feelings, values, attitudes, perceptions, and experiences at the heart of environmental concerns, as appropriate for different developmental levels.

3.1) Awareness

3.2) Focus on concepts

3.3) Concepts in context

3.4) Attention to different scales

**#4 Personal and Civic Responsibility**

Environmental education instructional materials promote personal and civic responsibility, encouraging learners to use their knowledge, skills, and assessments of environmental challenges and opportunities as a basis for environmental decision-making and action.

4.1) Sense of personal stake and responsibility

4.2) Self-efficacy and agency

**#5 Instructional Effectiveness**

Environmental education materials rely on instructional principles and techniques that create effective and inclusive learning environments for all learners.

5.1) Learner-centered instruction

5.2) Different ways of learning

5.3) Connection to learners’ everyday lives

5.4) Expanded learning environment

5.5) Equitable and inclusive learning environments

5.6) Interdisciplinary

5.7) Goals and objectives

5.8) Appropriateness for specific learning settings

5.9) Assessment

**#6 Usability**

Environmental education materials are well designed and easy to use.

6.1) Clarity and logic

6.2) Easy to use

6.3) Long-lived

6.4) Adaptable

6.5) Accompanied by instruction and support

6.6) Make substantiated claims

6.7) Fit with accepted recommendations and requirements

**KEY CHARACTERISTIC #1**

**Accurate, unbiased and inclusive**

Environmental education instructional materials are accurate, unbiased and inclusive in describing environmental conditions, concepts, processes, challenges, and decisions, and in reflecting the diversity of perspectives on them.

**1.1) Accuracy.** Environmental education instructional materials reflect current, scientifically accurate information and well-documented, research-based facts.

***Indicators:***

* Sources of information are relevant, accessible, timely, and documented.
* A range of experts in the appropriate fields reviewed the materials or participated in their development in another way. The materials provide a list of the people involved in development and review, and their areas of expertise.
* Information, descriptions, depictions, and data about people of various races, ethnic groups, cultures, gender identities, abilities, ages, social groups, classes, and religious traditions are accurate and come from well-documented sources.
* Data are displayed clearly, using accepted presentation practices, and are drawn from current, identified, peer reviewed sources.
* Information is presented in language appropriate for education rather than for marketing or political persuasion.
* Indigenous Environmental Knowledge and knowledge systems based on communities of color and other non-dominant groups are presented and referenced, as appropriate.
* Information comes from primary sources, which provide context, documentation, and explanation, rather than from reviews or newspaper articles that may simply provide bits and pieces of arguments or evidence.

**Possible Boxes**

**RESOURCES YOU CAN USE!**

<https://measuringu.com/graphing-displaying-data/>

<https://www.library.illinois.edu/village/primarysource/mod1/pg1.htm>

**THINGS TO THINK ABOUT**

Knowing the source of information can aid in judging its trustworthiness or identifying possible bias.

**DEFINITIONS**

**Fact**: something that is [known](https://dictionary.cambridge.org/us/dictionary/english/known) to have [happened](https://dictionary.cambridge.org/us/dictionary/english/happen) or to [exist](https://dictionary.cambridge.org/us/dictionary/english/exist), [especially](https://dictionary.cambridge.org/us/dictionary/english/especially) something for which [proof](https://dictionary.cambridge.org/us/dictionary/english/proof) [exists](https://dictionary.cambridge.org/us/dictionary/english/exist), or about which there is [information](https://dictionary.cambridge.org/us/dictionary/english/information). Cambridge Dictionary <https://dictionary.cambridge.org/us/dictionary/english/fact>

**Biased:** [showing](https://dictionary.cambridge.org/us/dictionary/english/showing) an [unreasonable](https://dictionary.cambridge.org/us/dictionary/english/unreasonable) preference or [dislike](https://dictionary.cambridge.org/us/dictionary/english/dislike) [based](https://dictionary.cambridge.org/us/dictionary/english/based) on [personal](https://dictionary.cambridge.org/us/dictionary/english/personal) [opinions](https://dictionary.cambridge.org/us/dictionary/english/opinion); giving [results](https://dictionary.cambridge.org/us/dictionary/english/result) that are not [accurate](https://dictionary.cambridge.org/us/dictionary/english/accurate) because [information](https://dictionary.cambridge.org/us/dictionary/english/information) has not been [collected](https://dictionary.cambridge.org/us/dictionary/english/collected) [correctly](https://dictionary.cambridge.org/us/dictionary/english/correctly). Cambridge Dictionary <https://dictionary.cambridge.org/us/dictionary/english/biased>

**RESOURCES YOU CAN USE!**

Media Literacy is a 21st century approach to education. It provides a framework to access, analyze, evaluate, create and participate with messages in a variety of forms — from print to video to the Internet. Media literacy builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy. <https://www.medialit.org/media-literacy-definition-and-more>

**1.2) Reflective of equity and inclusion.** The assets and strengths of different cultures, races, gender identities, social groups, religious traditions, classes, ages, abilities, language groups, and religious traditions are included with respect and equity.

***Indicators:***

* Specialists in equity and inclusion, experts in addressing the needs of learners with differing abilities, expected users of the materials, and members of historically under-represented groups have been involved in the development and review process.
* Instructional materials contain examples, descriptions, and illustrations that represent people of various races, ethnic groups, cultures, gender identities, abilities, ages, social groups, classes, and religious traditions in an asset-based, respectful, and equitable manner.
* Readings and other resources present perspectives from different cultures, social groups, and traditions, including traditional environmental knowledge.
* Content and illustrations reflect relevant geographic and cultural differences, and where appropriate, depict rural, suburban, and urban settings.
* Instructional materials are developmentally appropriate, and perspectives of individuals with special needs and their families were considered in the design of the educational materials.
* Learners are offered opportunities to examine multiple perspectives on environmental concerns and questions, including those from diverse races, ethnic groups, cultures, gender identities, classes, abilities, ages, social groups and religious traditions, as appropriate for their developmental level.
* As developmentally appropriate, implications for environmental justice are considered as learners investigate environmental history, conditions, issues, decisions, and impacts.
* Instructional materials ensure access to high quality educational experiences by all learners.

**Possible Box**

**THINGS TO THINK ABOUT/RESOURCES YOU CAN USE**

**Environmental Justice** is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. <https://www.epa.gov/environmentaljustice>

It will be achieved when everyone enjoys:

1. the same degree of protection from environmental and health hazards, and
2. equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

**Possible Box**

**THINGS TO THINK ABOUT/RESOURCES YOU CAN USE**

**Cultural Responsiveness**

“a pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes”

Ladson-Billings, Gloria (1994) The Dreamkeepers. Successful Teachers of African American Children. *Jossey-Bass Inc., 350 Sansome Street, San Francisco, CA 94104*

“Culturally responsive practice is intended to ensure that all groups are benefitting equally from instruction and classroom management practices. It is often applied for race and ethnicity but should be considered whenever there is a group that is not benefitting in an educational environment. It involves a set of congruent educator/stakeholder behaviors, attitudes, and policies that come together in a system that works for all students. At the classroom level, a culturally responsive approach means being aware of cultural differences, examining teaching materials and practice, and adapting programs and interventions, as appropriate, to respond to different student needs. On an institutional level, culturally responsive practice involves monitoring the effects of programs and interventions for all students, especially those from groups that have been historically marginalized. At its heart, cultural responsiveness involves self-reflection, continuous examination of data, raising difficult and sometimes awkward questions about why some students succeed and others do not, and making adjustments that can improve the instructional/disciplinary match for all groups of students.”

*Culturally Responsive Practice* <https://www.iidc.indiana.edu/pages/culturally-responsive>

“Culturally responsive teaching can be defined as using cultural knowledge, prior experiences, frames of reference, and performance styles of ethnically diverse students to make learning encounters more relevant and effective for them. It teaches *to and through* the strengths of these students. Culturally responsive teaching is the behavioral expression of knowledge, beliefs, and values that recognize the importance of racial and cultural diversity in learning.”

Gay, Geneva. *Culturally Responsive Teaching: Theory, Research, and Practice*. 2nd ed. Multicultural Education Series (New York, N.Y.). New York: Teachers College, 2010

**1.3) Balanced presentation of differing perspectives and theories.** Where there are differences of opinion or competing scientific explanations, perspectives are presented in a balanced way.

***Indicators:***

* Instructional materials communicate areas of substantial agreement among scientists or other experts.
* Perspectives and experiences of historically marginalized or underrepresented groups are reflected with respect.
* Proponents of different perspectives were involved in the review and development of the materials. The materials list the people involved in development and review, and their affiliation.
* Scientifically and socially credible positions and explanations are presented, while other positions are mentioned as appropriate.
* Perspectives or positions taken by the authors on policies, scientific interpretations, or preferred actions are clearly identified.
* Opinions or policies of an agency or organization referenced are clearly identified as such.
* Users of the instructional materials are provided enough background information to draw their own conclusions about contested content. Users are encouraged to examine their own biases and to consider how these biases might influence their interpretation of contested content.
* Learners are provided opportunities to explore how different perspectives and proposed solutions may affect environmental, social, and economic systems. As appropriate for their developmental level, learners are provided opportunities to explore critical questions about the societal status quo.

**Possible Box**

**THINGS TO THINK ABOUT**

Balanced presentation does not mean giving equal time and space to every opinion or perspective, but rather treating major positions fairly.

**1.4) Encourage questioning.** Instructional materials encourage learners to explore different perspectives, seek additional information, and form their own points of view using evidence-based explanations.

***Indicators:***

* Projects are suggested that involve learners in collecting and analyzing their own data and comparing those data to similar data from other places and times.
* Tools to help learners form and express opinions about competing theories and perspectives are provided.
* Opportunities for learners to examine systems and ask their own questions about relationships are provided.
* Exercises are suggested that help learners explore personal and societal values, culturally sensitive perspectives, and conflicting points of view with respect and equity.
* An atmosphere of respect for different opinions and perspectives, and an openness to new ideas, including those from diverse races, ethnic groups, cultures, gender identities, abilities, ages, social groups, classes, and religious traditions is promoted, as appropriate for the learners’ developmental level.
* Activities encourage learners to understand and listen to the perspectives of their peers and other community members.
* Exercises encourage learners to become discerning readers and media consumers and to apply logic and reasoning skills to evaluate the completeness and reliability of a range of environmental information and information sources.
* Educators are provided tools and strategies for modeling questioning and exploration, especially with young children and learners with different backgrounds from their own.

**Possible Box**

**RESOURCES YOU CAN USE!**

Power analysis exercise, e.g.,<https://ace-ej.org/power_analysis_exercise>

**KEY CHARACTERISTIC #2**

**Emphasis on Skills Building**

Environmental education instructional materials build lifelong skills that enable all learners to identify, analyze, discuss, deliberate, and make reasoned decisions about environmental challenges and opportunities.

**2.1) Critical and creative thinking.** Learners are challenged to use and improve their critical thinking and creative thinking skills.

***Indicators:***

* Learners are provided with opportunities to practice creative thinking processes such as modeling, using metaphors and analogies, formulating questions, practicing flexibility, generating ideas, associative thinking, showing curiosity, and divergent thinking.
* Learners are challenged to use higher level thinking processes such as identifying bias, inferring, relating, applying, analyzing, evaluating, and reflecting.
* Instructional materials offer learners opportunities to apply critical and creative thinking processes while engaged in asking questions, designing investigations, collecting and organizing information, evaluating accuracy and reliability, organizing and analyzing information, working with models, drawing conclusions, formulating possible solutions, and identifying opportunities for action.
* Learners are challenged to develop and apply systems thinking skills by making distinctions, recognizing systems and relationships within systems, comparing relationships among parts, considering feedback loops, taking different points-of-view to examine perspective, assessing decision options, and developing action plans.
* Guidance for judging the accuracy and reliability of various sources of information are provided. Learners are encouraged to apply these procedures.
* Learners are given opportunities to practice skills individually and in groups.
* Learners, especially young children, are given opportunities to develop creative and divergent thinking through participation in unstructured exploration of the environment.
* Instructional materials provide educational opportunities grounded in the interest and previous experiences of the learner, encouraging them to ask their own questions and create their own explorations.

**Possible Boxes**

**Did You Know**

Description and example of systems thinking.

**Did You Know**

Overview of NGSS, C3, K-12 EE Guidelines, Math, English Language Arts “practices”

**NGSS Science and Engineering Practices**

1. Asking questions (for science) and defining problems (for engineering)

2. Developing and using models

3. Planning and carrying out investigations

4. Analyzing and interpreting data

5. Using mathematics and computational thinking

6. Constructing explanations (for science) and designing solutions (for engineering)

7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

**C3: College, Career and Civic Life**

Inquiry Arc—a set of interlocking and mutually reinforcing ideas that feature the four Dimensions of informed inquiry in social studies: 1 Developing questions and planning inquiries; 2 Applying disciplinary concepts and tools; 3 Evaluating sources and using evidence; and 4 Communicating conclusions and taking informed action.

**2.2) Applying skills for decision-making.** Learners are provided opportunities to arrive at their own conclusions based on thorough research and study, rather than being taught that a certain decision is best.

***Indicators:***

* Learners identify, define, and evaluate issues based on evidence and an analysis of perspectives from varying stakeholders. Ethical and value considerations are included in their deliberations.
* A list of organizations and other resources that learners can use to explore the issue on their own is provided, as appropriate for their developmental level. This list highlights evidence-based resources and, when appropriate, includes groups and resources representing various perspectives from the local, national, and international levels.
* As appropriate for the intended developmental level, instructional materials provide opportunities for learners to evaluate, select and use different methods of analyzing environmental questions. For example, these methods may include risk analysis, cost/benefit analysis, ethical analysis, environmental impact analysis, root cause analysis, analysis of cumulative effects, different kinds of economic analyses, and social impact analysis.
* Environmental challenges and opportunities are presented with a range of possible actions as well as information about how concerns are currently being addressed. Learners are challenged to consider the benefits and tradeoffs of different approaches, including environmental justice and social equity implications.
* Learners are encouraged to freely express their thoughts and conclusions using multiple ways of representation.
* Examples of ways educators and other instructional leaders can facilitate learners in their decision-making process through physical, verbal and non-verbal assistance are provided.
* Materials facilitate the use of the results of applied science in decision-making, including laboratory and field investigations, and environmental monitoring.
* Learners are given opportunities to use various forms of technology to develop and apply decision-making skills. These technologies might include use of computer programs, communication and social networks, data gathering equipment, and video equipment.

**2.3) Skills for addressing environmental challenges and opportunities.** Learners gain basic skills needed for taking action on environmental questions.

***Indicators:***

* Learners apply action skills for addressing environmental challenges and opportunities, as appropriate for the intended age level. These skills may include determining if action is warranted, identifying others involved, selecting appropriate action strategies and understanding their likely intended and unintended consequences, creating an action plan, evaluating an action plan, implementing an action plan, and evaluating results.
* Learners apply system thinking when addressing environmental challenges and opportunities, as appropriate for their developmental level.
* Learners hone their ability to forecast and plan for the long term, as appropriate for their developmental level.
* Opportunities to evaluate the intended and unintended consequences of their own civic actions and actions taken by other individuals and groups, including environmental, social, and economic implications for long-term sustainability are provided.
* Based on their own research and analysis, learners are given opportunities to develop their own solutions and action strategies for environmental questions.
* Instructional materials and activities encourage learners to use evidence and apply deliberation skills when discussing proposed action strategies.
* Learners practice interpersonal and communication skills, including oral and written communication, group cooperation, leadership, and conflict resolution skills.
* Opportunities to develop a variety of civic skills, including participation in the political or regulatory process, consumer action, community service, and using the media, including social media, are provided.

**KEY CHARACTERISTIC #3**

**Depth of Understanding**

Environmental education instructional materials foster awareness of the natural and built environments, an understanding of environmental concepts, conditions, vocabulary, and issues, and a mindfulness toward the feelings, values, attitudes, perceptions, and experiences at the heart of environmental concerns, as appropriate for different developmental levels.

**3.1) Awareness.** Instructional materials foster awareness of the environment, environmental conditions and connections and recognize that feelings, experiences, and attitudes shape environmental perceptions.

***Indicators:***

* Developmentally appropriate awareness building experiences encourage learners to explore how the negative impacts of environmental actions may not be borne equally by members of different communities.
* Experiences that increase learners’ awareness of the natural and built environments are provided.
* As appropriate for their developmental level, opportunities for learners to explore, on a regular basis, the world around them are described.
* Learners explore the interdependence of all life forms, including humans, and are given opportunities to study how environmental, social, and economic systems are interconnected.
* Learners are encouraged to consider others’ experiences with the environment, including those from different races, ethnic groups, cultures, gender identities, abilities, ages, social groups, classes, and religious traditions from their own.
* Exercises and activities invite learners to identify, clarify, and express their own attitudes, values, and positions regarding the environment and environmental challenges and decisions.
* Learners identify ways that people depend on, change, and are affected by the environment.

**Possible Box**

**THINGS TO THINK ABOUT**

Human well-being is dependent on Earth resources and the health of the environment.

**3.2) Focus on concepts.** Rather than presenting a series of facts, materials emphasize unifying themes, discernable patterns, and conceptual understanding associated with environmental literacy.

***Indicators:***

* Ideas are introduced logically and are connected throughout the activities, emphasizing depth of understanding rather than encyclopedic breadth.
* A clearly articulated conceptual and skills framework or set of overarching questions that describe the concepts and skills to be learned, how they relate to each other and environmental literacy, and learning progressions is included.
* Concepts from environmental science fields – life science, earth science, physics, chemistry – that support the development of environmental literacy are presented, as appropriate for the intended audience.
* Concepts from social science fields – history, economics, psychology, sociology, anthropology, political science – that support the development of environmental literacy are presented, as appropriate for the intended audience.
* Traditional Environmental Knowledge that supports the development of environmental literacy is presented, as appropriate for the intended audience.
* Well-documented facts from reliable sources are included—and vocabulary is introduced and defined—in support of conceptual development.
* Systems thinking approaches are used to facilitate an understanding of the relationships among concepts.
* Thematic units, Phenomena-based instruction, and other interdisciplinary teaching strategies are used to introduce concepts from various disciplines, including environmental sciences, social sciences, and the humanities.

**3.3) Concepts in context.** Environmental concepts are set in a context that includes social, cultural, political, historical, and economic as well as ecological aspects.

***Indicators:***

* Beginning with the immediate surroundings for younger children and expanding to larger contexts for older participants, concepts are introduced through experiences relevant to learners’ lives. Connections to real-life are made, including connections to the learners’ cultural, social, economic, and environmental experiences.
* Historical, ethical, cultural, geographic, economic, and sociopolitical relationships are addressed, as appropriate, to further conceptual understanding.
* Learners are provided opportunities to explore the complexity of issues and decisions, including environmental justice and social equity implications, as appropriate for their developmental level.
* Investigations help learners probe the interrelationships among ecological, social, cultural, political, and economic systems.
* Exercises help learners make connections among concepts and varying environmental conditions, issues, and actions, and exposes them to the experiences of others.
* Extended thinking is encouraged with learners constructing knowledge and synthesizing their understanding through exploration, investigation, discussion, application, communication, and reflection.
* Strategies for using learners’ interests and previous experiences to enhance conceptual development are provided.
* Learners are provided opportunities to explore Traditional Environmental Knowledge Systems and to consider how understandings of the environment are formed.

**Possible Box**

**GUIDELINES IN PRACTICE**

Box that provides examples of what Concepts in Context looks like for children v adults.

**3.4) Attention to different scales.** The environment and environmental topics are explored using a variety of scales, such as short to long time spans, localized to global effects, magnitude of effect, spatial distribution, and local to international community levels, as appropriate for the development level of learners.

***Indicators:***

* Communities of different scales are considered. These scales include the local, regional, tribal, national, and global levels.
* Local, regional, continental, and global geographic scales are used to help learners recognize that issues can be complex, widespread or localized.
* Geographic and temporal scales are used to encourage learners to investigate how environmental decisions can impact different communities, especially communities of color and lower socioeconomic status communities, disproportionately.
* Instructional materials examine issues over a variety of temporal scales so that short-term and long-term conditions, actions, and impacts are considered.
* As developmentally appropriate, learners investigate the relationship between spatial scale and ecological and geomorphological processes.

**KEY CHARACTERISTIC #4**

**Personal and Civic Responsibility**

Environmental education instructional materials promote personal and civic responsibility, encouraging learners to use their knowledge, skills, and assessments of environmental challenges and opportunities as a basis for environmental decision-making and action.

**4.1) Sense of personal stake and responsibility.** Learners examine the possible environmental, social, and economic consequences of their and others’ behaviors and evaluate choices they can make to address environmental challenges and opportunities.

***Indicators:***

* Instructional materials promote intergenerational and global responsibility, linking historical and current actions with future and distant consequences.
* Learners are provided with opportunities to reflect on the effects of their actions, consider unintended consequences, and to sort out their opinions about what, if anything, they should do differently.
* Learners identify and describe the relationships between exercising individual rights and responsibilities and addressing environmental quality and long-term sustainability.
* Examples of people of different ages, races, gender identities, cultures, abilities, and education and income levels who have made a difference by taking responsible action are offered.
* The idea that many individual actions have cumulative effects, both in creating and addressing environmental challenges and opportunities, is conveyed.
* Age appropriate opportunities are provided to evaluate the broad environmental, social, and economic consequences of their actions, and to accept responsibility for recognizing those effects and changing their actions when warranted.
* Instructional materials suggest strategies for providing learners with opportunities to develop positive connections with nature by spending time in and exploring natural environments.
* In early childhood, young children’s questions, often generated through storytelling, book-reading, and direct play in natural environments, are used by educators to help design learning opportunities and guide problem-solving and action strategies.

**4.2) Self-efficacy and agency.** Instructional materials aim to strengthen learners’ perception of their ability to influence the outcome of a situation.

***Indicators:***

* Learners are challenged to apply their thinking and act on their conclusions as appropriate for their age level.
* Instructional materials provide opportunities for learners to make choices to bring about change in their community that addresses environmental quality and long-term sustainability.
* A variety of individual and community strategies for civic involvement are described. Learners are provided with opportunities to practice these strategies through projects they generate individually or in collaboration with others. They use feedback from their peers and the larger community.
* Examples of successful individual and collective actions are provided. Learners are encouraged to examine what made these actions successful. (Where actions were not successful, they are encouraged to examine where improvements may be needed.)
* Learners share and celebrate the results of their actions with peers and other members of the community.
* For early childhood audiences, instructional materials outline educational strategies that help guide young children through the process of making their own decisions.
* Instructional materials provide guidance to educators on the role of language skill development and the development of self-efficacy, especially in young children.

**KEY CHARACTERISTIC #5**

**Instructional Effectiveness**

Environmental education materials rely on instructional principles and techniques that create effective and inclusive learning environments for all learners.

**5.1) Learner-centered instruction.** When appropriate, learning is based on learner interest and on the learner’s ability to develop skills and construct conceptual understanding.

***Indicators:***

* Activities provide opportunities for learners to build from previous knowledge and lead toward a deeper understanding.
* Learners hone their skills and gain understanding through exploration, first-hand discovery, research, discussion, application, service learning, and practical experiences.
* Instruction encourages and assists learners in undertaking their own inquiry.
* Where appropriate, activities and projects use learner questions and concerns about real world phenomena as a starting point.
* Instruction facilitates learner participation in planning and assessing their own learning.
* Learner reflection on the process and content of learning are promoted.

**5.2) Different ways of learning.** Instructional materials offer opportunities for different modes of teaching and learning.

***Indicators:***

* Educators are encouraged to experiment with a range of instructional strategies to support different ways of learning. These may include research, experimentation, observation, lecture, discussion, creative expression, service learning, field studies, use of technology, role playing, independent work, citizen science, cooperative learning, cross-age teaching, and such.
* Important concepts are conveyed through a variety of sensory modes (e.g., visual, auditory, tactile) so that all learners can understand them.
* Strategies are suggested for creating a supportive environment that is culturally and linguistically responsive.
* Materials and activities are developmentally appropriate for the range of learners within the designated age groupings.
* Ways of adapting and differentiating instruction and assessment to address learner differences, including linguistic, physical ability, and developmental differences, are suggested.
* Opportunities are provided for individuals to learn from expression and experience—for example, using music, art, poetry, drama, and social media/technology or involving parents, families, caregivers, and the community in learning activities.
* Language accommodations or adaptations are made for people who are learning English and those with hearing loss.
* Appropriate accommodations and adaptations are made for learners with special needs.

**Possible Box**

**RESOURCES YOU CAN USE!**

**Include an informational box on Universal Design for Learning**

**5.3) Connection to learners’ everyday lives.** Instructional materials present information and ideas in a way that is relevant to learners.

***Indicators:***

* Concepts to be taught relate directly to and build from learners’ experiences.
* Case studies, examples, and metaphors are relevant to the learner.
* If the instructional materials are designed for use in a specific area of the country, the content and illustrations are appropriate and localized for that area.
* Ways to use technology, including social media, to connect to learners’ everyday lives are provided.
* Instructional materials, including technology resources, are accessible, adaptable, and easy for learners to use and understand.
* Activities and associated materials are culturally relevant and reflect gender identity, linguistic, ability level, and age differences.
* Strategies for continuing involvement throughout the year by the learner, both at home and in the learning setting, are offered.
* Suggestions for involving learners’ families or caregivers in educational activities are made.

**Possible Box**

**RESOURCES YOU CAN USE!**

**Include an informational box with examples of how social media, technology, service learning, citizen science can be used to connect learners’ to their everyday lives.**

**5.4) Expanded learning environment.** Learning takes place in environments that extend beyond the boundaries of the traditional classroom type setting.

***Indicators:***

* Learning takes place in diverse environments, including laboratory, field, school yard, forest/park, community, nature centers, and other settings beyond the classroom.
* Learners share their knowledge and their work with peers and members of the community.
* Examples that reflect real-world phenomena, experiences, concerns, and solutions are used.
* Materials suggest or use partnerships with local civic organizations, businesses, religious communities, or governments to explore local issues and/or to introduce possible career paths.
* Partnerships with local universities, colleges, or technical schools allow learners to participate in research, environmental monitoring, creative projects, and such.
* Experiential learning activities in which learners immerse themselves in an activity in their communities are described.
* Linkages to informal, experiential, service learning and/or citizen science opportunities in the community are suggested.
* Lists of written, audiovisual, internet-based, and other resources that facilitate further study are included.

**5.5) Equitable and inclusive learning environments.** Instructional materials foster an equitable and inclusive learning environment that welcomes different languages, cultures, races, ethnicities, ages, gender identities, classes, and abilities.

***Indicators:***

* People first language (e.g., people of color, people with disabilities) is used.
* As appropriate, a statement that acknowledges and respects local Indigenous peoples as the traditional stewards of the land is included.
* Personal pronouns used in instructional materials respect diverse gender identities.
* Educational strategies and instructional materials support all learners, including people with disabilities and those who are learning English.
* Instructional materials identify how the intersections of gender identities, ethnicity, race, religion, socio-economic status, age, and abilities can impact individuals and offer strategies for creating a more equitable and inclusive learning environment.
* Methods of setting norms that promote inclusion and openness, including respectful ways of sharing values, ideas, and opinions as well as asset-based approaches to communicating about and to individuals representing differing gender identities, ethnicity, race, religion, socio-economic status, age, and abilities are emphasized.
* Opportunities to expose learners to diverse people, experiences, and identities, especially within the local community are provided.
* Readings, media, and other instructional resources that highlight the contributions of traditionally under-represented people are included.

**5.6) Interdisciplinary.** Instructional materials recognize the interdisciplinary nature of the environment and environmental education.

***Indicators:***

* Instructional materials address the whole individual, suggesting ways learners can develop cognitive, fine/gross motor, language, self-help, and social-emotional skills.
* Instructional materials clearly list the disciplines or areas of study integrated into each lesson, and suggest tie-ins with other areas, such as the science disciplines, social studies, math, geography, English, art, music, physical education, and occupational education.
* Skills useful in disciplines, such as reading comprehension, math, writing, map reading, and analysis are developed.
* Where appropriate, activities are keyed to international, national, tribal, state/provincial, or local standards.
* Activities are aligned to an interdisciplinary framework for environmental literacy, such as *K-12 Environmental Education: Guidelines for Excellence*.
* Suggestions for the use of interdisciplinary approaches such as Phenomenon-Based Learning, Environmental Issue Investigation, Action Civics, or Problem-Based Learning are included.
* Ways of working with interdisciplinary teams, including speech, occupational, and behavioral therapists, families, caregivers, specialists (e.g., ESL, music, physical education, and/or technology teachers), and other service providers are suggested to enhance instruction for people with special needs, including those who are learning English.

**5.7) Goals and objectives.** Goals and objectives for the materials are clearly spelled out.

***Indicators:***

* Goals and objectives for learner outcomes are clearly stated and relevant.
* The content is appropriate for achieving the objectives, and steps for accomplishing the objectives are identified in written lesson or activity plans.
* Instructional methods are in alignment with research-based best practice and appropriate to the learning goals.
* Objectives should be in keeping with the goals of general education and when appropriate, in alignment with learning standards.
* Goals and objectives support the development of environmental literacy and are aligned with published frameworks such as *K-12 Environmental Education: Guidelines for Excellence*.

**5.8) Appropriateness for specific learning settings.** Claims about the material’s appropriateness for the targeted audience(s) are consistent with the experience of educators.

***Indicators:***

* Content and skills are appropriate (level and language) for the target audience(s). The examples, terminology, graphics, and comparisons used are within the probable vocabulary and experience of learners. Vocabulary is defined and related to the content.
* Questioning strategies used by the instructor are appropriate for the target audience(s). Similarly, expectations of the level of questions to be generated by the learners are appropriate for the target audience(s).
* Lesson-related activities can be accomplished in the time specified, with resources provided or easily available.
* Experiments and activities are relevant, accurate, and suitable for the target audience(s). Instructional materials include suggestions for appropriate variations and extensions.
* Activities are efficient. The amount of time required is consistent with the importance of what is to be learned.
* Environmental responsibility is modeled in the design, underlying philosophy, and suggested activities of the lessons and materials.

**5.9) Assessment.** A variety of means for assessing learner progress are included.

***Indicators:***

* Expected learner outcomes are stated and examples of how to use specific performance-based assessments such as portfolios, open-ended questions, group or independent research, or other appropriate projects to indicate mastery are provided.
* Learner outcomes, for both concepts and skills, are tied to the stated goals and objectives and integral to the instructional approach and activity sequence.
* Means of assessing learners’ prior knowledge and skills at the beginning of each lesson are included.
* Suggested assessment techniques for both content and skills are practical, efficient, meaningful, and appropriate. Scoring rubrics are included as appropriate.
* Assessment is on-going, tied to learning, and serves as a tool for the instructor to plan, modify, and adapt teaching and learning. Assessment is integral to the instructional approach.
* Assessment strategies are developmentally appropriate and culturally responsive and accommodate people who are learning English and those with special needs.
* Expectations are made clear to learners at the onset of an activity. As appropriate, scoring rubrics are shared with learners.
* Learners assess their own and other learners’ work.

**KEY CHARACTERISTIC #6**

**Usability**

Environmental education materials are well designed and easy to use.

**6.1) Clarity and logic.** The overall structure (purpose, direction, and logic) of the instructional materials is clear.

***Indicators:***

* Materials are clearly and engagingly written. Main concepts are well articulated. Examples in the text are appropriate to the content and easily understood.
* Instructions for educators are clear and concise.
* The following information is included in a straightforward manner:

– Intended audience/age level;

– Instructional setting and optimal number of learners;

– Disciplines and concepts covered;

– Intended learning outcomes;

– Skills and practices addressed (i.e., observing, communicating, comparing, categorizing, reasoning abstractly and quantitatively, relating, perspective taking, inferring, applying, decision-making, collaborating);

– Equipment needed;

– Safety precautions and clean-up if appropriate;

– Time needed for activity;

– Brief overview of the activity;

– Instructions for conducting the activity;

– Suggestions for formative and summative assessment tied to instructional goals and objectives; and

– Pre- and post-activities, including suggestions for enrichment activities, if appropriate.

* Background information for the educator is adequate and accurate, and there is a listing of additional resources.
* Materials are organized sequentially and in an easy-to-use fashion.
* Laboratory and field work, and other activities, are clearly linked to related content material.

**6.2) Easy to use.** Materials are inviting and easy to use.

***Indicators:***

* The layout of materials is interesting and appealing.
* Illustrations, photographs, maps, graphs, and charts are useful, clear, and easy to read.
* The material is easy to access, keep, and use.
* Masters for handouts and electronic media are easily duplicated.
* Copyright is spelled out or permission to copy is granted.
* Where appropriate, materials are available in electronic form such as downloadable computer files, on flash drives, or over the Internet.

**6.3) Long-lived.** Materials have a lifespan that extends beyond one use.

***Indicators:***

* Information on where replacements, updates, equipment, and special supplies can be obtained is included.
* Equipment and materials are listed, reasonably accessible, inexpensive, and simple to use.
* Learner materials are sufficiently supplied to support the objectives.
* Amount and type of consumable materials used is appropriate given the objectives of the activity.
* Consumables are of good quality and made of recyclable, sustainably resourced, and/or post-consumer recycled materials.
* Non-consumable materials can be reused by another educator.

**6.4) Adaptable.** Instructional materials are adaptable to a range of learning situations.

***Indicators:***

* Suggestions are provided for adapting lessons and activities for learners from differing ethnic, cultural, and linguistic backgrounds.
* Activities and associated handouts are available in more than one language, if appropriate.
* Where appropriate, easy adaptations for different environments, such as indoor and outdoor environments, changes in weather, formal and informal settings, large and small groups, mixed level classes, or rural, suburban, and urban settings are suggested.
* Suggestions for finding low-cost or no-cost alternatives for the equipment and materials needed and/or suggestions for obtaining the needed equipment from community partners (e.g., universities, utilities, industries, local government) are made.
* Strategies for adapting instruction for people with special learning needs, language needs, and physical needs are offered.
* Materials offer ideas for adapting to different age and experience levels.

**6.5) Accompanied by instruction and support**. Additional support and instruction is provided to meet educators’ needs.

***Indicators:***

* Professional development programs/training are accessible to educators who will use the materials.
* Continuing technical support for educators or other strategies for ongoing engagement are provided (e.g., contact information, website address, webinars, or a list of local or regional points of contact for questions about the materials).
* Instructional programs provide follow-up activities and help develop a network of practitioners.
* Lists of essential resources and supporting materials, such as agency contacts, references to videos, and information on computer databases, are included.

**6.6) Make substantiated claims.** Instructional materials accomplish what they claim to accomplish.

***Indicators:***

* Claims of learning outcomes are substantiated by systematic evaluation rather than merely by letters of endorsement and anecdotal comments from users.
* Activities were field tested under conditions similar to their intended use and evaluated in terms of stated goals and objectives prior to wide scale implementation.
* If part of a larger program, the program provides for continuous feedback and modification once it is underway.
* Educators and environmental/natural resource professionals who work in the settings in which the material is intended to be used participated on the development team and/or reviewed drafts.
* As appropriate, members of the intended audience participated on the development team, reviewed drafts, and/or provided feedback during pilot testing.
* Experts in learning theory, cultural competency, evaluation and assessment, and other appropriate specialties were involved on the development team or reviewed drafts of materials.
* Experts in the environmental topics addressed by the instructional materials were involved on the development team and/or reviewed drafts.

**6.7) Fit with accepted recommendations and requirements.** Environmental education materials fit within international, national, tribal, state/provincial, and/or local educational standards, frameworks, curricula, or goals.

***Indicators:***

* Materials have been aligned with a published environmental literacy framework such as *K-12 Environmental Education: Guidelines for Excellence*.
* How the materials support the United Nations Sustainable Development Goals is presented.
* Activities have been or could be easily aligned with national, tribal, state/provincial, and/or local requirements or learning objectives.
* Materials can be readily integrated into established curricula.
* As appropriate, instructional materials support recognition or badge programs (e.g., scouting).
* How the materials fit with the learning frameworks for ocean, energy, and climate literacy is presented, as appropriate.
* Fit with health and safety standards is included.