**SECOND DRAFT REVISION: July 2020**

**Environmental Education Materials: Guidelines for Excellence[[1]](#footnote-1)**

**North American Association for Environmental Education**

**INTRODUCTION[[2]](#footnote-2)**

*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 and comprehensive environmental education materials and programs. These guidelines draw on best practices honed by scholars and practitioners across a variety of fields and settings, including formal and nonformal education, curriculum development, instructional design, early childhood education, adult education, 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 team of environmental education professionals from a variety of backgrounds and organizational affiliations. This team took on the challenge of turning ideas about quality into tangible recommendations and examples. 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. As such, hundreds of practitioners have participated in the writing of these guidelines.

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**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.

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**ENVIRONMENTAL EDUCATION AND LEARNING**

Environmental education is learner-centered, providing participants with opportunities to construct their own understandings and develop skills through hands-on, minds on direct experiences and investigations. Environmental education is often conceptualized as a series of concentric circles, beginning at home and in communities, encouraging learners to understand and forge connections with their immediate surroundings. The awareness, knowledge, and skills needed for local understandings provide a basis for moving out into larger systems and broader issues. Simultaneously, this more sophisticated comprehension of interrelationships often leads directly to deeper connections in their own home and community.

Environmental education recognizes the importance of viewing human interconnectedness within the environment, incorporating an examination of human systems (e.g., economic, cultural, social, and political systems) as well as natural processes and systems. Environmental education fosters skills and habits that people can use throughout their lives to understand and act on environmental concerns. It cultivates the ability and willingness to recognize uncertainty, envision alternative scenarios, and adapt to changing conditions. It facilitates the development of an active learning community where learners share ideas and expertise, listen to one another, collaborate, and participate in continued inquiry. Environmental education builds the capacity of learners to work individually as well as cooperatively to improve environmental, social, and economic sustainability.

The goal of environmental education is to develop environmental literacy for all. While schools play a major role, cultivating environmental literacy is a task that neither begins nor ends with formal education. Many parts of our society shape attitudes toward and knowledge about the environment—family, peers, religion, community, interest groups, government, the media, etc. Environmental education is lifelong learning.

Ultimately, knowledge, skills, motivations, and habits of mind translate into being a member of the global community that is better able to address our common problems and create opportunities. With a focus on environmental quality, social equity, and economic prosperity, environmental education supports efforts to address the Sustainable Development Goals.

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**BOX: Sustainable Development Goals**

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

Sustainable Development Goals (SDGs) 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

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**ESSENTIAL UNDERPINNINGS OF ENVIRONMENTAL EDUCATION**

Environmental education builds from a core of key principles that inform its approach to education:

**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 examining 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.

**Justice, Equity, Diversity, and Inclusion**: Environmental education instruction is welcoming and respectful to all learners and embraces the principles of fairness and justice. Environmental education is designed to employ and engage the talents of people with different

backgrounds, experiences, abilities, and perspectives. Environmental education actively works to create equitable learning opportunities and promotes the dignity and worth of people of all races, ethnicities, religions, genders, sexual orientations, gender identities, abilities, incomes, marital statuses, ages, geographic locations, philosophies, and veteran statuses.

**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 connections and consequences.

**Roots in the Real World**: Learners develop knowledge and skills through direct experience with their community, the environment, current environmental issues, and society. Investigation, analysis, and problem solving are essential activities and are most effective when relevant to learners’ lives and rooted in their experiences.

**Integration and Infusion**: Disciplines from the natural sciences, social sciences, and the humanities are interconnected through the environment and environmental issues. Environmental education offers opportunities to integrate disciplinary learning, fostering a deeper understanding of concepts and skills. Environmental education works best when infused across the curriculum, rather than being treated as a separate or isolated experience.

**Lifelong Learning**: Critical and creative thinking, decision making, and communication, as well as collaborative learning, are emphasized. Development and ongoing use of a broad range of skills and practices are essential for active and meaningful learning, both in school and over a lifetime.

**Sustainability**: Learning reflects on the past, examines the present, and is oriented to the future. Learning focuses on environmental, social, and economic responsibility as drivers of individual, collective, 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 address 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 weigh 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 decision-making tool for selecting instructional materials, a target 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 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 how 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 decision-making, these *Guidelines for Excellence* can contribute to more effective environmental education.

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**BOX: Sample Format for the Guidelines**

#1: Key Characteristic

1.1) Guideline

• Indicator

• Indicator

1.2) Guideline

• Indicator

• Indicator

• Indicator

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

**#1 Accurate and inclusive**

Environmental education instructional materials are accurate and inclusive in describing environmental conditions, concepts, attitudes, 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 all learners to arrive at their own conclusions and make reasoned decisions about environmental challenges and opportunities.

2.1) Thinking skills

2.2) 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, culturally responsive, 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 and inclusive**

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

**1.1) Accuracy.** Environmental education instructional materials reflect current, scientifically accepted, and well-documented information from the sciences, social sciences, and other knowledge systems such as Traditional Ecological Knowledge.

***Indicators:***

* Sources of information are relevant, accessible, timely, and documented.
* A range of people knowledgeable about applicable fields and representing differing points of view 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, sexual orientations and 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.
* Traditional Ecological Knowledge is presented and referenced, as appropriate.
* 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 perspectives or evidence.

**1.2) Reflective of equity and inclusion.** The assets and strengths of a broad array of peoples, such as different cultures, races, ethnicities, sexual orientations, gender identities, socioeconomic groups, ages, abilities, language groups, and religious traditions, are included with respect and equity. When possible, instructional materials are co-created collaboratively with stakeholders.

***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 underrepresented groups have been involved in the development and review process.
* Instructional materials contain examples, descriptions, and illustrations that were generated by and are representative of differing groups of people, including those who are traditionally underrepresented.
* Readings and other resources present perspectives from different cultures, social groups, and traditions, including Traditional Ecological Knowledge, in an asset-based, respectful, and equitable manner.
* Content and illustrations reflect relevant geographic and cultural differences, and where appropriate, depict rural, suburban, and urban settings.
* Perspectives of individuals with special needs and their families were considered in the development of the educational materials.
* Learners are offered opportunities to examine multiple perspectives on environmental concerns and questions, including those from different cultures, social and economic groups, identities, and traditions, as appropriate for their age level.
* Age appropriate Implications for environmental justice are considered as learners investigate environmental history, conditions, issues, decisions, and impacts.
* Opportunities to learn from different peoples, experiences, and identities, especially within the local community, are provided.

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

***Indicators:***

* Instructional materials communicate areas of substantial agreement among scientists or others who are knowledgeable about the topic. When science or social science content is contested, differences are highlighted.
* 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.
* Perspectives and experiences of historically marginalized or underrepresented groups are reflected with respect.
* Proponents of a range of different perspectives and ways of thinking about the topic were involved in the review and development of the materials. The materials list the people involved in development and review, and their affiliation.
* Environmental positions and explanations are supported by scientifically accepted evidence, 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.
* 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.

**1.4) Encourage questioning.** Instructional materials encourage learners to explore different perspectives, seek and use observational and evidence-based information, form their own points of view, and communicate their reasoning.

***Indicators:***

* 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, environmental and social justice implications, and conflicting points of view with respect and equity.
* Projects are suggested that involve learners in crafting their own questions, collecting and analyzing their own data/information, and comparing it to similar data/information from other places and times.
* An atmosphere of respect for differing opinions and perspectives, and an openness to new ideas, including those from historically underrepresented groups, is promoted.
* 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 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.

**KC #1 DRAFT Informational Boxes: These boxes can be accessed here:** [**https://drive.google.com/drive/folders/1Su-zyHhpz1dQ867FTXVvT6yStiDa5tUy?usp=sharing**](https://drive.google.com/drive/folders/1Su-zyHhpz1dQ867FTXVvT6yStiDa5tUy?usp=sharing)

* **Did You Know? Ways of Knowing**
* **Did You Know? How to Avoid Pitfalls of Culturally Responsive Instruction**
* **Did You Know? Five Questions to Ask About Media**
* **Did You Know? Environmental Equity and Environmental Justice**

**KEY CHARACTERISTIC #2**

**Emphasis on Skills Building**

Environmental education instructional materials build lifelong skills that enable all learners to arrive at their own conclusions and make reasoned decisions about environmental challenges and opportunities.

**2.1) Thinking skills.** Learners are challenged to use and improve their thinking skills, including using creativity, socio-emotional thinking, systems thinking, etc.

***Indicators:***

* 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.
* Instructional materials offer learners opportunities to apply skills such as listening, suspending judgment, working across differences, collaboration, and cooperation while engaged in environmental investigations.
* Guidance for identifying sources of information and evaluating the accuracy and reliability of that 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.

**2.2) 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, such as social and environmental justice, 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 age 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 power mapping, risk analysis, cost/benefit analysis, root cause analysis, 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.
* Materials facilitate the use of social science results in decision-making, including economic analyses, interviews with community members, historical documents, first-hand accounts, polling data, housing and land use data and such.
* 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. As appropriate, action is taken collaboratively with others in their community.

***Indicators:***

* The materials provide opportunities for learners to apply action skills, such as those outlined in Strand 3 of [*K-12 Environmental Education: Guidelines for Excellence*](https://cdn.naaee.org/sites/default/files/eepro/products/files/k-12_ee.lr_.pdf), for addressing environmental challenges and opportunities.
* Opportunities for learners to apply system thinking and design thinking when addressing environmental challenges and opportunities are provided, as appropriate for the concern and their developmental level.
* Age appropriate activities encourage learners to hone their ability to forecast and plan for the long term, including possible social and environmental justice consequences of their proposals.
* 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 listening, oral and written communication, group cooperation, deliberation, 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.

**KC #2 DRAFT Informational Boxes: Access boxes** [**here**](https://drive.google.com/drive/folders/1YoJ2XvlLT0VbcfIze_VdV2lZLefnBwDr?usp=sharing)**:**

[**https://drive.google.com/drive/folders/1YoJ2XvlLT0VbcfIze\_VdV2lZLefnBwDr?usp=sharing**](https://drive.google.com/drive/folders/1YoJ2XvlLT0VbcfIze_VdV2lZLefnBwDr?usp=sharing)

* **Did You Know? Thinking Skills and Practices**
* **Resources You Can Use! K-12 EE Guidelines**
* **DID YOU KNOW? Some Methods of Analyzing Environmental Issues**

**KEY CHARACTERISTIC #3**

**Depth of Understanding**

Environmental education instructional materials aim to foster the development of the deep personal awareness and conceptual understandings necessary for environmental literacy.

**3.1 Awareness.** Instructional materials foster awareness of environmental interrelationships and recognize that history, feelings, experiences, and attitudes shape environmental perceptions.

***Indicators:***

* Experiences are provided that increase learners' awareness of the interrelationships between the natural and built environments, and the way those interrelationships influence our everyday lives.
* Age 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.
* 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, sexual orientations and gender identities, abilities, ages, social groups, classes, and religious traditions.
* 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 are a part of, depend on, change, and are affected by the environment.
* Instructional materials suggest strategies for providing learners with opportunities to develop positive connections with nature by spending time in and exploring natural environments.

**3.2) Focus on concepts.** Rather than presenting a series of facts, materials emphasize unifying themes, discernable patterns, interconnections, 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 is included, describing the concepts and skills to be learned, how they relate to each other and environmental literacy, and learning progressions.
* 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. 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 systems and their interrelationships.

***Indicators:***

* Beginning with the immediate community 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 the learners’ cultural, social, economic, and environmental experiences.
* Historical, ethical, cultural, geographic, economic, and sociopolitical relationships are addressed, as appropriate, to further conceptual understanding.
* Age appropriate opportunities are provided to explore the complexity of issues and decisions, including environmental justice and social equity implications.
* 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, ways of knowing, and previous experiences to enhance conceptual development are provided.
* Learners are provided opportunities to explore Traditional Ecological Knowledge and to consider how understandings of the environment are formed.

**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, magnitude of effect, and local to global. The instructional materials foster an understanding of the interconnectedness within the different scales.

***Indicators:***

* Learners are encouraged to consider communities and community connectedness at different geographic scales, such as local, regional, tribal, national, and global levels.
* The instructional materials acknowledge that concepts such as scale, including geographic and time scales, may be understood differently across cultural traditions.
* Local, regional, continental, and global geographic scales are used to help learners recognize how issues are interrelated and that they 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.
* When exploring scales, especially geographic scale, the instructional materials encourage learners to use their systems thinking skills to consider that the part under study is also part of a larger system.
* Instructional materials examine issues over a variety of temporal scales so that short-term and long-term conditions, actions, and impacts are considered.
* Learners investigate the relationship between spatial scale, including spatial distribution, and ecological and geomorphological processes, as appropriate for their age.
* Instructional materials encourage learners to consider environmental interrelationships by examining different geographic scales and by exploring past, present, and future.

**KC #3 DRAFT Informational Boxes: Access draft boxes** [**here**](https://drive.google.com/drive/folders/1kxkNR4m4OvNwLuZS3EShnp0dUK--pR0z?usp=sharing)**:**

[**https://drive.google.com/drive/folders/1kxkNR4m4OvNwLuZS3EShnp0dUK--pR0z?usp=sharing**](https://drive.google.com/drive/folders/1kxkNR4m4OvNwLuZS3EShnp0dUK--pR0z?usp=sharing)

**DID YOU KNOW? Reliable Sources**

**DID YOU KNOW? Depth of Knowledge**

**DID YOU KNOW? Implementing Meaningful STEM Education with Indigenous Students**

**GUIDELINES IN PRACTICE Arizona Project WET: Taking a Systems Approach**

**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, social, and economic systems 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 now and in the future.

***Indicators:***

* Instructional materials promote intergenerational and global responsibility and environmental and social justice, 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, sexual orientations, gender identities, cultures, abilities, religions, and education and income levels who have made a difference by taking responsible action are offered.
* Instructional materials provide learners with opportunities to reflect on how laws and policies impact their lives, environmental quality, and community well-being. They are given opportunities to consider how individuals and groups influence how laws and policies are made and their own possible role in that process.
* 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.
* 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 take individual and/or collective actions in collaboration with community stakeholders to bring about positive, community-based change that addresses environmental quality and long-term sustainability.
* A variety of individual and community strategies for civic engagement are described. Learners are provided opportunities to practice these strategies through projects they generate individually or in collaboration with others in their community. They use feedback from their peers and their larger community.
* Instructional materials provide opportunities for learners to exhibit self-efficacy and personal agency by acting individually and collectively to bring about change in their community, including change in policies, that addresses environmental quality and long-term sustainability.
* Examples of successful individual, collective, and policy-oriented 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 their 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.

**KC #4 DRAFT Informational Boxes: Access draft boxes** [**here**](https://drive.google.com/drive/folders/1QAk-CjReGvbpkP8VU5rTOUyRZkiJxSPJ?usp=sharing)**:**

**https://drive.google.com/drive/folders/1QAk-CjReGvbpkP8VU5rTOUyRZkiJxSPJ?usp=sharing**

* **DID YOU KNOW?** Self-Efficacy and Agency
* **GUIDELINES IN PRACTICE** Earth Force: Students for a Better Tomorrow
* **GUIDELINES IN PRACTICE** Building Capacity for Sustainable Action through Inquiry, Experiential Learning, and Collation Student Action for a Sustainable Future
* **DID YOU KNOW?** Civic Engagement

**KEY CHARACTERISTIC #5**

**Instructional Effectiveness**

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

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

***Indicators:***

* Activities provide opportunities for learners to build from previous knowledge, experiences, and ways of knowing to 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 is promoted.
* Learner voice is supported and encouraged by offering different ways for learners to influence and make choices about the learning process, express themselves, interact with others, and provide leadership.

**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 knowing and learning. These may include strategies such as experimentation, observation, lecture, discussion, creative expression, service learning, field studies, use of technology, role playing, independent work, civic science[[3]](#footnote-3), cooperative learning, cross-age teaching, and such.
* Important concepts are conveyed through a variety of sensory modes (e.g., visual, auditory, tactile) and in more than one format (e.g., text, video, experiential) so that all learners can engage in 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, neurological (e.g., Alzheimer, multiple sclerosis), hearing impairment, visual impairment, and developmental differences (e.g., Autism spectrum, ADHD), are suggested.
* Learners are given opportunities to make choices about preferred ways of learning, expression, and assessment.
* 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.

**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 linguistic, ability level, and age differences.
* Strategies for continuing involvement 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.

**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 a variety of 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 government agencies 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, and service-learning 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 people with different languages, cultures, races, ethnicities, social groups, ages, religious traditions, sexual orientations and 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 different genders.
* Educational strategies and instructional materials support all learners within the learning setting, including people with disabilities and those who are learning English.
* Methods of setting norms that promote inclusion and openness within the learning setting, including respectful ways of sharing values, ideas, and opinions, are emphasized.
* Asset-based approaches to communicating across differences are included.
* Readings, media, and other instructional resources that highlight the contributions of traditionally under-represented people are included.
* Instructional materials provide strategies that ensure access to high quality educational experiences by all learners.

**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 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*](https://cdn.naaee.org/sites/default/files/eepro/products/files/k-12_ee.lr_.pdf).
* 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, social and behavioral therapists, families and other caregivers, instructional 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*](https://cdn.naaee.org/sites/default/files/eepro/products/files/k-12_ee.lr_.pdf).

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

***Indicators:***

* Content and skills are appropriate (level and language) for the targeted learners. 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 targeted learners. Similarly, expectations of the level of questions to be generated by the learners are appropriate for the targeted learners.
* Lesson-related activities can be accomplished in the time specified, with resources provided or easily available.
* Instructional methods, including experiments, service learning, and community investigations, are relevant, accurate, and suitable for the learners. Instructional materials include suggestions for appropriate variations, extensions, and ways of getting learners outside.
* 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 ways 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 experiences, perspectives, knowledge and skills, and ways of knowing are included at the beginning of each lesson.
* 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, culturally and linguistically responsive and accommodate people 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. They are given choices of how best to demonstrate their learning.

**KC #5 DRAFT Informational Boxes: Access draft boxes** [**here**](https://drive.google.com/drive/folders/14IlE41nu2WUuFrPJrv-vz11QhYheaUVJ?usp=sharing)**:**

**https://drive.google.com/drive/folders/14IlE41nu2WUuFrPJrv-vz11QhYheaUVJ?usp=sharing**

**DID YOU KNOW?** Teaching Young Children: Developmentally Appropriate Practice (DAP)

**DID YOU KNOW?** Universal Design for Learning

**DID YOU KNOW?** Differentiated Instruction

**DID YOU KNOW?** Motivating Adults, Reducing Barriers, and Employing Effective Teaching Strategies

**DID YOU KNOW?** Student Voice

**GUIDELINES IN PRACTICE:** Asian and Pacific Islander Obesity Prevention Alliance: Air Quality Workshops for Urban Students

**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
	+ 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, language, 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 are 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 with the targeted learners, under conditions similar to their intended use, and evaluated in terms of the 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.
* Specialists in learning theory, cultural competency, evaluation and assessment, and other applicable fields were involved on the development team or reviewed drafts of materials.
* Specialists in the environmental topics addressed by the instructional materials, including those with Traditional Ecological Knowledge, were involved on the development team and/or reviewed drafts.

**6.7) Fit with accepted recommendations and requirements.** Environmental education materials support 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*](https://cdn.naaee.org/sites/default/files/eepro/products/files/k-12_ee.lr_.pdf).
* 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.

**KC #6 DRAFT Informational Boxes: Access draft boxes** [**here**](https://drive.google.com/file/d/1k8aOA-nEVhQO2r9_mZA9_8YKE0H3dsn7/view?usp=sharing)**:**

**https://drive.google.com/drive/folders/14IiqiRlWe3Td0ZWzgGpLw1ghJqNmlDsM?usp=sharing**

**DID YOU KNOW?** Born Accessible

**DID YOU KNOW?** Writing SMART Objectives

**GUIDELINES IN PRACTICE:** Students and Teachers Restoring a Watershed (STRAW)

**DID YOU KNOW?** CLEAN

1. Draft revision of Environmental Education Materials: Guidelines for Excellence (2010), Washington, DC: NAAEE. Please provide any feedback to Bora Simmons, borasimmons@gmail.com [↑](#footnote-ref-1)
2. Writing team members: Bora Simmons, Yash Bhagwanji, Drew Burnett, Laura Downey, Jennifer Hubbard-Sanchez, Kim Martinez, Katie Navin, Rober Raze, Jackie Stallard, Elena Takaki, Brenda Weiser [↑](#footnote-ref-2)
3. The word citizen can, at times, carry political connotations that may be considered restrictive or exclusionary. Consequently, we have purposely avoided using the term ‘citizen science.’ Instead, we refer to civic science. Alternative terms include community and citizen science and public participation in scientific research. [↑](#footnote-ref-3)