

## Handout C

### Activity #5: K–12 Guidelines Scramble

Now that you have a general idea of what is included in the environmental literacy framework, it's time to explore how environmental literacy develops as we age.

#### Materials:

[\*K-12 Environmental Education: Guidelines for Excellence – Executive Summary\*](#), activity cards, scissors, 4 envelopes, pen or pencil.

#### Procedure:

1. Clear off a table or your desk as a workspace.
2. Print the Scramble Cards.
3. Cut the grade level descriptions (Fourth Grade, Eighth Grade, Twelfth Grade) into individual cards. Place them on your workspace as headers forming three columns.
4. Cut the individual guidelines (e.g., Questioning, Designing investigations, etc.) into separate cards. For each guideline there will be three cards. (Note: Strand 1 will have 21 cards, Strand 2 will have 30 cards, Strand 3 will have 24 cards, and Strand 4 will have 9 cards.)
5. Keep the cards in their strand grouping (e.g., Strand 1, Strand 2).
6. Label each of the envelopes to represent one of the strands (e.g., Strand #1)
7. Place the cards into their designated envelopes for storage. That is, all the STRAND 1: Questioning, Analysis and Interpretation Skills cards should be placed into Envelope #1 and all the Strand 2: Environmental Processes and Systems cards should be placed into Envelope #2, etc.
8. Taking one envelope/Strand at a time, place all the cards from that individual envelope out onto your workspace. After you have emptied Envelope #1, mix up the cards so they are no longer in order.
9. Make sure that all the cards are face up.
10. Take one card at a time and read it (e.g., Questioning). From the description, determine whether that guideline is most appropriate as a benchmark for fourth, eighth, or twelfth grades.

11. Place the card under the appropriate grade level.
12. Find the remaining two cards for that same guidelines (e.g., Questioning). Read them and determine which benchmark grade level is most appropriate for each. Remember, for each guideline (e.g., Questioning) there can only be one card placed under each grade level.
13. Continue with the rest of the cards in Strand 1.
14. Take a photo of your work and post it to your instructor. Make sure you included your name and date in the photo.
15. Open a copy of [\*K-12 Environmental Education: Guidelines for Excellence – Executive Summary\*](#) and check your work for Strand 1.
16. As time permits, complete the card sorting activity for all four Strands.
17. Using a copy of the ***Executive Summary***, pick one grade level to look at a bit more closely (e.g., fourth grade). Read down the column. This will give you a good idea of what environmental literacy looks like for a fourth grader.
18. Now, pick one or more of the guidelines (e.g., Questioning). Read across the chart – fourth grade to eighth grade to twelfth grade. How does the guideline change?
19. What does this tell you about how environmental literacy develops from elementary school to middle school to the end of high school?
20. What does it tell you about the relationship between lifelong learning and environmental literacy?

**Fourth Grade**

Learners should be able to meet the guidelines included in this section by the end of fourth grade.

The kindergarten through fourth grade years are a time of tremendous cognitive development. By third and fourth grades, learners have developed some basic skills that help them construct knowledge. Instructors in earlier grade levels should use these fourth-grade guidelines as a target, extrapolating from this end goal appropriate activities and lessons for younger learners.

In these early years of formal education, learners tend to be concrete thinkers with a natural curiosity about the world around them. Environmental education can build on these characteristics by focusing on observation and exploration of the environment—beginning close to home.

**Eighth Grade**

Learners should be able to meet the guidelines included in this section by the end of eighth grade.

In the fifth through eighth grades, learners begin to develop skills in abstract thinking and continue to develop creative thinking skills—and along with these, the ability to understand the interplay of environmental and human social systems in greater depth. Environmental education can foster this development by focusing on investigation of local environmental systems, problems, and issues. As learners become actively engaged in deciding for themselves what is right and wrong, educators can use environmental problems to help learners explore their own responsibilities and ethics.

**Twelfth Grade**

Learners should be able to meet the guidelines included in this section by the time they graduate from high school.

By the end of twelfth grade, learners are well on their way to environmental literacy. They should possess the basic skills and dispositions they need to understand and act on environmental problems and issues as responsible community members—and to continue the learning process throughout their lives. In the ninth through twelfth grades, environmental education can promote responsible civic action by challenging learners to hone and apply problem-solving, analysis, persuasive communication, and other higher-level skills—often in real-world contexts.

## Envelope #1: Strand 1 - Questioning Analysis and Interpretation Skills

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| <p><b>Questioning</b>—Learners develop questions that help them conduct simple investigations and learn about the environment.</p>             | <p><b>Questioning</b>—Learners develop, refine, and explain questions that help them conduct environmental investigations and learn about the environment.</p>  | <p><b>Questioning</b>—Learners develop, modify, clarify, and explain questions that guide environmental investigations of various types. They describe criteria that influence the questions they pose and explain their reasoning.</p>  |
| <p><b>Designing investigations</b>—Learners design simple environmental investigations.</p>  | <p><b>Designing investigations</b>—Learners design environmental investigations to answer specific questions – often their own questions.</p>   | <p><b>Designing investigations</b>—Learners design investigations to explore environmental questions, problems, issues, phenomena, and models. They explain their reasoning.</p>   |
| <p><b>Collecting information</b>—Learners locate and collect information about the environment and environmental topics.</p>                   | <p><b>Collecting information</b>—Learners locate and collect quantitative and qualitative information about the environment and environmental topics, using a range of methods and sources. They explain why they used selected information collection methods.</p> | <p><b>Collecting information</b>—Learners use established protocols to locate and collect information for environmental investigations of many types. They use increasingly sophisticated methods and technology to access, gather, store, and display the information they collect.</p> |
| <p><b>Evaluating accuracy and reliability</b>—Learners identify basic criteria to judge the merits of information and information sources.</p> | <p><b>Evaluating accuracy and reliability</b>—Learners compare the weaknesses and strengths of the information and the information sources they are using in their environmental inquiries.</p>   | <p><b>Evaluating accuracy and reliability</b>—Learners apply logic and reasoning skills to evaluate the completeness and reliability of a range of environmental information and information sources.</p>  |

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| <p><b>Organizing and analyzing information</b>—Learners describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.</p> | <p><b>Organizing and analyzing information</b>—Learners classify, organize, and display data and information they collect in ways that help them analyze and interpret their environmental investigations.</p> | <p><b>Organizing and analyzing information</b>—Learners organize, analyze, and display data and information from their environmental investigations for a variety of audiences and purposes.</p>  |
| <p><b>Working with models and simulations</b>—Learners use models to represent environmental relationships, patterns, and processes.</p>   | <p><b>Working with models and simulations</b>—Learners use models to analyze information that support their environmental investigations. They explain the purposes and limitations of these models.</p>       | <p><b>Working with models and simulations</b>—Learners create, use, test, and evaluate models to analyze environmental questions, problems, issues, or phenomena.</p>   |
| <p><b>Drawing conclusions and developing explanations</b>—Learners develop explanations that address their questions about the environment.</p>  | <p><b>Drawing conclusions and developing explanations</b> – Learners synthesize their environmental observations and findings into coherent explanations.</p>  | <p><b>Drawing conclusions and developing explanations</b>—Learners propose explanations that address their initial environmental questions using quantitative and qualitative data and evidence that has been collected and analyzed.</p> |

## Envelope #2: Strand 2 - Environmental Processes and Systems

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| <p><b>Earth's physical systems</b>—Learners describe characteristics of Earth's physical systems, including air, water, and land. They explain how these systems interact with one another and identify changes in the physical environment over time. They provide examples of how physical systems affect living organisms, including humans.</p> | <p><b>Earth's physical systems</b>—Learners describe the physical processes that shape Earth, including weather, climate, plate tectonics, and the hydrologic cycle. They explain how matter cycles and energy flows among the abiotic and biotic components of the environment. They describe how humans affect and are affected by Earth's physical systems.</p>  | <p><b>Earth's physical systems</b>—Learners describe the major processes and systems that form Earth and relate these processes, especially those that are large-scale and long-term to characteristics of Earth. They explain how changes in one system (hydrosphere, atmosphere, geosphere, and biosphere) result in changes to another. They describe how human sustainability depends on Earth systems.</p> |
| <p><b>Earth's living systems</b>—Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment in which they live, and how their environment affects them.</p>   | <p><b>Earth's living systems</b>—Learners describe how living things, including humans, are dependent on their environment and are adapted to live in particular ecosystems under particular environmental conditions. They describe major interactions among organisms and populations of organisms and explain the importance of biodiversity to ecosystem health. They describe how humans affect and are affected by the biosphere.</p> | <p><b>Earth's living systems</b>—Learners describe basic population dynamics, genetic mechanisms behind biological evolution, and the importance of diversity in living systems. They explain how changes in the hydrosphere, atmosphere, and geosphere affect the biosphere. They describe how human sustainability is dependent on the biosphere.</p>   |

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| <p><b>Individuals, groups, and societies</b>—Learners generate examples of how people act, as individuals, as members of a group, and as members of society, toward the environment. They articulate their own beliefs and the beliefs of family and community members about the environment and environmental issues.</p> | <p><b>Individuals, groups, and societies</b>—Learners explain ways that individual traits and group membership or affiliation influence perceptions of and actions toward the environment. They describe how their environmental beliefs and values are shaped by their community and the larger society. They compare their beliefs and values to those held by others in their community.</p> | <p><b>Individuals, groups, and societies</b>—Learners observe and describe ways that individual and group action affects the environment, and how each can work to promote the common good. They analyze differing beliefs and values within the same community and the larger society and explain how sustainable solutions rely on reconciling diverse perspectives.</p> |
| <p><b>Culture</b>—Learners identify ways that people express different cultural backgrounds and how these can influence environmental perceptions and activities.</p>  | <p><b>Culture</b>—Learners describe examples of the interconnection between cultural perspectives and the environment.</p>  | <p><b>Culture</b>—Learners recognize and describe examples of different cultural perspectives and dynamics and apply their understanding to current and historical environmental situations.</p>   |
| <p><b>Political systems</b>—Learners identify characteristics of political systems and how they help people by providing basic services, maintaining order, managing conflict and caring for the environment.</p>  | <p><b>Political systems</b>—Learners describe how political systems at varying scales account for, manage, and affect natural resources and environmental quality.</p>  | <p><b>Political systems</b>—Learners analyze how political systems and political decision-making, from the local to international levels, impact environmental quality and long-term sustainability.</p>   |
| <p><b>Economic systems</b>—Learners identify basic characteristics of economic systems that help people make choices about how to use resources, including natural resources, to satisfy human needs and wants.</p>  | <p><b>Economic systems</b>—Learners describe how economic systems and economic decision-making influence natural resource use and management as well as environmental and human well-being.</p>   | <p><b>Economic systems</b>—Learners analyze how economic systems and economic decision-making affect environmental quality and long-term sustainability at local, tribal, national, and global levels.</p>   |

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| <p><b>Human-environment interactions—</b><br/>Learners identify ways that people depend on, change, and are affected by the environment.</p>   | <p><b>Human-environment interactions—</b><br/>Learners describe human-caused changes that affect the immediate environment as well as other places, other people, and future times.</p>   | <p><b>Human-environment interactions—</b><br/>Learners analyze ways that humans interact with their environment and how these interactions change with technological developments. Learners determine costs and benefits to different groups in society as well as unintended consequences.</p> |
| <p><b>Resource distribution and consumption—</b>Learners describe ways people harvest, re-distribute, and use natural resources.</p>   | <p><b>Resource distribution and consumption—</b>Learners explain that uneven geographic distribution of natural resources influences their use and perceived value.</p>   | <p><b>Resource distribution and consumption—</b>Learners analyze ways that the perceived value and use of natural resources change over time and vary under different economic, political, social, and technological systems.</p>   |
| <p><b>Places—</b>Learners identify ways that places differ in their physical and human characteristics.</p>  | <p><b>Places—</b>Learners describe the meaning of “place” both close to home and around the world.</p>  | <p><b>Places—</b>Learners describe “place” as humans endowing a location with meaning and that this meaning can be created through individual and group interactions with that environment.</p>   |
| <p><b>Change and conflict—</b>Learners recognize that change is a normal part of individual and societal life. They describe examples of ways that conflict related to the environment or natural resources may be rooted in different points of view.</p> | <p><b>Change and conflict—</b>Learners explain that human social systems are dynamic and that conflicts sometimes arise over differing and changing viewpoints about the environment and natural resource use and management.</p> | <p><b>Change and conflict—</b>Learners analyze the functioning of public processes for promoting and managing change and conflict, and can evaluate their effects on the environment, society, and the economy.</p>   |



### Envelope #3: Strand 3 - Skills for Understanding and Addressing Environmental Issues

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| <p><b>Identifying and investigating issues</b>—Learners identify and investigate issues in their local environment and community.</p>  | <p><b>Identifying and investigating issues</b>—Learners use primary and secondary sources of information and apply research and analytical skills to investigate environmental issues, beginning in their own community and region.</p>  | <p><b>Identifying and investigating issues</b>—Learners apply their research and analytical skills to systematically investigate environmental issues ranging from local issues to those that are regional or global in scope.</p>  |
| <p><b>Sorting out the consequences of issues</b>—Learners use their knowledge of how ecological and human systems are interconnected to describe the environmental, social, and economic consequences of local environmental issues.</p> | <p><b>Sorting out the consequences of issues</b>—Learners apply their knowledge of ecological and human processes and systems to describe the short and long-term consequences of selected environmental issues on environmental, social, and economic sustainability.</p>   | <p><b>Sorting out the consequences of issues</b>—Learners evaluate the consequences of a broad range of environmental changes, conditions, and issues on environmental, social, and economic sustainability. They identify environmental justice and social equity implications.</p>  |
| <p><b>Identifying and critiquing alternative solutions and courses of action</b>—Learners develop plans, including possible design solutions, for addressing selected local environmental issues.</p>                                    | <p><b>Identifying and critiquing alternative solutions and courses of action</b>—Learners identify and develop action strategies, including design solutions, appropriate for addressing a range of environmental issues at community and regional levels. They describe how their action strategies and design solutions might impact environmental quality and other people now and in the future.</p> | <p><b>Identifying and critiquing alternative solutions and courses of action</b>—Learners identify and propose environmental action plans, including design solutions, and evaluate their likely effectiveness in specific environmental, cultural/social, and economic contexts. They identify ways that these action plans and design solutions might affect different groups of people, including possible environmental justice and social equity implications.</p> |

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| <p><b>Working with flexibility, creativity, and openness</b>—Learners demonstrate openness and receptivity while listening to and working with others who have perspectives about the environment that are different from their own.</p> | <p><b>Working with flexibility, creativity, and openness</b>—Learners demonstrate active listening, tolerance, adaptability, and openness as they work with others to gather a range of perspectives and information.</p>                | <p><b>Working with flexibility, creativity, and openness</b>—Learners engage each other in evidence-based peer review and work collaboratively and cooperatively in the spirit of open deliberation, especially in contexts that bring to the surface deeply held priorities and values.</p>   |
| <p><b>Forming and evaluating personal views</b>—Learners examine and express their own views on environmental issues.</p>  | <p><b>Forming and evaluating personal views</b>—Learners identify, justify, and clarify their views on environmental issues and alternative ways to address them.</p>  | <p><b>Forming and evaluating personal views</b>—Learners evaluate, justify, and communicate their own views on environmental issues and possible ways to address them.</p>   |
| <p><b>Evaluating the need for action</b>—Learners determine whether action is needed on selected environmental issues and whether they should be involved. They describe their reasoning.</p>  | <p><b>Evaluating the need for action</b>—Learners evaluate whether action is needed in specific situations, using environmental, cultural/social, and economic criteria. They decide whether they should be involved in that action.</p> | <p><b>Evaluating the need for action</b>—Learners apply their research and analytical skills to systematically determine whether action is needed in specific environmental, cultural/social, and economic contexts and whether they should be involved.</p>   |
| <p><b>Planning and taking action</b>—Learners develop an action strategy or design solution for a specific local environmental issue of their choosing.</p>  | <p><b>Planning and taking action</b>—Learners use their research results to develop action strategies and design solutions at levels consistent with their maturity and preparation. As appropriate, they implement their plans.</p>     | <p><b>Planning and taking action</b>—Learners develop action strategies and design solutions based on their research and analysis of an environmental issue. If appropriate, they implement plans that are within the scope of their rights and consistent with their individual abilities and responsibilities as members of the community.</p> |

**Evaluating the results of actions—**

Learners identify environmental, social, and economic consequences of design solutions and civic actions, including their own actions.

**Evaluating the results of actions—**

Learners analyze the effects of design solutions, their own civic actions, and actions taken by other individuals and groups. They describe the short- and long-term effects of these actions and design solutions in terms of environmental, social, and economic consequences.

**Evaluating the results of actions—**

Learners evaluate the intended and unintended consequences of design solutions, their own civic actions and actions taken by other individuals and groups, including implications for long-term environmental, social, and economic sustainability.

## Envelope #4: Strand 4 - Personal and Civic Responsibility

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| <p><b>Recognizing rights and responsibilities</b>—Learners describe their basic rights and responsibilities as members of a community and the importance of these rights and responsibilities in promoting environmental quality and community well-being.</p> | <p><b>Recognizing rights and responsibilities</b>—Learners explain the rights and responsibilities of community membership and their role in promoting environmental, social, and economic sustainability.</p>  | <p><b>Recognizing rights and responsibilities</b>—Learners describe the relationships between exercising their individual rights and responsibilities and addressing environmental, social, and economic sustainability.</p>                       |
| <p><b>Recognizing efficacy and developing agency</b>—Learners describe how they can realistically and meaningfully contribute to their community and environmental quality.</p>  | <p><b>Recognizing efficacy and developing agency</b>—Learners possess a realistic self-confidence in their effectiveness as community members to make changes in their community that address environmental, social, and economic sustainability.</p> | <p><b>Recognizing efficacy and developing agency</b>—Learners exhibit personal agency by working independently and making choices to bring about change in their community that addresses environmental, social, and economic sustainability.</p>  |
| <p><b>Accepting personal responsibility</b>—Learners identify ways in which they are responsible for the environmental, social, and economic effects of their actions.</p>   | <p><b>Accepting personal responsibility</b>—Learners describe the broad environmental, social, and economic consequences of their personal and group actions and as appropriate, accept responsibility for their actions.</p>                         | <p><b>Accepting personal responsibility</b>—Learners evaluate the broad environmental, social, and economic consequences of their actions. They accept responsibility for recognizing those effects and changing their actions when warranted.</p> |