

EXCELLENCE IN ENVIRONMENTAL EDUCATION: GUIDELINES FOR LEARNING, GRADES K–4

GUIDELINES FOR K–4TH 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.

Examining Environmental Issues in Fourth Grade

Many educators believe that exploring issues helps fourth-grade learners make important links between conceptual understanding, what is happening in their community, and their own responsibility for environmental quality. Others caution that fourth graders are only beginning to synthesize their knowledge into the kind of complex understanding that is essential to examining environmental issues. When deciding how to handle environmental issues in the fourth grade classroom, educators must rely on their own judgment about what each class—and each student—is ready to handle.

Basic guidelines for examining environmental issues with fourth graders are:

- *Keep it simple.*
- *Keep it local.*
- *Make close links with what they're observing and learning about the local environment.*

Local solid waste and water issues easily fit these basic guidelines. They are especially appropriate for these young learners.

STRAND 1—QUESTIONING, ANALYSIS AND INTERPRETATION SKILLS

A) Questioning—Learners are able to develop questions that help them learn about the environment and do simple investigations.

- Identify questions they are likely to be able to answer by combining their own observations and investigations of the environment with existing information.
- Pose questions based on experiences in their own community and local environment as well as from other sources, such as journalistic reports about the environment.
- Generate ideas and questions about objects, organisms, events, places, and relationships in the environment.

B) Designing investigations—Learners are able to design simple investigations.

- Predict possible answers to their own questions, developing and discussing simple alternative hypotheses.
- Design ways of answering questions based on systematic observations. For example, devise a way to learn about the life cycle of a caterpillar or the means of transportation that children take to and from their school.
- Design simple experiments to answer questions and test ideas they have about the environment.

C) Collecting information—Learners are able to locate and collect information about the environment and environmental topics.

- Observe and record characteristics, differences, and change in objects, organisms, events, places, and relationships in the environment.
- Find, assess, select, and use resources such as atlases, data bases, charts, tables, graphs, and maps.
- Use basic field skills, such as observing, interviewing and measuring, to collect information.
- Use tools such as rulers, thermometers, watches, scales, magnifiers, and microscopes to make observations and measurements.
- Use computers, calculators and other devices to conduct investigations and manipulate information.

D) Evaluating accuracy and reliability—Learners understand the need to use reliable information to answer their questions. They are familiar with some basic factors to consider in judging the merits of information.

- Provide specific examples of information they believe to be factual, fictitious, or of questionable merit and explain their reasoning.
- Identify some factors that might influence the credibility of a specific source of information, for example, who created it, how old it is, and what kind of arguments or evidence are used.

E) Organizing information—Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.

- Summarize observations and describe data.
- Construct, read, and interpret maps, graphs, tables, diagrams, and other displays of data.
- Identify patterns in events, designs, organisms, and sets of numbers.
- Describe mathematical relationships and use those relationships as a way of organizing data. For example, chart the relationship between plant growth and different amounts of water or sunlight.

F) Working with models and simulations—Learners understand that relationships, patterns, and processes can be represented by models.

- Interpret information and situations by noting associations and similarities, and recognizing patterns, trends, relationships, and sequences.
- Give examples of models or simulations and how they can be used to learn about what they represent.
- Identify ways in which a model differs from what it represents.
- Use a number of types of models such as geometric figures, graphs, and maps to summarize observations of the environment.

G) Drawing conclusions and developing explanations—Learners can develop simple explanations that address their questions about the environment.

- Summarize information, compare findings, and use basic mathematics to analyze data.
- Identify information that is not relevant to a proposed explanation and explain their reasoning.
- Use models and examples to explain their thinking.
- List strengths and weaknesses of the explanations they propose.

STRAND 2—KNOWLEDGE OF ENVIRONMENTAL PROCESSES AND SYSTEMS

Strand 2.1—The Earth as a Physical System

A) Processes that shape the Earth—Learners are able to identify changes and differences in the physical environment.

- Identify some of the forces that cause erosion within their own region, pointing out factors such as freezing and thawing, wind, waves, and gravity.
- Identify some distinctive landforms within their region and, using maps and images, in other areas of the world.

- Differentiate among climates, considering factors such as precipitation, temperature, and resident plants and animals and how they form the different biomes.
- Observe and record seasonal differences. For example, draw a series of pictures or compile photographs that illustrate differences such as day length, migration of specific bird species, and when specific tree species lose their leaves.

B) Changes in matter—Learners are able to identify basic characteristics of and changes in matter.

- Describe objects in terms of the materials they are made of and their observable properties. For example, describe buildings constructed with different materials and discuss why these materials may have been selected based on such properties as rigidity, ability to reflect or gather heat, and transparency.
- Identify the effects of factors such as heating, cooling, and moisture on the properties of materials and how quickly change happens. For example, describe the change of water from solid to liquid to gas in the environment.
- Describe the basic elements of the hydrologic cycle and geologic processes (including weathering, erosion, and deposition). Locate examples of these in the local environment.

C) Energy—While they may have little understanding of formal concepts associated with energy, learners are familiar with the basic behavior of some different forms of energy.

- Identify different forms of energy including radiant light, geothermal, electrical, and magnetic energy. Identify examples of these different forms in their homes, school, community, and natural environment.
- Explain some of the ways in which heat, light, or electricity are produced, travel, stored and used. Use examples such as the sun, power generation, batteries, and so forth.

Strand 2.2—The Living Environment

A) Organisms, populations, and communities—Learners understand basic similarities and differences among a wide variety of living organisms. They understand the concept of habitat.

- Identify similarities and differences among living organisms ranging from single-celled organisms they can observe under microscopes to plants and animals they encounter through direct observation, videos, books, or other media.
- Classify or group organisms using categories such as how animals bear their young, anatomical features, or habitats.
- Describe the basic needs of all living things and explain how organisms meet their needs in different types of environments such as deserts, lakes, or forests.

B) Heredity and evolution—Learners understand that plants and animals have different characteristics and that many of the characteristics are inherited.

- Identify some basic traits of plants and animals. Give examples of how those traits may vary among individuals of the same species.
- Identify some similarities among offspring and parents as being inherited and others as resulting from the organism's interactions with its environment.
- Compare fossil life forms and living organisms to identify similarities and differences between organisms that lived long ago and those alive today.

C) Systems and connections—Learners understand basic ways in which organisms are related to their environments and to other organisms.

- Describe ways in which an organism's behavior patterns are related to its environment. Identify examples of environmental change and discuss how these changes may be helpful or harmful to particular organisms.
- Identify ways in which organisms (including humans) cause changes in their own environments. Create a skit that shows how these changes may help or harm both the organisms that caused the change and other organisms.

- Identify ways in which organisms are interdependent. For example, some animals eat plants, some fish depend on other fish to keep them free of parasites, and earthworms keep soil loose and fertile, which makes it easy for plants to grow.

D) Flow of matter and energy—Learners know that living things need some source of energy to live and grow.

- Explain how most living organisms depend on the sun as the source of their life energy. Give examples that illustrate the understanding that animals ultimately depend on plants for this energy and that plants depend on the sun. Use this idea to trace the energy in the food they eat for lunch back to the sun.
- Describe how matter can be recycled, sometimes in a changed form from the original material. Use examples from their own experience, such as fleece jackets made from recycled soda bottles or envelopes made from recycled telephone books. Or make their own recycled paper and explain how the use of matter differs between making recycled paper and new (or “virgin”) paper.
- Explain the process of life, growth, death, and decay of living organisms as a form of recycling. For example, use a compost pile to study recycling of organic materials.

Strand 2.3—Humans and Their Societies

A) Individuals and groups—Learners understand that people act as individuals and as group members and that groups can influence individual actions.

- Give examples of influences on individual behavior, particularly behavior that affects the environment. For example, discuss why a person might choose to dispose of household garbage, candy wrappers, or toxic products in certain ways. Consider influences such as financial costs, convenience, laws, and the opinions of friends and family members.
- Identify some of the many groups that a person can belong to at the same time. Describe some tensions that a person might feel as a result of belonging to different groups.
- Discuss why students might belong to school or after-school clubs (such as environmental clubs or scouting troops). Consider personal benefits (such as fun and learning) as well as good things the clubs do for the whole school or community.

B) Culture—Learners understand that experiences and places may be interpreted differently by people with different cultural backgrounds, at different times, or with other frames of reference.

- Describe their favorite place or their own community from a variety of perspectives, including their own.
- Role-play the reactions of different people to a place or historical event—especially one with local significance.
- Compare how people live in different regions and how different cultures meet basic human needs. For example, prepare a visual display that compares how people support themselves in different regions and discuss how those livelihoods can both affect the environment and depend on the environment.

C) Political and economic systems—Learners understand that government and economic systems exist because people living together in groups need ways to do things such as provide for needs and wants, maintain order, and manage conflict.

- Discuss what might happen if there were no laws to protect the environment in their area. Consider possible positive and negative effects on plants and animals, specific natural areas, landowners, specific businesses, water users, and others.
- List jobs in their community that are linked to processing natural resources. Identify clusters of related businesses and interview employees or owners to determine why those economic activities are located in their community.
- Identify elements of infrastructure (e.g. communications and transportation systems) in their community. For example, create a map or a skit showing how information, people, and goods move from place to place. Include information about who is responsible for, or who pays for, this infrastructure (e.g., the government, private business, individuals).

D) Global connections—Learners understand how people are connected at many levels—including the global level—by actions and common responsibilities that concern the environment.

- Identify ways in which individual needs and wants are related to environmental concerns such as energy use, conservation and environmental protection.
- Describe how trade connects people around the world and enables them to have things they might not be able or willing to produce themselves. For example, create a map that shows where a learner’s food, clothing and household items are produced, where the raw materials come from, products that are traded into and out from their region, and so forth.
- Identify possible environmental concerns that might come up in other regions or countries as a result of producing or shipping products that learners use regularly.
- Discuss how television, computers, and other forms of communication connect people around the world.

E) Change and conflict—Learners recognize that change is a normal part of individual and societal life. They understand that conflict is rooted in different points of view.

- Identify aspects of family and community life that have remained constant over generations, as well as aspects that have changed. For example, interview family or community members and develop a visual display about their findings.
- Give examples of rules related to the environment at home, in school, or elsewhere that have changed and others that have stayed the same.
- Identify some basic ways in which individuals, groups, and institutions such as schools resolve conflict concerning the environment. For example, develop and perform short skits about different ways of solving a school problem such as littering on the playground or in hallways.

Strand 2.4—Environment and Society

A) Human/environment interactions—Learners understand that people depend on, change, and are affected by the environment.

- Identify ways in which people depend on the environment. For example, create an artistic representation of how the environment provides food, water, air, recreation, minerals, and other resources.
- Identify ways in which human actions change the environment. For example, list changes that activities such as building houses or stores with parking lots, farming, or damming rivers have caused within their community or region.
- Describe how the environment affects human activities in their community or region. For example, describe the effects of weather or climate, the likelihood of earthquakes or flooding, soil and mineral types, or the presence of water on where people live, how they make a living, how they recreate, and so forth.

B) Places—Learners understand that places differ in their physical and human characteristics.

- Identify and describe places in their region that they or others think are important. For example, draw pictures, create a video, or take photographs that illustrate what people find unique or important about regional landmarks, downtown areas, parks, farms, wilderness areas, and so forth.
- Discuss how humans create places that reflect their ideas, needs, and wants, as well as the physical environment. Illustrate with examples of places within their experience such as playgrounds, parks, classrooms, and homes.
- Compare their neighborhood or town with another nearby place, or compare their favorite park with another park they know. List characteristics that make one place different from another.

C) Resources—Learners understand the basic concepts of resource and resource distribution.

- Explain what a natural resource is and give examples.
- Distinguish among resources that are renewable and nonrenewable, and resources (like running water or wind) that are available only in certain places at certain times.
- Identify ways they use resources in their daily lives.

- Locate sources of various resources on a map. For example, trace the origins of the local water supply or map the region’s natural resources.
- Link patterns of human settlement and other activity with the presence of specific resources such as mineral deposits, rivers, or fertile farming areas. Research the origins of their own community and explain the role of resource availability on how the community developed.

D) Technology—Learners understand that technology is an integral part of human existence and culture.

- Describe technologies as tools and ways of doing things that humans have invented. Give examples of technologies that affect their lives in areas such as transportation, communications, and entertainment.
- Interview family members or community members to trace technological changes that have taken place over the last three generations.
- Identify drawbacks and benefits of specific technologies. Consider the fact that technologies can benefit some humans and other organisms while harming others.
- Identify important technological systems such as agriculture, transportation, and manufacturing.

E) Environmental issues—Learners are familiar with some local environmental issues and understand that people in other places experience environmental issues as well.

- Discuss some local environmental issues by identifying some changes or proposals that people disagree about. Describe or role-play how different people feel about these changes and proposals.
- Discuss how people in other places with similar conditions might react or perceive the situation in similar ways.

STRAND 3—SKILLS FOR UNDERSTANDING AND ADDRESSING ENVIRONMENTAL ISSUES

Strand 3.1—Skills for Analyzing and Investigating Environmental Issues

A) Identifying and investigating issues—Learners are able to identify and investigate issues in their local environments and communities.

- Identify and describe a current or historical environmental issue in their community.
- Use primary and secondary sources of information to explore the dilemma confronting people in a current or historical situation that involves the environment.
- Apply ideas of past, present, and future to local environmental issues. For example, describe what has changed, is changing, and could change or discuss how long the issue has existed.
- Identify people and groups that are involved.
- Identify some of the decisions and actions related to the issue.

B) Sorting out the consequences of issues—As learners come to understand that environmental and social phenomena are linked, they are able to explore the consequences of issues.

- Observe and speculate about social, economic, and environmental effects of environmental changes and conditions, and proposed solutions to issues. For example, describe short-term and long-term effects of existing uses of land or another resource in the home, community, and region.
- Discuss how an environmental issue affects different individuals and groups.

C) Identifying and evaluating alternative solutions and courses of action—Learners understand there are many approaches to resolving issues.

- Identify proposed solutions to an issue and discuss arguments for and against them.
- Explain why various strategies may be effective in different situations, and that each proposed strategy is likely to have a different effect on society and the environment. Illustrate with examples from a specific issue.
- Describe some of the different levels at which action can be taken—for example by individuals, families, school classes, different levels of government, or businesses. Identify ways that these groups might take action on a specific issue.
- Propose alternative approaches to problems.

D) Working with flexibility, creativity, and openness—Learners understand the importance of sharing ideas and hearing other points of view.

- Engage in critique and discussion as part of the process of inquiry. Explain why these processes are important.
- Hear and respect different perspectives and communicate with people whose lives, cultures, and viewpoints are different from their own.
- Identify ideas and interpretations that differ from theirs. Ask questions about different perspectives and discuss their strong points and drawbacks.

Strand 3.2—Decision-Making and Citizenship Skills

A) Forming and evaluating personal views—Learners are able to examine and express their own views on environmental issues.

- Identify and express their own ideas about environmental issues and alternative ways to address them.
- Test their views against what they know and believe, remaining open to new information and ideas.
- Identify unanswered questions.
- Identify, clarify, and express their own beliefs and values regarding the environment.

B) Evaluating the need for citizen action—Learners are able to think critically about whether they believe action is needed in particular situations and whether they believe they should be involved.

- Discuss whether citizens should take action on a particular environmental issue. Consider findings from their issue investigations such as causes of the problem and promising strategies for addressing it.
- Identify types of citizen action appropriate for a specific issue.
- Discuss whether and how they think they would like to be involved. Identify reasons for and against taking specific kinds of action.

C) Planning and taking action—By participating in issues of their choosing—mostly close to home—they learn the basics of individual and collective action.

- Develop action plans they can carry out individually, in small groups, or as a class. Include clear reasons and goals for action. Consider the results of their environmental issue investigation and their assessment of the need for action.
- Set realistic goals for action and measures of success consistent with learners’ abilities.
- Decide whether their plan should be implemented immediately or at another time, changed, or abandoned; and carry through with action when appropriate.

D) Evaluating the results of actions—Learners understand that civic actions have consequences.

- Describe the apparent effects of their own actions and actions taken by other individuals and groups.
- Discuss some of the reasons why identifying the effects of actions may be difficult. Consider, for example, the time required to see effects, the influences of others’ actions, and other changes in the situation.

Strand 4—Personal and Civic Responsibility

A) Understanding societal values and principles—Learners can identify fundamental principles of U.S. society and explain their importance in the context of environmental issues.

- Identify examples of beliefs that many U.S. citizens hold in common, such as the importance of individual property rights, the right to pursue happiness, the public or common good, and the well-being of future generations. Create a skit that explores why people might decide to act on environmental issues, considering possible connections with these basic beliefs.

- Discuss how their own beliefs about the environment, environmental issues, and society compare to these general, societal beliefs.
- Recognize tensions that occur when basic values and beliefs differ. Illustrate with examples from local environmental issues.

B) Recognizing citizens' rights and responsibilities—Learners understand the basic rights and responsibilities of citizenship.

- Identify examples of the personal, political, and economic rights of U.S. citizens.
- Identify examples of the responsibilities of citizenship.
- Discuss rights and responsibilities in the context of local environmental issues.

C) Recognizing efficacy—Learners possess a realistic self-confidence in their effectiveness as citizens.

- Describe ways in which individuals and groups act within their community to protect the environment. Identify cases where citizen action has had an effect on an environmental decision or action.
- Identify ways in which they have made a difference through their own actions. Give examples from situations over which learners have some control (for example, in the classroom, at home, or in the community) and that are appropriate to their level of understanding.

D) Accepting personal responsibility—Learners understand that they have responsibility for the effects of their actions.

- Identify and describe some of the effects that they and the groups they belong to (e.g., family or school class) have on the environment and on humans and other living beings.
- Discuss the notion of responsibility and identify some of their personal responsibilities.

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> Key to Symbols: <ul style="list-style-type: none"> ● The EE concept is the main focus of the Project WILD activity. ⊙ The concept is one of the main focuses of the activity; is reinforced. ○ The concept is not the main focus of the activity, but it is supported or reinforced. </div> ENVIRONMENTAL EDUCATION GUIDELINES FOR LEARNING, K–4	Color Crazy (gr. K–4, p. 2)	Grasshopper Gravity (gr. K–4, p. 4)	What’s Wild? (gr. K–4, p. 7)	Classroom Carrying Capacity (gr. K–4, p. 9)	Graphanimal (gr. Pre-K–4, p. 49)	Wildlife Is Everywhere! (gr. K–4, p. 51)	Habitacks (gr. K–4, p. 53)	What’s That, Habitat? (gr. K–4, p. 56)	Beautiful Basics (gr. K–4, p. 58)	Everybody Needs a Home (gr. K–4, p. 59)	Environmental Barometer (gr. Pre-K–4, p. 77)	Habitrekking (gr. 3–4, p. 79)
STRAND 1—QUESTIONING AND ANALYSIS SKILLS												
A. Questioning		⊙		⊙				○				○
B. Designing investigations	○	⊙	○		⊙	○	○	○			⊙	⊙
C. Collecting information												
D. Evaluating accuracy and reliability												
E. Organizing information		⊙	○	○	⊙		○		○	○	⊙	⊙
F. Working with models and simulations	○			⊙	○					⊙		
G. Developing explanations	○			○	○				○	○	○	○
STRAND 2—KNOWLEDGE OF ENVIRONMENTAL PROCESSES AND SYSTEMS												
2.1—The Earth as a Physical System												
A. Processes that shape the Earth												
B. Changes in matter												
C. Energy												
2.2—The Living Environment												
A. Organisms, populations, and communities		○	○	○		○	⊙	●	⊙	○		⊙
B. Heredity and evolution	○	○										
C. Systems and connections	○		○	⊙	○	○	○	○	○	○	○	○
D. Flow of matter and energy				○				○	○	○		
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B. Recognizing citizens’ rights and responsibilities											○	○
C. Recognizing efficacy											○	○
D. Accepting personal responsibility											○	○

<p>Key to Symbols:</p> <ul style="list-style-type: none"> ● The EE concept is the main focus of the Project WILD activity. ⊙ The concept is one of the main focuses of the activity; is reinforced. ○ The concept is not the main focus of the activity, but it is supported or reinforced. <p>ENVIRONMENTAL EDUCATION GUIDELINES FOR LEARNING, K-4</p>	Are You Me? (gr. K-4, p. 2)	Aqua Words (gr. K-4, p. 29)	Water Plant Art (gr. K-4, p. 31)	Marsh Munchers (gr. K-4, p. 34)	Fashion a Fish (gr. K-4, p. 56)	Sockeye Scents (gr. 3-4, p. 61)	Water We Eating? (gr. K-4, p. 83)	Plastic Jellyfish (gr. K-4, p. 128)	Silt: A Dirty Word (gr. 3-4, p. 176)
STRAND 1—QUESTIONING AND ANALYSIS SKILLS									
A. Questioning									
B. Designing investigations									○
C. Collecting information					○		○		○
D. Evaluating accuracy and reliability									
E. Organizing information				○				⊙	○
F. Working with models and simulations				⊙		⊙			⊙
G. Developing explanations				○					
STRAND 2—KNOWLEDGE OF ENVIRONMENTAL PROCESSES AND SYSTEMS									
2.1—The Earth as a Physical System									
A. Processes that shape the Earth									○
B. Changes in matter								○	
C. Energy									
2.2—The Living Environment									
A. Organisms, populations, and communities	○		○	○	⊙	○			
B. Heredity and evolution	●				⊙				
C. Systems and connections	○		○	⊙	○	○			○
D. Flow of matter and energy			○				○	○	
2.3—Humans and Their Societies									
A. Individuals and groups									⊙
B. Culture									
C. Political and economic systems									
D. Global connections									
E. Change and conflict									

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2.4—Environment and Society									
A. Human/environment interactions		⊙	○					○	
B. Places									
C. Resources							⊙		
D. Technology								○	
E. Environmental issues									
STRAND 3—SKILLS FOR UNDERSTANDING AND ADDRESSING ENVIRONMENTAL ISSUES									
3.1—Skills for Analyzing and Investigating Environmental Issues									
A. Identifying and investigating issues								○	
B. Sorting out the consequences of issues								○	
C. Identifying and evaluating alternative solutions and courses of action								○	
D. Working with flexibility, creativity, and openness								○	
3.2—Decision-Making and Citizenship Skills									
A. Forming and evaluating personal views								○	
B. Evaluating the need for citizen action								○	
C. Planning and taking action								○	
D. Evaluating the results of actions								○	
STRAND 4—PERSONAL AND CIVIC RESPONSIBILITY									
A. Understanding societal values and principles									
B. Recognizing citizens’ rights and responsibilities								○	
C. Recognizing efficacy								○	
D. Accepting personal responsibility								○	