

GUIDELINES FOR THE 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.

Strand 1— Questioning, Analysis and Interpretation Skills

References to Standards:

Geography 49
Mathematics 248
Science 145

Guidelines:

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

- Identify environmental questions based on personal experiences both in and outside school, newspaper and magazine articles, television or radio news, or videos.

Summarize an environmental problem or situation to provide context for, or explain the origin of, a particular question. Create visual presentations (such as maps, graphs, or video tapes) and written and oral statements that describe their thinking about the problem.

- Pose clear questions and ideas to test (hypotheses), reformulating them when necessary.
- Clarify their own beliefs about the environment and discuss how those beliefs are reflected in the questions they ask.

B) Designing investigations—Learners are able to design environmental investigations to answer particular questions—often their own questions.

- Select types of inquiry appropriate to their questions.

Mathematics 248
Science 145, 148

Understanding the Local Environment

Experiencing and observing the local environment is an essential part of environmental education. Understanding their surroundings helps learners build a strong foundation of skills and knowledge for reaching out further into the world and deeper into the conceptual understandings that environmental literacy demands. Direct experience in the environment also helps foster the awareness and appreciation that motivate learners to further questioning, better understanding, and appropriate concern and action.

The following chart suggests ways in which learners at different grade levels might explore and understand the local environment. It is printed in each grade level section of these guidelines to help show progression as learners mature. Other ideas are included in the guidelines.

Grades Pre K-4

Identify basic types of habitats (e.g., forests, wetlands, or lakes). Create a short list of plants and animals found in each.

Trace the source of their drinking water and where it goes after it is used.

Recognize resident animal species, migrants, and those that pass through on migratory routes.

Collect or produce images of the area at the beginning of European settlement.

Describe aspects of the environment that change on a daily, weekly, monthly, and yearly basis.

Record weather observations such as precipitation, temperature, or cloud cover.

Identify food crops that are grown or processed locally.

Grades 5-8

Classify local ecosystems (e.g., oak-hickory forest or sedge meadow). Create food webs to show—or describe their function in terms of—the interaction of specific plant and animal species.

Describe how drinking water and wastewater are treated.

Map migratory routes of birds, butterflies, and other animals that pass through the area. Identify their local habitat needs.

Monitor changes in water or air quality, or other aspects of the local environment.

Identify species that are locally threatened, endangered, or declining in population. Describe their habitat needs.

Identify sources of electricity used in the community (e.g., hydroelectric, fossil fuels, solar, nuclear).

Describe the area's climate and identify factors that contribute to it.

Create a map for the local area that shows where food that is consumed locally comes from.

Grades 9-12

Identify several plants and animals common to local ecosystems. Describe concepts such as succession, competition, predator/prey relationships, and parasitism.

Evaluate sources of nonpoint source pollution of local bodies of water, including sources that are not local.

Investigate short- and long-term environmental changes in a local watershed, and aquifer, or in air quality. Or document changes in land use and their environmental effects.

Research population trends for a locally threatened species. Describe changes, activities, and other factors that seem to affect the population trends.

Calculate the potential for generating wind or solar power on a particular site.

Trace human population trends for their region and make projections, based on research findings, for the future.

- Define the scope of their inquiry, identifying the main variables and phenomena to be studied.
- Select appropriate systems of measurement and observation.
- Select tools that are appropriate for their environmental investigations based on the question asked and the type of information sought.

C) Collecting information—Learners are able to locate and collect reliable information about the environment or environmental topics using a variety of methods and sources.

- Observe systematically, measure accurately, and keep thorough and accurate records, which may include written notes and data tables, sketches, and photographs.
- Understand and use various systems of measurement and derived measurements such as rates.
- Assess, choose, and synthesize materials from resources such as aerial photographs, topographic maps, and satellite images; library and museum collections, historical documents, and eyewitness accounts; computerized databases and spreadsheets; the internet; and government records.
- Collect firsthand information about their own community using field study skills.

D) Evaluating accuracy and reliability—Learners are able to judge the weaknesses and strengths of the information they are using.

- Identify and evaluate vague claims they hear on television or through other media. For example, examine the credibility of results of public opinion polling about environmental topics, considering such factors as sampling methods, logical conclusions, and appropriate analogies.
- Identify factors that affect the credibility of information, including assumptions and procedures used to create it; the social, political, and economic context in which the information was created; and potential bias due to omission, suppression, or invention of factual information.
- Examine evidence, identify faulty reasoning, and apply other basic logic and reasoning skills in evaluating information sources.

Arts 47
 English Language Arts 27-28,
 38-40
 Geography 49-50, 144-145
 History 67-68
 Mathematics 214, 222, 232, 240
 Science 145
 Science Benchmarks 294
 Social Studies 85-87

History 67-68
 Mathematics 248, 256
 Science 143, 148

Butterflies After the Hurricane

From: Judi Kohler, Village Pines School

Grade Level: 5th-6th

Correlating Guidelines:

Strand 1 B, C, E, F

Strand 2.2 A, C

In 1992, Hurricane Andrew left this Florida school with little remaining landscaping. By creating a butterfly garden, one middle school class turned the difficult experience into a rewarding interdisciplinary unit on habitat restoration.

Students used their math skills to measure the garden plot and figure out how many plants could fit into the area. In language arts, they wrote letters seeking help selecting plants, and spelling lessons focused on related vocabulary words. The butterflies inspired haiku and acrostic poems, while illustrating the poems drew upon the students' artistic skills.

In social studies, students researched the places butterflies live, and studied the different cultures found along their migratory routes.

A field trip to a local nature center provided an opportunity to learn from a local expert about the needs of butterflies, and scientific observations unveiled the mysteries of metamorphosis and the life cycle of a butterfly.

- Identify gaps in information that indicate a need for further discovery or inquiry.
- Evaluate data and evidence for accuracy, relevance, significance, appropriateness, and clarity.

E) Organizing information—Learners are able to classify and order data, and to organize and display information in ways that help analysis and interpretation.

- Present environmental data in a variety of formats including charts, tables, plots, graphs, maps, and flow charts. For example, chart stream flows, create a map of local businesses that require air quality permits, or organize survey results into a table.
- Explain why they chose specific ways of ordering and displaying information. Consider factors such as the question being answered, the type of information, and the purpose of the display.
- Present environmental data in ways that demonstrate possible relationships between sets of information such as population census counts of a certain bird species and the prevalence of certain tree species or habitat types.

Arts 50

English Language Arts 35-36

Geography 50-51, 144-145

Mathematics 222, 248, 274, 280

Science 145

F) Working with models and simulations—Learners understand many of the uses and limitations of models.

- Describe how models are used to think about long-term processes such as population growth or processes that are difficult to see such as bird migration or the movement of the planets in relationship to the sun.
- Use models to represent and investigate aspects of the physical world such as weather and specific phenomena such as hurricanes.
- Manipulate mathematical and physical models using a computer.
- Evaluate models based on the question being investigated. Account for variables such as the complexity of the model, its scale, its ability to represent important features of the process being modeled, and its reliability and accuracy.
- Recognize limitations of models and simulations. For example, describe a situation in which a model of an environmental phenomenon is not useful.

G) Drawing conclusions and developing explanations—Learners are able to synthesize their observations and findings into coherent explanations.

- Distinguish between description and explanation and give examples of each based on their own environmental investigations.
- Consider the possible relationships among two or more variables.
- Propose explanations based on what they observed or learned through research, selecting which evidence to use and accounting for discrepancies. Synthesize and interpret information from a range of sources.
- List strengths and weaknesses of proposed explanations. Discuss how the proposed explanation could be rejected or its reliability improved.
- Use their proposed explanations to form new questions and suggest new avenues of inquiry.

Geography 144-145
Mathematics 222, 232
Science 145
Science Benchmarks 286-287

English Language Arts 39-40
Geography 51-52
History 68-70
Mathematics 222, 248, 274, 280
Science 145, 148

Strand 2— Knowledge of Environmental Processes and Systems

Strand 2.1— The Earth as a Physical System

References to Standards:

Geography 156-157
Science 158-160
Science Benchmarks 73

Guidelines:

A) Processes that shape the Earth—Learners have a basic understanding of most of the physical processes that shape the Earth. They are able to explore the origin of differences in physical patterns.

- Analyze physical patterns such as climate, areas of geothermal activity, soil types, and arid regions, suggesting reasons for these patterns. Explain these patterns in terms of abrupt forces (such as earthquakes or major storms) and long-term processes (such as erosion and rock formation), as well as those that are human-caused (such as suburban development or agricultural practices).
- Predict the consequences of specific physical phenomena such as a hurricane in a coastal area or heavy grazing in an arid region.
- Relate physical processes and patterns (such as climate, weather phenomena, and seasonal change) to the Earth/sun relationship. For example, create a model that shows how seasonal change is affected by the Earth/sun relationship.

B) Changes in matter—Learners understand the properties of the substances that make up objects or materials found in the environment.

- Describe a variety of chemical reactions and offer examples from daily life and the local environment.
- Explain properties of materials in terms such as atomic and molecular structure or reactivity. For example, describe why particular building materials have properties such as rigidity, impermeability, or the ability to reflect or gather heat.
- Explain an object's characteristics based on its composition and how it was formed. For example, describe the characteristics of different types of rock and account for these characteristics based on their

Science Benchmarks 77-79
Science 154

constituent parts and the processes by which they were formed.

C) Energy—Learners begin to grasp formal concepts related to energy by focusing on energy transfer and transformations. They are able to make connections among phenomena such as light, heat, magnetism, electricity, and the motion of objects.

- Trace the flow of energy in examples that encompass several different transfers and transformations of energy. For example, trace the path of energy in the creation and consumption of fossil fuels.
- Explain how solar energy contributes to the movement of global air masses, the hydrological cycle and ocean currents.
- Explain how the process of life is based on the conversion, utilization, storage and transfer of energy. For example, create a visual display that shows how plants or animals use energy, where that energy comes from, and where it goes.

Strand 2.2— The Living Environment

Guidelines:

A) Organisms, populations, and communities—Learners understand that biotic communities are made up of plants and animals that are adapted to live in particular environments.

- Define and give examples to illustrate the concepts of species, population, community, and ecosystem. Trace and give examples of connections among organisms at those levels of organization.
- Link features of internal and external anatomy with the ability of organisms to make or find food and reproduce in particular environments.
- Understand that some animals and plants have adapted to extreme environmental conditions. Give examples of adaptations that are behavioral (for example, the migration of Canada geese and other birds) and physical (such as the physical structures that enable desert animals and plants to exist on minimal amounts of water).
- Describe how organisms differ in how they use energy. For example, identify organisms that use energy quickly for growth and metabolism, and therefore must replace it quickly (e.g., a hummingbird) and others that use

Science 155
Science Benchmarks 84-85

References to Standards:

Geography 158-159
Science 156-157
Science Benchmarks 104

energy more slowly and therefore need to replace it less frequently (e.g., a python). Predict the habitat needs of these different types of organisms.

Science 157-158
Science Benchmarks 108, 124

B) Heredity and evolution—Learners have a basic understanding of the importance of genetic heritage.

- Describe some ways in which variation among individuals of the same species can sometimes give certain individuals an advantage within a specific environment.
- Describe in general terms the theory of natural selection for particular traits and how that process can result in descendants that are quite different from their ancestors.
- Define extinction, cite evidence of extinction, and identify some of its causes.
- Discuss the possible implications of permanent loss of a species and how it affects interdependence within an ecosystem.

Geography 158
Science 157-158
Science Benchmarks 117

C) Systems and connections. Learners understand major kinds of interactions among organisms or populations of organisms.

- Describe and give examples of producer/consumer, predator/prey, and parasite/host relationships.
- Identify organisms that are scavengers or decomposers. Describe the roles they play within particular systems focusing on their relationship to other organisms and physical elements of the system.
- Summarize how abiotic and biotic components in combination influence the structure of an ecosystem. For example, create a map for the local region that shows average temperature and rainfall correlated with local forest, grassland or desert ecosystems. Or discuss the process of soil formation in terms of the interaction of climate, geology, and living organisms.

Science 158
Science Benchmarks 120

D) Flow of matter and energy—Learners understand how energy and matter flows among the abiotic and biotic components of the environment.

- Trace the flow of energy through food webs that identify relationships among organisms in natural systems.
- Explain how matter is transferred among organisms and between organisms and their environment in these food webs.

- Describe how energy, which enters ecosystems as sunlight, changes form and is transferred in the exchanges (production, consumption, and decomposition) that comprise food webs.

Strand 2.3— Humans and Their Societies

Guidelines:

A) Individuals and groups—Learners understand that how individuals perceive the environment is influenced in part by individual traits and group membership or affiliation.

- Describe individual development and identity in terms such as learning, perception, innate abilities, culture, social influences, and experience. Interpret their own beliefs about the environment using similar concepts.
- Explain how group membership—and shared values, beliefs, and assumptions—can influence individuals, impel different reactions to physical and social

References to Standards:

Arts 46
 Science Benchmarks 141-142,
 155, 159
 Social Studies 88-90

PRISM— Providing Resolution with Integrity for a Sustainable Molokai

From: Vicki Newberry, Kaunakakai, Hawaii

Grade Level: Upper Elementary

Correlating Guidelines:

Strand 1 A, B, C, D, E,
 F, G
 Strand 2.3 C
 Strand 2.4 A, B
 Strand 3.1 A, B

This Molokai, Hawaii upper elementary school class begins studying local issues early in the school year. To start, they learn about local ecology and begin developing their skills in issue analysis—identifying the problem, issue, parties, positions, beliefs, values, and solutions (according to *Investigating Environmental Issues and Actions* by Hungerford, Litherland, Peyton, Ramsey, and Volk).

The students then select specific problems and issues to work on throughout the year. They are limited to island issues to make it easier to obtain background information and involve the community. Visits to field sites, and an in-class speakers forum help students

begin to understand the complexity of their issues and the players involved. Further investigations during the second quarter deepen their understanding and help them develop findings.

In the spring, students sponsor a community-wide symposium called PRISM. The students invite an adult keynote speaker, but the rest of the day is theirs. They write speeches and present their findings in panels, workshops and action-planning sessions. In 1998, 12 different issues were explored, and 100 adults and 125 students attended the symposium.

environments and changes, and cause social change. For example, describe how family, religion, gender, ethnicity, socioeconomic status, and other factors may influence individuals' values and perceptions about the environment and their communities.

- Identify and critique instances of stereotyping based on group affiliation. For example, discuss how people who are all identified as "environmentalists" may have very different perspectives from one another.

B) Culture—As they become familiar with a wider range of cultures and subcultures, learners gain an understanding of cultural perspectives on the environment and how the environment may, in turn, influence culture.

- Explain how the environment is perceived differently by various cultures, and how these perspectives may influence individuals' perceptions of the environment. For example, based on stories from other cultures, script and perform scenes about what is considered beautiful, valuable, or frightening in the environment.
- Explain how new technologies can change cultural perceptions and social behavior. For example, discuss how snowmobiles have changed subsistence lifestyles in Alaska, or the impact of air conditioning on settlement in southern Florida.
- Identify ways in which transportation and communications technology helps, or has helped, spread cultural values and behavior patterns.

C) Political and economic systems—Learners become more familiar with political and economic systems and how these systems take the environment into consideration.

- Differentiate among public and private goods and services, using environment-related goods and services to illustrate. For example, examine the values and functions of wetlands. Distinguish among public goods, such as groundwater recharge, flood control, and wildlife habitat; and private goods, such as their value for agricultural production or water storage, or the value of draining the land for other uses. Discuss difficulties encountered in drawing these distinctions.
- Identify economic and political features of the local community and state, and describe how environmental decisions can be influenced by these economic and political systems and actors.

Arts 48, 51
English Language Arts 27-29,
38-39
Geography 154-155, 162-163
Science Benchmarks 155
Social Studies 79-81

Civics and Government 47-52,
61-70
Economics 5-7, 19-20, 30-31
Geography 164-166
Science Benchmarks 169
Social Studies 94-98

- Identify ways in which governments and economic systems work to protect the environment and distribute natural resources. Give examples of laws, incentives, and penalties that affect people's behavior toward the environment and each other.

D) Global connections—Learners become familiar with ways in which the world's environmental, social, economic, cultural, and political systems are linked.

- Explain international trade in terms of uneven distribution of resources.
- Describe ways in which the global environment is affected by individual and group actions, as well as by government policies and actions having to do with energy use and other forms of consumption, waste disposal, resource management, industry, and population.
- Explain how an environmental change in one part of the world can have consequences for other places. For example, develop a map or another visual presentation that shows the effects of acid rain or nuclear fallout in places distant from the source of the pollution.
- Identify a variety of global links, including transportation and communication systems, treaties, multi-national corporations, and international organizations.

E) Change and conflict—Learners understand that human social systems change over time and that conflicts sometimes arise over differing and changing viewpoints about the environment.

- Describe patterns of change within and across cultures, communities, and other groups. Consider the rapidity of change, mechanisms that helped spread change, and what motivated change. For example, discuss how and why wastewater treatment became a common practice in the United States.
- Explain how change affects individuals and groups differently and give examples of the trade-offs involved in decisions and actions ranging from the individual to the societal levels. For example, discuss how a decision about where to site a landfill, build a chemical plant, or locate a new highway might affect different neighborhoods, businesses, workers, people of varying socio-economic status, and others. Role play their reactions.

Civics and Government 71-73
 Geography 164-166, 171-172
 Science Benchmarks 177
 Social Studies 102-104

Science Benchmarks 163, 166,
 173
 Social Studies 82-84, 91-93

- Describe and analyze examples of tensions between individual rights and benefits and the societal good. Illustrate with examples from the local community, possibly including disagreements over zoning, controversial proposals to raise taxes to pay for the purchase of open space or sewer system upgrades, or tradeoffs between commuting to work individually in a car or taking public transportation.
- Identify some of the formal and informal ways that groups (including governments) attempt to anticipate, avoid, or resolve conflicts related to the environment.

Strand 2.4— Environment and Society

References to Standards:

Geography 173-175
Science 168-169

Guidelines:

A) Human/environment interactions—Learners understand that human-caused changes have consequences for the immediate environment as well as for other places and future times.

- Describe intended and unintended environmental and social consequences associated with the changing use of technologies. Consider consequences that may be positive as well as negative. For example, discuss particular irrigation methods, different ways of generating electrical power, or the use of synthetic pesticides.
- Explain how human-caused environmental changes cause changes in other places. For example, discuss the effects of building a dam on downstream plant and animal communities as well as on human communities.
- Describe the effects of a local environmental restoration effort, such as wetlands creation. Predict the long-term consequences of such efforts, or a particular restoration project.

B) Places—Learners begin to explore the meaning of places both close to home and around the world.

- Analyze physical and human characteristics of places and make inferences about how and why these characteristics have developed and changed over time. For example, use maps and satellite photographs to examine how cities change in response to natural disasters such as floods, hurricanes, or earthquakes.

Arts 50
Geography 150-155
Social Studies 85-87, 99-101

Live Oaks Communities

From: Teaching Naturally

Grade Level: Middle School (Grades 5-8)

Correlating Guidelines:

Strand 1 E

Strand 2.3 A

Strand 2.4 A, B, C

Strand 3.1 A, B, C, D

Near the school, there's a wooded section of public land, called a green way, with a live oak hammock ecosystem. Taking advantage of the green way's proximity, four instructors developed a coordinated unit that used the site and met learning objectives for each discipline.

In science, students learned about interrelationships by studying an oak tree and the diverse organisms that it supports. The class walked to the green way and, in small groups, conducted inventories of selected trees. The groups used field guides to identify and record the plants, animals, and animal signs they discovered.

The math instructor helped students compile and graph their data and interpret their findings. The students learned to calculate percentages by figuring the relationship of each animal or plant group to the total biodiversity of the area.

Students read Longfellow's *Evangeline* and other stories involving oaks, which

prompted them to write folk tales about trees. The art teacher also got into the act with lessons on foreground and background perspectives that helped students draw pencil sketches of their study trees to illustrate their stories.

In social studies, students estimated the age of their trees and developed time lines of historical events that took place during the trees' life spans.

As questions arose about preserving and removing trees, students researched city planning, tree ordinances, and other related civic issues.

To culminate the interdisciplinary unit, student groups used county maps to identify several large oak trees, then developed a rationale for locating a new county road that accounted for site and materials. The recommendations were presented in a mock county planning meeting.

- Identify ways in which personal perceptions, culture, and technology influence people's perceptions of places. Discuss the importance of some places (such as Yellowstone National Park or the Mississippi River) as cultural symbols.
- Identify regions based on different criteria such as watershed boundaries, sales and service areas for different businesses, or the area from which sports teams draw fans or symphony orchestras attract audiences.

C) Resources—Learners understand that uneven distribution of resources influences their use and perceived value.

- Map and discuss distribution and consumption patterns for specific resources, such as metals, fresh

Economics 1-3
Geography 176-178
History 67-68
Science 168

water, or certain types of forests. Note resources that are being rapidly depleted.

- Explain why certain resources (such as oil, coal, or natural gas) are key to the development of human societies, and identify resources that were critical to development at different times in history.
- Explain conflicts between individuals, states, regions, or nations noting factors such as differing attitudes about the use of specific resources and scarcity of natural resources. Illustrate with local or regional examples such as conflicts over water rights and use of habitat for local endangered species.

Science 169
Science Benchmarks 55-56, 185-186, 189-190, 194, 198, 202-203, 206
Social Studies 99-101

D) Technology—Learners understand the human ability to shape and control the environment as a function of the capacities for creating knowledge and developing new technologies.

- Discuss technologies in the context of larger systems that have shaped the course of human history as well as human relationships with the environment. Use illustrations from the agricultural, industrial and transportation revolutions that have dramatically changed how people live and use resources.
- Analyze how the ability to develop and use technology gives humans great influence over the environment and other living things. Use examples from their region, such as the ability to construct levees to protect areas from flooding or create wildlife refuges, build machines that produce or reduce air or water pollution, or domesticate plants or animals for food production.
- Identify some of the important environmental and social issues related to particular technological developments in fields such as agriculture, manufacturing, and energy.

Geography 181-182

E) Environmental issues—Learners are familiar with a range of environmental issues at scales that range from local to national to global. They understand that people in other places around the world experience environmental issues similar to the ones they are concerned about locally.

- Identify other places, either contemporary or historical, experiencing issues similar to those in the learner's community or region.
- Explain how issues arise because of conflicting points of view about a specific proposal, event, or condition in the environment. For example, discuss conflicting perspectives about past and present proposals to build

large-scale dams such as the Three Gorges project in China, the Hetch-Hetchy dam in the U.S., or a similar project in the learner's region.

- Discuss how the disagreements at the heart of environmental issues makes them difficult to resolve. Consider the role of understanding, creativity, or compromise in finding solutions.

Strand 3— Skills for Understanding and Addressing Environmental Issues

Strand 3.1— Skills for Analyzing and Investigating Environmental Issues

Guidelines:

A) Identifying and investigating issues—Learners are able to use primary and secondary sources of information, and apply growing research and analytical skills, to investigate environmental issues, beginning in their own community.

- Clearly articulate and define environmental issues. For example, describe the history and origins of the issue, actions that have been taken to address the issue, the apparent effects of these actions, and the current situation.
- Identify key individuals and groups involved, their viewpoints, and the types of action they support. Describe areas of conflict and agreement.
- Investigate the issue using secondary sources and original research where needed.
- Examine how others have analyzed and understood the issue, identifying their approaches and the assumptions behind them.
- Compare the issue with similar issues from other places and times.

B) Sorting out the consequences of issues—Learners are able to apply their knowledge of ecological and human processes and systems to identify the consequences of specific environmental issues.

- Describe the effects of human actions on specific elements, systems, and processes of the environment.

References to Standards:

Geography 164-166, 169-170,
179-182
History 68-70
Social Studies 79-93, 105-107

Geography 171-172
Social Studies 85-87

- Analyze issues by looking at trade-offs that have been made. For example, consider where various human activities (such as landfills, highways, chemical factories, or hazardous waste incinerators) are located and their effects on different places and different segments of the population.
- Speculate about the effects of a proposed state or local environmental regulation. For example, consider effects on different sectors of the economy, neighborhoods, public health, particular plant and animal species and communities, and overall environmental quality.
- Predict the consequences of inaction or failure to resolve particular issues.

English Language Arts 41
History 70
Social Studies 105-107

C) Identifying and evaluating alternative solutions and courses of action—Learners are able to identify and develop action strategies for addressing particular issues.

- Identify different proposals for resolving an environmental issue. Recognize and explain the perspectives on the issue that are embedded in those views.
- Explain why various strategies may be effective in different situations. Consider their likely effects on society and the environment.
- Independently and in groups, develop original strategies to address issues.
- Discern similarities and differences in problem situations which might affect their ability to apply strategies that were successful in other places and times.

Arts 51
English Language Arts 31-33, 41-42, 44-45
Geography 181
Science 148
Science Benchmarks 286-287
Social Studies 88-90

D) Working with flexibility, creativity, and openness—Learners are able to consider the assumptions and interpretations that influence the conclusions they and others draw about environmental issues.

- Explain how the interplay of ideas and perspectives strengthens the process of inquiry and the societal ability to address issues.
- Receive questions and alternative explanations that others offer in discussions as well as in readings.
- Explain why it is not always possible to select one correct explanation or a single best approach to addressing an issue.

Strand 3.2— Decision-Making and Citizenship Skills

Guidelines:

A) Forming and evaluating personal views—Learners are able to identify, justify, and clarify their views on environmental issues and alternative ways to address them.

- Discuss personal perspectives with classmates, remaining open to new ideas and information.
- Justify their views based on information from a variety of sources, and clear reasoning.
- Discuss their own beliefs and values regarding the environment and relate their personal view of environmental issues to these.
- Identify ways in which others' views correspond or differ with their own views.

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

- Discuss whether action is warranted. Account for factors such as the scale of the problem; legal, social, economic, and ecological consequences; and alternatives to citizen action.
- Identify different forms of action that citizens can take in the economic, political, and legal spheres, as well as actions aimed at directly improving or maintaining some part of the environment or persuading others to take action.
- Speculate about the likely effects of specific actions on society and the environment, and the likelihood these actions will resolve a specific environmental issue.
- Point out advantages and disadvantages of their personal involvement, considering factors such as their own skills, resources, knowledge, and commitment.

C) Planning and taking action—As learners begin to see themselves as citizens taking active roles in their communities, they are able to plan for and engage in citizen action at levels appropriate to their maturity and preparation.

- Develop action plans they can carry out individually, in small groups, or with a class, club, or larger organization. Include clear reasons and goals for

References to Standards:

Arts 40
Geography 179-182
History 70
Social Studies 88-90

Civics and Government 68-70
Social Studies 105-107

Civics and Government 80-83
Social Studies 105-107

The Many Sides of Cotton

From: *Windows on the Wild—Biodiversity Basics*,
World Wildlife Fund

Grade Level: Middle School (grades 6-9)

Correlating Guidelines:

Strand 1 A, C, D, E, G

Strand 2.4 A, C, D, E

Strand 3.1 A, B, C, D

This activity is part of a broader unit on biodiversity, and incorporates social studies, science, and language arts.

Students begin by exploring a hypothetical controversy, such as supposing that the school has to cut the budget and must choose between the music program or after-school sports.

Through this exercise, students are introduced to issue analysis: identifying the problem, the issue, the parties involved and their positions, the beliefs that shape those positions, and the values that underlie them, and examine possible solutions.

Once familiar with the approach, students apply the issue analysis process to examine the pros and cons of growing organic and

conventional cotton. Using readings written by people with diverse perspectives on the issue, students work individually or in groups to analyze the articles for points of agreement and disagreement, facts, opinions, and bias. Individually or in groups, they complete a chart on sorting out the issues.

Finally, students write a personal position statement on conventional versus organic cotton, making sure to back up their statements with specific reasons, and describing whether and how their positions will affect their actions as a consumer and a citizen.

action. Base these plans on knowledge of a range of citizen action strategies and the results of their environmental issue investigations.

- Set realistic goals for action and include measures of success consistent with learners' abilities and an understanding of the complexity of the issue.
- 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 are able to analyze the effects of their own actions and actions taken by other individuals and groups.

- Analyze the effects of decisions, policies, and actions taken by individuals and groups on a particular issue.
- Analyze their own actions, explaining apparent effects and discussing them in light of students' goals and reasons for acting.

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- Describe some of the reasons why analyzing the results of actions may be difficult, including the scale of the issue, the time required to see effects, and the influence of other actions and factors.

Strand 4— Personal and Civic Responsibility

Guidelines:

A) Understanding societal values and principles—Learners understand that societal values can be both a unifying and a divisive force.

- Identify some of the shared political values and principles that unite American society, and explain their importance.
- Discuss conflicting views about the meaning and application of shared values in specific issues. For example, explore conflicting views about the idea that one person's rights end where they infringe on another's. Use a specific context such as proposed sports stadium or whether to permit an industrial facility or housing development that is likely to pollute a stream.
- Identify ways in which advocates appeal to values such as individual freedoms, property rights, the public good, economic well-being, and patriotism. For example, analyze speeches and writings on specific environmental issues.
- Evaluate the principle of stewardship as a shared societal value. For example, compare conceptions of stewardship contained in writings of John Muir, Gifford Pinchot, and Aldo Leopold with their own understanding.

B) Recognizing citizens' rights and responsibilities—Learners understand the rights and responsibilities of citizenship and their importance in promoting the resolution of environmental issues.

- Identify rights and responsibilities associated with citizenship, including personal and civic responsibilities.
- Describe ways in which commonly accepted rights and responsibilities of citizenship motivate people to

References to Standards:

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help resolve environmental issues. Consider rights and responsibilities such as acquiring, using and selling property; the right to vote; freedom of speech and assembly; accepting responsibility for the consequences of one's actions; obeying the law; and respecting the rights and interests of others.

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

- Explain the ways in which citizen action and public opinion influence environmental policy decisions.
- Describe how individuals and groups act within society to create change, meet individual needs and promote the common good. Illustrate with examples from environmental issues.
- Describe ways in which their actions have made a difference. Use examples that begin in the classroom and the home, and extend beyond to encompass the broader communities in which students begin to see possibilities for action.

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D) Accepting personal responsibility—Learners understand that their actions can have broad consequences and that they are responsible for those consequences.

- Analyze some of the effects that their actions (and the actions of their families, social groups, and communities) have on the environment, other humans, and other living beings.
- Describe actions in terms of their effects that reach into the future.
- Describe their personal responsibilities, comparing their view of their responsibilities with commonly accepted societal views.
- Identify ways in which they feel responsible for helping resolve environmental issues within their community.