QUICK REFERENCE: 12TH GRADE ENVIRONMENTAL ED.

A. QUESTIONING AND ANALYSIS

Content Standard
Students in Wisconsin will use credible research methods to investigate environmental questions, revise their personal understanding to accommodate new knowledge and perspectives, and be able to communicate this understanding to others.

Rationale:

Developing an understanding of the environment and environmental sustainability depends on students' willingness and ability to ask questions about the world around them, speculate and hypothesize, seek information, and develop answers to their questions. Environmental literacy requires a familiarity with some basic modes of inquiry; a mastery of fundamental skills for gathering, organizing, interpreting, synthesizing, and evaluating information; developing explanations; and communicating these understandings to others.

PERFORMANCE STANDARDS

By the end of grade 12 students will:

A.12.1 Identify questions that require skilled investigation* to solve current problems* cited in literature, media, or observed through personal observations (*see LA Research*)

A.12.2 Suggest possible investigations* and describe the results that might emerge from the investigations* (*see SC Inquiry*)

A.12.3 Evaluate personal investigations* and those of others, critiquing procedures, results, and sources of data and suggest improvements to the investigation* (*see LA Research; MA Process*)

A.12.4 State and interpret their results accurately and consider other explanations for their results (*see LA Writing*)

A.12.5 Communicate the results of their investigations* to groups concerned with the issue* (*see LA Oral Language*)

B. KNOWLEDGE OF ENVIRONMENTAL PROCESSES AND SYSTEMS

Content Standard
Students in Wisconsin will demonstrate an understanding of the natural environment and the interrelationships among natural systems.

Rationale:

The foundation of environmental education is a basic understanding of the processes of the interacting systems that comprise the environment. Therefore, it is essential that students have knowledge of the earth as a dynamic, physical, and living system that has been affected over time by various human societies. This knowledge is a necessary prerequisite for problem-solving activities required for individual and community response to environmental issues.

PERFORMANCE STANDARDS

By the end of grade 12 students will:

Energy and Ecosystem

B.12.1 Evaluate the relationship of matter and energy* and the flow of energy* in natural, managed, and built systems (*see SC Physical Science*)

B.12.2 Describe the value of ecosystems* from a natural and human perspective; e.g., food, shelter, flood control, water purification

B.12.3 Evaluate the stability and sustainability* of ecosystems* in response to changes* in environmental conditions (*see SC Life and Environmental Science*)

B.12.4 Analyze the factors that determine the number of organisms that can exist in a given area

B.12.5 Analyze past and current trends in ecosystem* degradation and species extinction (*see SC Earth and Space Science*)

B.12.6 Predict population response to changes* in environmental conditions

B.12.7 Evaluate the importance of biodiversity*

B.12.8 Relate the impact of human activities in ecosystems* to the natural process of change, citing examples of succession,* evolution,* and extinction (*see SC Earth and Space Science*)

B.12.9 Evaluate ways in which technology has expanded our ability to alter the environment and its capacity to support humans and other living organisms

Natural Resources and Environmental Quality

B.12.10 Identify and evaluate multiple uses of natural resources* and how society* is influenced by the availability of these resources

B.12.11 Assess how changes in the availability and use of natural resources* (especially water and energy* sources) will affect society and human activities; such as, transportation, agricultural systems, manufacturing

B.12.12 Evaluate the environmental and societal costs and benefits of allocating resources in various ways and identify management strategies to maintain economic and environmental sustainability* (*see SC Earth and Space Science*)

B.12.13 Analyze how different political and governmental systems manage resource development, distribution, consumption, and waste* disposal (*see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility*)

B.12.14 Investigate how technological development has influenced human relationships and understanding of the environment

B.12.15 Describe changes* in the rates of human population growth in various societies and the factors associated with those changes* related to economic and environmental sustainability*

B.12.16 Analyze how natural resource* ownership and trade influences relationships in local, national, and global economies (*see SS The Behavioral Sciences: Individuals, Institutions, and Society*)

B.12.17 Explain the concept of exported/imported pollution;* e.g., smokestacks, watersheds, and weather systems

B.12.18 Analyze cause and effect relationships of pollutants and other environmental changes* on human health

B.12.19 Illustrate how environmental quality affects the economic well-being of a community

B.12.20 Debate the risks of producing pollutants

B.12.21 Research the roles of various careers related to natural resource* management and other environmental fields (*see SC Applications*)

B.12.22 Research individuals who have made important contributions to the field of resource management (*see SC Nature of Science*)

C. ENVIRONMENTAL ISSUE INVESTIGATION SKILLS

Content Standard
Students in Wisconsin will be able to identify, investigate, and evaluate environmental problems and issues.

Rationale:

Solving environmental problems and issues requires skills in environmental investigations. These skills, in turn, provide students with opportunities to apply and improve their capacity for systems thinking and their understanding of a sustainable world and society. Focusing on environmental issues offers students a means of integrating their knowledge of human and environmental systems and a way of finding personal relevance in that knowledge.

PERFORMANCE STANDARDS

By the end of grade 12 students will:

C.12.1 Compare the effects of natural and human-caused activities that either contribute to or challenge an ecologically and economically sustainable* environment (*see SC Nature of Science*)

C.12.2 Explain the factors that contribute to the development of individual and societal values* (*see SS The Behavioral Sciences: Individuals, Institutions, and Society*)

C.12.3 Maintain a historical perspective when researching environmental issues;* include past, present, and future considerations (*see SC Connections*)

C.12.4 Identify the strengths and weaknesses of different approaches to investigating an environmental issue* and identify some of the assumptions for each approach

D. DECISION AND ACTION SKILLS

Content Standard
Students in Wisconsin will use findings from environmental issue investigations to develop decision-making skills, and to gain experience in citizen action skills.

Rationale:

Students need decision-making and action skills to contribute toward environmental sustainability. In addition, these skills enable them to analyze the effectiveness of individual versus group action, develop issue-resolution plans that incorporate one or more citizen participation skills, and consider these plans in terms of social, cultural, and ecological consequences and implications.

PERFORMANCE STANDARDS

By the end of grade 12 students will:

D.12.1 Identify a variety of approaches to environmental issues,* evaluate the consequences of each, and select and defend a position

D.12.2 Evaluate reasons for participation or nonparticipation in an environmental activity in the home, school, or community

D.12.3 Describe the range of political and legal options available to resolve an environmental problem;* state for each the costs, benefits, and limitations of effectiveness in practice; and select and defend the best option (see SS Economics: Production, Distribution, Exchange, Consumption)

D.12.4 Describe the rights and responsibilities of citizenship in regard to environmental problems* and issues* (see LA Oral Language)

D.12.5 Develop a plan to maintain or improve some part of the local or regional environment, and enlist support for the implementation of that plan (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility; SC Nature of Science)

D.12.6 Identify and analyze examples of the impact beliefs* and values* have on environmental decisions

D.12.7 Analyze political, educational, economic, and governmental influences on environmental issues,* and identify the role of citizens* in policy formation (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)

D.12.8 Use cost-benefit analysis to evaluate proposals to improve environmental quality

D.12.9 Describe the regulatory and economic approaches to improving the environment and explain the advantages and disadvantages of each

E. PERSONAL AND CIVIC RESPONSIBILITY

Content Standard
Students in Wisconsin will develop an understanding and commitment to environmental stewardship.

Rationale:

Environmentally literate students recognize how their individual behaviors affect the environment. They have the knowledge, skills, and confidence to act on their own about what should be done to maintain an economically and ecologically sustainable environment. They will recognize that their participation in activities can lead to resolution of environmental challenges.

PERFORMANCE STANDARDS

By the end of grade 12 students will:

E.12.1 Articulate their personal beliefs* regarding their relationship to the environment (see LA Oral Language)

E.12.2 Write a plan of action based on personal goals of stewardship* for an economically and ecologically sustainable* environment

E.12.3 Take action in regard to environmental issues* in the home, school, or communities

Glossary of Terms

Audience Appropriate. Materials, ideas, language, etc., being used or presented at a level of understanding.

Belief. Something accepted as true.

Citizen. A person entitled by birth or naturalization to the protection of a given state.

Culture. The totality of socially transmitted behavior patterns, arts, beliefs, institutions, and all other products of human work and thought characteristic of a community or population.

Diversity. Physical or biological complexity of a system. Usually a measure of the number of different species in an ecosystem. (Miller)*

Ecosystems. Self-regulating natural community of plants and animals interacting with one another and with their nonliving environment. (Miller)*

Energy. Ability to do work or produce a change by pushing or pulling some form of matter or to cause a heat transfer between two objects at different temperatures. (Miller)*

Ethic. A principle of right or good conduct; the moral quality of a course of action.

Evolution. The process by which a population of a species changes its characteristics over time in response to changes in environmental conditions. (Miller)*

Habitat. The area or type of environment in which an organism or biological population normally lives or occurs.

Hydrologic Cycle. Biogeochemical cycle that moves and recycles water in various forms through the biosphere. (Miller)*

Inquiry. A close examination of some matter in a quest for information or truth.

Investigation. A process of systematic inquiry.

Issue. A point of discussion, debate, or dispute.

Monitor. To scrutinize or check systematically with a view to collecting certain specified categories of data.

Natural Resource. Anything obtained from the physical environment to meet human needs. (Miller)*

Nonpoint Source. Source of pollution in which wastes are not released at one specific, identifiable point but from a number of points that are spread out and difficult to identify and control. (Miller)*

Nonrenewable. Resource that exists in a fixed amount (stock) in various places in the earth's crust and has the potential for renewal only by geological, physical, and chemical processes taking place over hundreds of millions to billions of years. (Miller)*

Point Source. Source of pollution that involves discharge of pollutants from an identifiable point such as a smokestack or sewage treatment plant. (Miller)*

Pollution. A change in the physical, chemical, or biological characteristics of the air, water, or soil that can affect the health, survival, or activities of human beings or other living organisms in a harmful way. (Miller)*

Problem. A question or situation that presents uncertainty, perplexity, or difficulty.

Renewable. Resource that theoretically can last indefinitely without reducing the available supply, either because it is replaced more rapidly through natural processes than are nonrenewable resources or because it is essentially inexhaustible. (Miller)*

Society. A group of human beings broadly distinguished from other groups by mutual interests, participation in characteristic relationships, shared institutions, and a common culture.

Succession. Process in which communities of plant and animal species are replaced in a particular area over time by a series of different and usually more complex communities. (Miller)*

Sustainability. Ability of a system to survive for some specified (finite) time.

Stewardship. The concept of responsible caretaking, based upon the premise that we do not own resources but are managers of resources, and are responsible to future generations for their condition.

Value. A principle, standard, or quality considered worthwhile or desirable.

Waste. Useless, unneeded, discarded, unused or excess material such as ashes, garbage, by-products.

*_Environmental Science: Working with the Earth._ 7th edition. G. Tyler Miller, Jr. Wadsworth Publishing Co. c1999.