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The GreenPrint: Nevada's Environmental Literacy Plan, Part 1

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The GreenPrint

Nevada's Environmental Literacy Plan, Part 1



THE GREENPRINT

NEVADA'S ENVIRONMENTAL LITERACY PLAN

Executive Summary – GreenPrint for Schools

President Obama's "Blueprint for Reform" includes environmental education in part because research has demonstrated significant benefits from environmental education, including impacting student test scores in science, reading, math, and social studies. Additionally, studies have shown that environmental education can reduce discipline problems, increase attendance, and develop leadership and other social skills. Other important benefits include increased engagement, motivation, and enthusiasm for learning. The National Science Board of the National Science Foundation recognizes the importance of environmental education to student learning in their 2000 report, [Environmental Science and Engineering for the 21st Century](#).

The need for environmental literacy arises from the growing complexity of environmental and social issues facing our nation today. Addressing these issues is important to sustain healthy communities, schools, and individuals, which requires a high level of knowledge, skills, and motivation. Creating an environmentally literate citizenry requires a concerted systematic approach to environmental education. This approach is detailed in **The GreenPrint: Nevada's Environmental Literacy Plan for Schools**.

The pursuit of Environmental Literacy is gaining national momentum. Organizations and agencies, including the National Science Foundation, the Environmental Protection Agency, the National Park Service, and the US Department of Education, have proclaimed their support for Environmental Literacy in a variety of ways. As a result of this momentum, Congressman John Sarbanes of Maryland and Senator Jack Reed of Rhode Island have introduced legislation that strengthens and expands environmental education in America's classrooms and reconnects children with nature. These bills, each titled the No Child Left Inside Act of 2007 (NCLI), were introduced in the House (H.R.3036) and the Senate (S.1981).

The framework for the Nevada **GreenPrint** is driven by No Child Left Inside funding requirements. The **GreenPrint** details how Nevada will boost student knowledge across subject areas and connect students to communities through a variety of experiences.

The Nevada GreenPrint Environmental Literacy Plan for Schools recommends the integration of Nevada State Environmental Literacy Core Concepts into NV State Standards of Science, Health, and Social Studies. These Core Concepts and their Benchmarks will ensure students the ability to begin their journey toward Environmental Literacy.

Through this plan, existing courses and tests will be refined and strengthened to ensure academic achievement and foster Environmental Literacy. Associated professional development will give administrators, teachers, and pre-service educator's opportunities to establish and demonstrate their understanding of environmental literacy. The **GreenPrint** also addresses methods to measure students' environmental literacy level, both through coursework and experiences outside the classroom. These experiences will be held to rigorous standards, designed to promote and assess environmental literacy.

Key Recommendations for the State of Nevada

1. Adopt and distribute Environmental Literacy Core Concepts and Benchmarks
2. Professional Development for implementation of the Nevada **GreenPrint** For Schools
3. Refine, strengthen, and/or develop High School Environmental Science Course to integrate environmental literacy
4. Support opportunities for education beyond the classroom

To be eligible for funding through the pending No Child Left Inside legislation, the Nevada Department of Education must adopt and distribute the Nevada **GreenPrint** and initiate the implementation plan.

The success of the Nevada **GreenPrint** depends on state-wide support and collaboration. Beginning in 2007, a diverse planning team, headed by Dr. Richard Vineyard (NV Dept. of Education) and Jonathan Mueller (Sierra Nevada Journeys) was created to develop the **GreenPrint**, including representatives from:

- Nevada Department of Education, Office of Assessment, Program Accountability, & Curriculum
- Clark County School District, Division of Curriculum and Professional Development
- Washoe County School District and Regional Center for Teaching and Learning
- Lyon County School District
- Southern Nevada Regional Professional Development Program
- Northwest Regional Professional Development Program
- Sierra Nevada Journeys
- The University of Nevada, Las Vegas Public Lands Institute
- University of Nevada, Reno
- Nevada State College
- Southern Nevada Agency Partnership, including the National Park Service, Bureau of Land Management, US Fish and Wildlife Service, and USDA Forest Service
- Nevada Division of Environmental Protection

Contributions to the Nevada **GreenPrint** have been obtained from an even wider pool consisting of hundreds of stakeholders from federal and state agencies, organizations, and businesses from across the

state. Feedback has been solicited through summits, meetings, on-line review, and state-wide conferences.

THE GREENPRINT

NEVADA'S ENVIRONMENTAL LITERACY PLAN

Purpose of the GreenPrint

The purpose of the Nevada GreenPrint is to provide a comprehensive framework for Nevada's educational system to ensure the youth in our state have experiences allowing them to connect with nature and the opportunity to develop the knowledge and skills necessary to become informed and responsible stewards of our environment with the ability to address complex environmental issues that face us now and in the future.



Why is the GreenPrint Important?

The pursuit of Environmental Literacy is gaining national momentum. Organizations and agencies, including the National Science Foundation, the Environmental Protection Agency, the National Park Service, and the US Department of Education, have proclaimed their support for Environmental Literacy in a variety of ways. As a result of this momentum, Congressman John Sarbanes of Maryland and Senator Jack Reed of Rhode Island have introduced legislation that strengthens and expands environmental education in America's classrooms and reconnects children with nature. These bills, each titled the No Child Left Inside Act of 2007 (NCLI), were introduced in the House (H.R.3036) and the Senate (S.1981).

The local impacts of climate change, natural resource consumption, and air and water quality will be challenges our youth will inherit. Strong Nevada communities will rely on future leaders that skilled in problem solving, collaboration and critical thinking. Environmental Literacy will provide a pathway to this future through an understanding of the interconnectedness and mutual dependence of community, economy, and the environment.

Through the GreenPrint for Schools, environmental education will provide a pathway to student achievement, academic success, and motivated learners.

Vision

Nevada's GreenPrint describes what an environmentally literate person should know and do. The GreenPrint will guide Nevada's educational providers in fostering environmental literacy.



The GreenPrint will include two parts:

1. GREENPRINT FOR SCHOOLS

This plan will formalize environmental education in Nevada's public schools.

2. GREENPRINT FOR COMMUNITIES

This plan will bring together educational providers, community organizations, businesses, and families in pursuit of environmental literacy.

After careful review by stakeholders across the state, The GreenPrint for Schools will serve to provide the framework for Nevada school systems to expand and improve their environmental education programs. Recommendations outlined in the GreenPrint are such that no extra mandates are placed on an already burdened educational system. The recommendations will support and strengthen core content and help achieve academic success. Students will become more fully engaged in learning about Nevada and our resources, while gaining an even more global perspective of the environmental concerns facing us. Educators across our state -- formal and nonformal, preservice and inservice -- will work collaboratively to provide opportunities for youth to learn and explore in the natural world.

A community-based Environmental Literacy Council will oversee the implementation of the GreenPrint. The Council will be comprised of a diverse representation of Nevadans from both private and public sectors. The Council will provide guidance on educational efforts and strategic direction.

The process for creating GreenPrint for Communities will be proposed Spring 2010. It will complement The GreenPrint for Schools, sharing the Core Concepts and the environmental education approaches supported in this document. It will include strategies for involving businesses, community leaders, non-profit organizations, and government agencies in creating community-oriented solutions to increasing environmental literacy.

Elements of The GreenPrint for Schools

In compliance with the requirements of the No Child Left Inside Act, to ensure Nevada's eligibility for funding which may come available for outdoor learning activities and high-quality environmental education, and in following the guidance of the North American Association for Environmental Education' best practice for developing a state environmental literacy plan, the following elements are addressed in the GreenPrint:

1. Specific content standards, content areas, and courses or subjects where instruction will take place.
2. A description of how state high school graduation requirements will ensure that graduates are environmentally literate.
3. A description of programs for professional development of teachers to improve their environmental content knowledge, skill in teaching about environmental issues, and field-based pedagogical skills.
4. A description of how the state education agency will measure the environmental literacy of students.
5. A description of how the state education agency will implement the plan, including securing funding and other necessary support.



THE GREENPRINT FOR SCHOOLS

NEVADA'S ENVIRONMENTAL LITERACY PLAN

◆PART 1◆

The goal of environmental education is to foster and support learning that positively transforms how we think, make decisions, and lead our lives. The future depends on our collective ability to apply an integrated approach to teaching and helping students understand the inter-dependent elements of sustainable environmental systems from ecological, economic, and community perspectives.

Environmental literacy describes how we think, make decisions, and lead our lives.

Environmental Literacy is the capacity to perceive, understand and interpret environmental systems and to take appropriate action to maintain, restore, or improve the health of those interconnected systems.

1. SPECIFIC CONTENT STANDARDS, CONTENT AREAS, AND COURSES OR SUBJECTS WHERE INSTRUCTION WILL TAKE PLACE.

The specific content standards, content areas, and subjects where instruction will take place are embedded in the Nevada State Environmental Literacy Core Concepts (listed below). These Core Concepts provide a coherent articulation of the broad content and experience needs to develop an environmentally literate citizenry.

ENVIRONMENTAL LITERACY CORE CONCEPTS:

- A. All Life on Earth exists within an ecosystem
- B. Human beings are an integral part of all ecosystems.
- C. Healthy ecosystems provide many essential services and benefits that sustain and improve human lives.

- D. The human experience requires a connection to nature. These experiences in natural places in our community enrich our lives and inspire our choices for future generations.
- E. Human beings are responsible for dramatic changes to ecosystems at a rate unprecedented in Earth's history.
- F. We have a responsibility to care for the Earth, to leave healthy ecosystems for our families and future generations.

The Environmental Literacy Core Concepts are further described by benchmarks (see Appendix I). These benchmarks are directly and indirectly related to Nevada State Education Standards, including Science, Health, and Social Studies. Effective environmental education will therefore be integrated across all content areas through these Core Concepts. Both Formal and Non-formal education providers will support this interconnected model.

Mastery of these Environmental Literacy Core Concepts will take time. The GreenPrint therefore describes three levels of achievement that represent depth of understanding and action. These three stages of mastery are: Emergent, Functional, and Operational (described in Appendix II).

2. A DESCRIPTION OF HOW STATE HIGH SCHOOL GRADUATION REQUIREMENTS WILL ENSURE THAT GRADUATES ARE ENVIRONMENTALLY LITERATE.

There are four essential components of environmental literacy: knowledge, skills, affect, and behavior. Students will work toward environmental literacy through a variety of experiences, including classes, field trips, service learning, and other delivery methods.

Nevada's legislature passed a law in 2007 mandating that every high school student take three science credits. This provides a unique opportunity to provide 'capstone' classes for high school students that can both contribute to graduation requirements and to environmental literacy. The GreenPrint recommends that the State Education Board assign an "Environmental Science" synthesis class to fulfill one of these credits.



Individual school districts will be provided with learning objectives and standards (based on the Environmental Literacy Core Concepts) that will need to be met through the recommended Environmental Science Class. Each school district will have the freedom to design this interdisciplinary course to suit their needs, based on environmental literacy learning objectives and testing standards.

Student's depth of knowledge will be assessed through an existing 'end-of-course' assessment. Results from these end-of-course proficiency exams would be published in the Nevada Report Card and will serve as a metric for students' environmental literacy statewide.

Measurements relating to the other essential components of environmental literacy – affect, skills, and behavior – are described in Section 4.

The expectation is that students will be environmentally literate at the 'Functional' level by the time they graduate from high school (as described in Appendix II).

3. A DESCRIPTION OF PROGRAMS FOR PROFESSIONAL DEVELOPMENT OF TEACHERS TO IMPROVE THEIR ENVIRONMENTAL CONTENT KNOWLEDGE, SKILL IN TEACHING ABOUT ENVIRONMENTAL ISSUES, AND FIELD-BASED PEDAGOGICAL SKILLS.



Educators should be provided with an instructional system that helps them to establish their understanding of environmental literacy and affords them the structure with which to plan and implement instruction to foster environmental literacy.

Professional development opportunities will be provided through a variety of venues, including: formal courses (including graduate and undergraduate); school-site trainings; evening and weekend workshops; symposiums; retreats; and conferences. Formal and non-formal education providers will work together to ensure quality professional development opportunities are created.

Nevada currently provides a variety of opportunities for educators to enhance their knowledge and skills in the fundamental characteristics and goals of environmental education. For example, many of the Environmental Literacy Core Concepts are addressed, but tend to happen in isolation of one another and solely as science instruction. There is a need to expand these opportunities so that all six core concepts are addressed in a more interconnected, coordinated way. Professional development opportunities should emphasize pedagogical approaches, content, and/or strategies; opportunities should also be convenient, affordable, and of high quality.

PROFESSIONAL DEVELOPMENT PROGRAMS

Pre-service Educators

The colleges and universities in Nevada will be urged to incorporate one or more of the following in their pre-service programs:

1. Units in science methods courses that present the Nevada Environmental Literacy Core Concepts and their application for classroom education. Due to the interdisciplinary nature of the Core Concepts, complementary units in other methods courses should also be considered.
2. An Environmental Literacy course in the elementary and secondary education course requirements that would include: the knowledge and skills necessary to use the environment as an integrating context; the strategies necessary for education about the environment; and the skills necessary to teach using Service Learning strategies.
3. An environmental education minor or supplemental certification program or endorsement, with the appropriate number of credits earned by taking a variety of environmental studies and environmental education courses.
4. An environmental education major, with students completing a combination of environmental studies and environmental education courses, in addition to required core course work for education majors. The Standards of Best Practices for Nevada

Environmental Education and Interpretation Professionals (Appendix III) should be used as a guide for this coursework.

5. Early childhood programs will be encouraged to incorporate age-appropriate environmental education strategies, including the strategies necessary to use the outdoors as a classroom.

In-Service Educators

1. PreK-8 certified educators should be required to earn a minimum of 2 credits, either NDOE renewal credits or college credits, with an environmental education theme during their next recertification period.
2. School Districts will be encouraged to support professional development opportunities with an environmental education theme, and may partner with non-formal education institutions to provide these opportunities.
3. Regional and district professional development trainers, non-profits, colleges and universities, and non-formal education institutions will be encouraged to provide and support opportunities for formal educators to gain knowledge and resources needed for gaining skills in teaching environmental education, as well as strategies for teaching in the outdoors, experiential learning, and service learning opportunities for their students.
4. Elementary schools will be urged to schedule professional development opportunities with an environmental education theme.
5. Middle schools will be urged to offer professional development opportunities that provide strategies for incorporating environmental education into interdisciplinary, thematic units.
6. High schools will be urged to schedule professional development opportunities that provide secondary teachers the skills, knowledge and resources needed to incorporate the study of environmental issues in a variety of disciplines.
7. Job shadowing opportunities in areas such as sustainability, green jobs, conservation, ecology, environmental protection, and outdoor education, will be encouraged for teachers. This will serve to enhance their knowledge of career pathways as well as their own personal environmental literacy.
8. Departments in colleges and universities will be encouraged to evaluate and offer academic major degrees that build upon environmental literacy.

School Administrators

Principals and other administrators will be expected to participate in workshops that will enhance their knowledge and understanding of the Environmental Literacy Core Concepts and their application with respect to classroom teaching. Their EL training should focus on being able to provide support to their teachers in developing and delivering curricula.

Non-Formal Educators

Non-formal educators will be expected to participate in workshops that will enhance their knowledge and understanding of the Environmental Literacy Core Concepts and how they relate to the Nevada State Standards, instructional planning and delivery strategies for diverse audiences, and partnership opportunities with schools to advance environmental literacy in Nevada. This may include, but is not exclusive to the Environmental Education and Interpretation Certification program(s) offered in the State.

EDUCATOR PROFICIENCIES

After completion of pre-service coursework and/or in-service professional development options, Nevada educators will have improved their environmental literacy, skill in teaching about environmental issues, and field-based pedagogical skills.

In an effort to best meet the needs of Nevada's educators, the following proficiencies have been identified as key recommendations.

1. Understanding of the GreenPrint's Core Concepts, benchmarks and levels of achievement, and how they complement, enhance, and focus an interdisciplinary model for instruction.
2. Mastery of environmental literacy at the Functional level.
3. Awareness of local, state, and federal resources, agencies, and non-formal education institutions and their contributions in Nevada as they relate to environmental literacy, and the ability to access these resources to enhance the educational experience for Nevada's students.
4. Knowledge of local ecology (flora, fauna, ecosystems, geology) and the opportunities within Nevada related to environmental literacy.
5. Action skills to address a variety of environmental issues important to Nevada.

INSTRUCTION MODEL

Achieving Functional mastery of the Environmental Literacy Core Concepts will require integration of the Concepts into a variety of disciplines. In order to successfully accomplish this goal, educators need a comprehensive dynamic instructional model. It is suggested that the Science, Technology and Society curricular model be augmented for this task. James, Robinson and Powell modified the model in 1994 to address the point that interconnected topics should not be examined in isolation. The proposed 6-Rings of Environmentally Active Learning (6-REAL) model utilizes a center concept or fundamental idea as a focus for study. After the focus for study is determined, the focus concept is studied through the lens of each of six sub-foci, providing different perspectives of the focus concept. The sub-foci lenses might include: economics, society, environment (physical setting), science, ethics, technology, self, and/or Culture (i.e., art, literature, history).

The 6-REAL instructional model provides a framework for both teachers and students to learn about the interrelationships, and often inter-dependence, between many of the complex and dynamic issues involved in environmental education. Each of the benchmarks for the Environmental Literacy Core Concepts (Appendix I) should be viewed as the focus concept for the 6-REAL model.

4. A DESCRIPTION OF HOW THE STATE EDUCATION AGENCY WILL MEASURE THE ENVIRONMENTAL LITERACY OF STUDENTS.



Students' environmental literacy will be measured based on (1) specific knowledge they've gained and (2) on the affect/skills/behavior developed in conjunction with that knowledge. To truly measure a student's level of environmental literacy, it is therefore necessary to use a multi-layered measurement system that is integrated across experiences where possible.

This measurement system must take into account the variety of experiences that each student will

have on their journey to environmental literacy, both through Formal and Non-formal education.

Non-formal education providers will partner with school districts to provide experiences to students in K-8. The location and type of experience will vary tremendously, from a single three-hour field trip at a museum, to a multi-day field study experience, to an entire course utilizing service-learning.

Non-formal educational providers are expected to follow the Standards of Best Practices for Nevada Environmental Education & Interpretation Professionals (Appendix III). These Standards will promote a standardized quality of experiences designed to foster environmental literacy. Importantly, the Standards of Best Practices include the use of authentic assessments to both ensure experiences meet stated objectives and to determine whether participants gain the knowledge and skills needed to become environmentally literate.

The number of students who participate in Non-formal learning experiences will be reported through the Nevada Report Card.

KNOWLEDGE



The Environmental Literacy Core Concepts will be built into future revisions of the K-8 Nevada Educational Standards. It is recommended that the Environmental Literacy Core Concepts and Benchmarks that relate to science be incorporated as a new ‘Unifying Concept C’ in Science. Standards relevant to other disciplines (health, reading, math, social studies, etc.) will be incorporated into those standards as they are updated per the schedule outlined by the Nevada Department of Education. It will also be important to incorporate “indicator guidelines” to show cross-curricular

connections between the disciplines.

The standards themselves – including these connections – will be regarded as interim steps within a road-map across grades and disciplines to articulate way-points on the road to students’ environmental literacy. Teachers will become actively responsible for making

these connections. Therefore, the professional development programs described previously must be geared to instructing teachers in making these cross-disciplinary connections. Note that it will become more challenging as disciplines get increasingly segregated in the higher grades (7-12).

For reporting and accountability purposes, the Nevada Report Card currently captures testing data for the state. With incorporation of new standards, data about knowledge of environmental literacy concepts will automatically be captured through examination of specific questions related to Environmental Literacy Core Concepts.

AFFECT, SKILLS, BEHAVIOR

Measuring students' Environmental Literacy as it relates to their affect (i.e. feelings), demonstrated skills, and behavior is difficult to capture through standardized testing or other commonly used assessments.

Though it is more difficult to measure community-wide success, it will be possible to examine a variety of key indicators that will serve as a proxy for an environmentally literate citizenry. Such indicators could include, but are not limited to: participation in nature-related organizations, sustainability-themed programs, outdoor recreation visitor days, and other metrics.



In Formal-education classrooms, students will build a portfolio of the work they've done based on experiences they've had, including those in partnership with non-formal educational organizations. Portfolios will be evaluated using a standardized rubric to determine how well the students have developed the affect, skills, and behaviors that signify environmental literacy.

To measure learning related to the remaining three essential components – affect, skills, behavior – students will build a portfolio of the work they've done related to environmental literacy. Teachers will assess that portfolio to determine how well the students have developed the affect, skills, and behaviors that signify environmental literacy. The

expectation is that – through the High School Environmental Studies class and through their work in K-8 – students will be environmentally literate at the ‘Functional’ level by the time they graduate from high school.

5. A DESCRIPTION OF HOW THE STATE EDUCATION AGENCY WILL IMPLEMENT THE PLAN, INCLUDING SECURING FUNDING AND OTHER NECESSARY SUPPORT.

In order for the Nevada Environmental Literacy Plan to be effectively implemented, several conditions must be satisfied. The plan must be adopted, properly funded, communicated, implemented and assessed. The demands of these needs call for the development of an oversight council and a coordinator with the authority to actively and dynamically harmonize the components.

ADOPTION

A statewide Environmental Literacy Coordinator position should be established, along with an Environmental Literacy Council that operates on a statewide basis.

The Environmental Literacy Council should function to provide oversight, guidance, and make recommendations to the Nevada Environmental Literacy Coordinator. The Council should be responsible for filling the Coordinator position.

The Council will provide advice on educational efforts and strategic direction and informs the Coordinator on trends in education, government, business and the non-formal education sector. The Council should be comprised of a diverse representation of Nevadans from the academic, business, cultural arts, non-profit agencies, government, and community members.

The Environmental Literacy Coordinator should work closely with Council members to determine how he/she can effectively provide direction, recommendations, programs, resources, and materials that improve academic achievement and increase environmental literacy among the state's students.

The Environmental Literacy Coordinator will be responsible for raising and dispersing funds, coordinating professional development opportunities, and developing and implementing an Environmental Literacy communication plan.

FUNDING

The Environmental Literacy Coordinator will seek and secure funding from a variety of sources, such as Title II, Title V, IDEA, EPA Environmental Education program, STEM, state wildlife agencies, foundations, federal programs, and pending No Child Left Inside legislation.

The Environmental Literacy Coordinator will establish a competitive grant program that will allow agencies, organizations, and individual citizens the opportunity to provide and fund environmentally focused educational programs and services that meet the Environmental Literacy Core Concepts.

This should include providing grant workshops for PD trainers and Non-formal providers, as well as establishing grant criteria framework to define the types of programs that should be funded, at what level, and the standards necessary to qualify for the grant. Fundable programs may include:

- Internships
- Site-based education opportunities, including field trips
- Outreach programs
- Extracurricular clubs and activities
- Environmentally motivated organizations and projects

COMMUNICATION

To be successful, the GreenPrint Plan must be understood and supported at a variety of levels. Therefore, creating and implementing a communication plan will be an important function for the Environmental Literacy Coordinator. This communication plan should be designed for all levels of citizens, agencies, and government.

It will be important to also give periodic updates through a variety of reporting methods to the:

- State Board of Education
- Legislatures
- Government agencies such as Parks & Recreation, Wildlife, school districts, etc.
- Non-formal education providers

INTEGRATION OF THE PLAN

The Environmental Literacy Coordinator will work with Nevada Department of Education Coordinators to discuss the implementation and integration of the Environmental Literacy Core Concepts throughout all disciplines and grade levels of the Nevada Education Standards.

The Environmental Literacy Coordinator will also be tasked with providing services to formal and non-formal education providers, including:

- Professional development based on the implementation and integration of the Core Concepts and Benchmarks of the Nevada Environmental Literacy Plan.
- Grants will be available to fund Environmental Literacy experiences for students, including service learning; grant-writing workshops will provide teachers and other educators with the knowledge and skills to apply for the Environmental Literacy competitive grants.
- Professional development in assessment of Environmental Literacy.

EVALUATION OF THE SUCCESS OF THE PLAN

- a. Establishment of a grant review and evaluation process to govern extended funding on an annual basis.
- b. Presentations at conferences at state, regional, and national levels to discuss the success and challenges of programs and develop new ideas for furthering environmental literacy in Nevada.

APPENDIX I

CORE CONCEPTS WITH BENCHMARKS

Core Concepts (adapted with permission from the *American Zoo and Aquarium's Conservation Education Message*) are revealed through their benchmarks. The benchmarks incorporate the following essential components of environmental literacy:

- Knowledge
- Affect (Feelings)
- Skill
- Behavior/Actions

A. ALL LIFE ON EARTH EXISTS WITHIN AN ECOSYSTEM.

1. Ecosystems are made of interdependent relationships between groups of living things (biodiversity) and their physical environment.
2. An impact on any element of an ecosystem has consequences throughout that ecosystem (and potentially others).

B. HUMAN BEINGS ARE AN INTEGRAL PART OF ALL ECOSYSTEMS.

1. Human activities within ecosystems affect these systems.
2. Ecosystems can affect human decisions and activities.

C. HEALTHY ECOSYSTEMS PROVIDE MANY ESSENTIAL SERVICES AND BENEFITS THAT SUSTAIN AND IMPROVE HUMAN LIVES.

1. Natural systems maintain a habitable planet by regulating climate and by cycling water, oxygen and carbon dioxide and soil nutrients.
2. Natural systems provide human beings with essential services (ecosystem services) that sustain life on Earth: fresh air, clean water, energy, mineral resources, soil, and oceans that can produce food.
3. People depend on thousands of plants and animals to live their daily lives.
4. Biological diversity provides a multitude of natural resources used commercially for food, shelter, fiber, medicines, and other products.
5. Healthy ecosystems underpin healthy human economics. Many jobs depend directly on protecting natural ecosystems (recreation, farming, utilities).

6. Healthy communities and the people that live there are sustained by healthy ecosystems. Natural places nourish human's mental and physical health.

D. THE HUMAN EXPERIENCE REQUIRES A CONNECTION TO NATURE. THESE EXPERIENCES IN NATURAL PLACES IN OUR COMMUNITY ENRICH OUR LIVES AND INSPIRE OUR CHOICES FOR FUTURE GENERATIONS.

1. For all human beings, nature is a place to renew the human spirit and refresh our emotional and mental health.
2. The beauty and resources of the natural and cultural world are global treasures. They help define America's national heritage and character, and provide the nation with valuable and irreplaceable natural resources.
3. Nevada's natural world provides wondrous places to play and recreate, to explore, to be creative, to learn and enjoy both as individuals and with our friends and families.

E. HUMAN BEINGS ARE RESPONSIBLE FOR DRAMATIC CHANGES TO ECOSYSTEMS AT A RATE UNPRECEDENTED IN EARTH'S HISTORY

1. The growth of the human population coupled with the increased consumption of resources by individuals will increasingly impact the planet's finite resources.
2. Human threats to Nevada's environment include global climate change, invasive species, habitat destruction, water, and air quality.

F. WE HAVE THE RESPONSIBILITY TO CARE FOR THE EARTH, TO LEAVE HEALTHY ECOSYSTEMS FOR OUR FAMILIES AND FUTURE GENERATIONS

1. Human solutions to environmental challenges include sustainability initiatives that minimize our impact, such as use of alternative energy sources, public transportation, recycling, green architecture, and responsible water use.
2. Nevadan's strive for a personal commitment to help ensure environmental quality and quality of life through actions such as:
 - Making appropriate lifestyle decisions
 - Actively participating in public decisions
 - Sharing our knowledge and feelings about the natural world

- Support local environmental organizations
 - Practice and promote stewardship and responsible use
3. Nevadan's are informed and consider multiple points of view.
 4. Nevadan's have understanding of their local environment, including where their water comes from, natural features, and local environmental issues.



APPENDIX II

LEVELS OF ACHIEVEMENT OF ENVIRONMENTAL LITERACY

Measuring the Environmental Literacy of an Individual:

- I. **Emergent**: At this stage of environmental literacy, a person is able to recognize many of the basic terms in the core concepts and are developing a rationale for their participation in environmental actions. They have an unsophisticated knowledge of the basic components of systems within and affecting the environment. At the emergent level, a person is developing an awareness of and sensitivity toward the environment, and has a concern for human impacts on the environment. Environmental actions that are taken are not necessarily based on knowledge and understanding of the environment.
- II. **Functional**: At this level, there is a broader knowledge and understanding of the core concepts. They possess the basic ability to analyze, synthesize, and evaluate the negative and positive **interactions** among systems and predict possible outcomes. This person evaluates a selected issue on the basis of evidence *and* personal values. They have the self-efficacy to act and are motivated by the results.
- III. **Operational**: At this highest level, a person has moved beyond functional environmental literacy in both the breadth and depth of understandings and skills. This person routinely evaluates the impacts and consequences of actions; gathers and synthesizes pertinent information, chooses among alternatives, and takes and advocates actions that work to sustain or enhance a health environment. They understand the cause and affect relationships between systems and thus seek solutions to possible environmental issues by taking preemptive action.

APPENDIX III

STANDARDS OF BEST PRACTICES FOR NEVADA ENVIRONMENTAL EDUCATION & INTERPRETATION PROFESSIONALS

The *Standards of Best Practices for Nevada Environmental Education & Interpretation (NEE&I) Professionals* was developed in coordination with the Nevada State Certification Program for Environmental Education & Interpretation.

Introduction

This document provides guidelines about the knowledge and skills needed to provide effective Environmental Education and Interpretation (EE&I) experiences in the state of Nevada. Effective experiences not only further the mission of the organization but also inspire understanding, appreciation, and stewardship of Southern Nevada's environment.

Standards of Best Practices for Nevada Environmental Education & Interpretation (NEE&I) Professionals is a guide for providers working at public lands, nature centers, museums, zoos, aquaria, schools, and all nature and heritage-rich places. It is designed to help NEE&I providers develop and implement the highest quality experiences for all possible audiences. It is a tool for NEE&I providers to use as they develop new experiences, deliver programs, or evaluate the effectiveness of the experience. Because EE&I experiences come in many forms, not every part of this document will apply to every EE&I experience.

Best Practices are best understood in the context of an organizational hierarchy. For the purposes of this document, the categories of this hierarchy are:

Theme

→ Strands

→ Best Practices

Standards of Best Practices for NEE&I Professionals is organized into five Themes:

- ◆ Environmental Literacy
- ◆ Foundations of EE&I
- ◆ Responsibilities of an EE&I Professional
- ◆ Planning, Implementing, and Fostering Learning
- ◆ Learner Assessment

◆ THEME: ENVIRONMENTAL LITERACY

Overview

Nevada EE&I Professionals should be environmentally literate. This means having the ability to question, investigate, and analyze; knowledge of environmental processes and human systems; an understanding of environmental issues; and the ability and motivation to practice environmental decision-making.

❖ Strand: How We Learn

Learning and instruction are closely linked. NEE&I Professionals are competent in effective ways of gaining and applying knowledge.

Best Practices:

- ☒ Use appropriate questioning and analysis skills to gain knowledge.
- ☒ Design and carry out investigations, using appropriate tools to gather, analyze, and interpret data.
- ☒ Understand what science is, what science is not, and how this applies to the practice of EE&I.

❖ Strand: Ecological Systems, Social Systems, and Their Influences

NEE&I Professionals synthesize knowledge across disciplines, especially in the natural and social sciences, to understand the processes and systems that comprise the environment.

Best Practices

- ☒ Understand the interrelationships of human societies and ecosystems.
- ☒ Understand that these interrelationships happen on different scales.

❖ Strand: Understanding and Addressing Environmental Issues

NEE&I Professionals have the abilities to learn about, evaluate, and act on environmental issues.

Best Practices

- ☑ Address environmental issues using questioning skills, analysis skills, and content knowledge. (Environmental issues are those that are caused by anthropogenic effects on the natural environment.)
- ☑ Identify and evaluate alternate solutions and courses of action, using creativity, flexibility, and openness to other viewpoints.
- ☑ Identify and investigate environmental issues on different scales, and relate to place.
- ☑ Understand environmental justice “do no harm” philosophy and how it applies to the equitable application of laws and benefits across socio-economic boundaries.

❖ Strand: Personal and Civic Responsibility

Environmental literacy is activated by individual commitment.

Best Practices

- ☑ Recognize that personal actions can have broad environmental consequences.
- ☑ Understand the role and influence of political institutions and the media.
- ☑ Analyze shared and culturally conflicting values.
- ☑ Understand EE&I’s focus on environmental literacy and citizenship and how EE&I provides opportunities for learners to develop critical thinking and action skills.

◆ THEME: FOUNDATIONS OF EE&I

Overview

Having knowledge of the goals, theory, practice, and history of the fields of EE&I provides a solid foundation for developing a philosophy for individual practice.

❖ Strand: Different Methods of Education about the Environment

NEE&I Professionals understand EE&I as distinct fields and know their defining characteristics and goals.

Best Practices

- ☑ Define environmental education, interpretation, and other terms and practices used to describe education about the environment.
- ☑ Understand the broad outlook that EE&I takes of the “environment,” incorporating concepts such as systems, interdependence, and interactions among humans, other living organisms, the physical environment, and the built or designed environment.
- ☑ Understand the interdisciplinary nature of EE&I and how each practice draws on and integrates knowledge across academic disciplines.

❖ Strand: Goals, Theory, and Practice of EE&I

Knowledge of the foundations, philosophies, and varied practices of EE&I will allow NEE&I Professionals to develop a philosophy for individual practice.

Best Practices

- ☑ Identify the philosophy, conceptual foundations, and goals of EE&I by examining founding documents of the field.
- ☑ Identify major components of environmental literacy and the relationship to the practices of EE&I.
- ☑ Understand the influences that have contributed to the evolution of these concepts (e.g., work done by C. Roth, H. Hungerford, R. Ben Beyton, R. Wilke, S. Ham, E. Mills, F. Tilden, and others).
- ☑ Describe a variety of national, regional, state and local EE&I programs and support services, including funding sources and resources.
- ☑ Understand local efforts to link and enhance programs through partnerships and other collaborations.

❖ Strand: Historical and Current Perspectives of EE&I

The fields of EE&I have changed over time and continue to change.

Best Practices

- ☑ Understand the educational movements, including place-based education, nature study, outdoor education, conservation education, experiential education, and other programs, that have contributed to the development of EE&I and how they relate to EE&I.

- ☑ Understand how different entities, including the United Nations, schools, state and federal agencies, zoos, museums, and other professional organizations have influenced – or might influence – the manner and form of EE&I.
- ☑ Describe specific findings from EE&I research and discuss their effect on how EE&I is perceived, defined, or practiced.
- ☑ Understand current and emerging issues in the fields of EE&I.

◆ THEME: RESPONSIBILITIES OF AN EE&I PROFESSIONAL

Overview

Practitioners of EE&I should maintain consistent and high standards for instruction and professional conduct. This includes exemplary instructional practice that does not advocate a particular point of view, and an ethic of lifelong learning.

❖ Strand: Expectations of an EE&I Professional

Provide EE&I that is appropriate, constructive, and aligned with the standards of the field.

Best Practices

- ☑ Identify ways in which EE&I can be used as a tool for meeting curriculum standards and addressing education reform goals.
- ☑ Understand the role of partnerships among community members, organizations, agencies, businesses, and educational systems.
- ☑ Practice responsible, respectful, and sensitive behavior during instruction.
- ☑ Model the process of inquiry, experiential learning, and the application of environmental investigations in EE&I programming.
- ☑ Make complex issues understandable and establish relativity to the audience.

❖ Strand: Factual Accuracy and Multiple Points of View

Provide accurate, balanced, and effective experiences while not promoting a particular view about environmental conditions, issues, or actions.

Best Practices

- ☑ Identify deliberate strategies and techniques that encourage participants to explore and discover different perspectives, form their own opinions, and explain their beliefs.
- ☑ Use deliberate techniques for presenting differing viewpoints and theories in a balanced manner.
- ☑ Identify potential sources of bias and conflict.
- ☑ Differentiate among resource materials on the basis of factual accuracy, including primary and secondary sources.
- ☑ Weigh evidence regarding environmental problems based on validity of data (e.g., from scientific societies or reputable journals or reputable websites).

❖ Strand: Ongoing Learning and Professional Development

NEE&I participants are aware of the need to be active learners in their professional lives.

Best Practices

- ☑ Learn and use research and analytical skills to expand existing knowledge about the environment, related issues, EE&I, and instructional methods.
- ☑ Use research and analytical skills to expand existing knowledge about the environment and EE&I.
- ☑ Build relationships with mentors, advisors, and others who will challenge NEE&I professionals to continually expand and upgrade their knowledge and skills.
- ☑ Reflect on and learn from personal practice as an EE&I professional, both individually and with other professionals and colleagues.
- ☑ Seek out opportunities to learn essential content and skills in real-world environmental settings or contexts, especially within local ecosystems.

◆ THEME: PLANNING, IMPLEMENTING, AND FOSTERING

Overview

NEE&I Professionals must combine the fundamentals of effective communication techniques with the unique features of EE&I to design and implement effective learner-centered, experiential learning experiences.

❖ **Strand: Knowledge of Audience**

Tailor instructional approaches to meet the needs of different learners.

Best Practices

- ☑ Identify, select, adapt, and model materials and experiences for program options that are developmentally appropriate and take learning styles into consideration for a designated age or level of knowledge.
- ☑ Identify and understand possible diverse audiences and their needs, including: moral, cognitive, social and physical, perspectives, and appropriate learner outcomes.
- ☑ Recognize and acknowledge the validity of varying cultural perspectives present in the audience. Tailor instructional approaches to appropriately and respectfully respond to these perspectives and use them as a resource.

❖ **Strand: Planning and Delivery of EE&I Experiences**

Employ a range of methods that are particularly suited to EE&I. This includes planning age-appropriate experiences that meet specific goals, and creating a safe and conducive learning environments both indoors and outside. Be familiar with ways of including EE&I in the local school district curriculum.

Best Practices

- ☑ Where appropriate, understand how EE&I experiences meet relevant national, state, and local educational standards for learning performance in specific disciplines. Ability to correlate EE&I experiences with state education standards in a particular discipline or grade level.
- ☑ Demonstrate a concern for audience safety in designing, planning, and implementing instruction, especially experiences that are hands on, or that take place outside the classroom. Attend to the physical layout such that the site is used safely and effectively.

❖ **Strand: Materials, Resources, and Technology**

Access, evaluate, and use a range of materials, resources and technologies.

Best Practices

- ☑ Identify and evaluate materials and resources.
- ☑ Identify informal science and heritage institutions, local businesses, service organizations, government agencies, nonprofit organizations, and others that may participate in and support EE&I experiences.
- ☑ Identify, assess, and use a variety of professional development opportunities.
- ☑ Demonstrate use of a variety of tools of the trade for environmental observation and measurement.
- ☑ Demonstrate how to use technologies to analyze and communicate environmental information.

❖ **Strand: Create the Learning Environment**

Foster an environment that is conducive to learning, including enabling the audience to engage in open inquiry and investigation.

Best Practices

- ☑ Identify and model ways of presenting the natural world or environmental issues in engaging ways.
- ☑ Select among relevant topics and issues based on audience interests to construct knowledge and foster conceptual understanding.
- ☑ Use a variety of instructional methods and strategies appropriate for the content and context based on learning objectives, learner characteristics, time requirements, involvement of community members, community and agency dynamics and policies, available resources, and the instructional setting.
- ☑ Promote lifelong learning and engage the audience in the idea of taking responsibility for their own learning and expectations for achievement.
- ☑ Apply experiential learning techniques, inquiry-based learning techniques, and other instructional techniques that allow the audience to explore and discover the world around them.

- ☑ Understand that experiences that foster clear and independent thinking are important to the ultimate goal of developing environmentally literate citizens.
- ☑ Use instructional techniques that encourage the audience to ask questions and explore a variety of answers.
- ☑ Take into account audience preconceptions and assumptions while encouraging creativity and openness.
- ☑ Promote cooperative learning as a component of environmental literacy.
- ☑ Modify instructional plans and approaches, when appropriate, to take advantage of unexpected opportunities (e.g. new developments in community issues, recent events or phenomena that are in the news, or breakthroughs in scientific understanding) and audience questions and interests.
- ☑ Work collaboratively with others, adapting instructional approaches as needed to blend or complement instructional styles and to meet shared goals.
- ☑ Make complex issues understandable and establish relativity to audience.

◆ THEME: LEARNER ASSESSMENT

❖ Strand: Learner Outcomes

Link assessment to learning.

Best Practices

- ☑ Link the goals and objectives of the EE&I experience to expected audience outcomes.
- ☑ Use (when appropriate) assessment of learner outcomes to measure if outcomes meet national, state and local standards.
- ☑ Engage the audience in setting their own expectations for the experience. Understand the importance of these abilities in light of EE&I's emphasis on learner-centered education and lifelong learning.

❖ Strand: Assessment as Part of the EE&I Experience

Incorporate assessment into EE&I experiences.

Best Practices

- ☑ Make objectives and other expectations clear to the audience at the outset of an EE&I experience.
- ☑ Assess the audience's baseline understandings and skills at the beginning of an EE&I experience.
- ☑ Use a variety of assessments, including open-ended questions, projects, presentations, or other activities appropriate to the EE&I experience.
- ☑ Understand appropriate use of formative and summative assessment tools to specific EE&I activities, projects, or experiences.

❖ Strand: Improving EE&I Experiences

Use instructional experiences and assessments to improve future EE&I activities.

Best Practices

Use results of differing kinds of assessment to help modify and improve future programming and activities.