

New Hampshire Environmental Literacy Plan

A Collaboration of:

Environmental Literacy Plan Working Group

New Hampshire Environmental Educators

New Hampshire Children in Nature Coalition



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Executive Summary

Environmental literacy requires an understanding of the natural world and the capacity to interpret environmental systems. An environmentally literate citizen can make informed decisions about the environment based on scientific, aesthetic and ethical considerations while bearing in mind the interconnectedness of the social, cultural, economic and political systems.



Environmental literacy is gained through environmental education, an interdisciplinary approach to education that employs hands-on, outdoor, place-based and inquiry-based learning experiences in order to understand the environment as a whole. Incorporating numerous content areas, environmental education uses real-world experiences, giving students a chance to explore the matters at hand to gain experience investigating, defining and creating solutions to issues.

Environmental education not only builds environmental literacy but also increases overall student engagement and motivation, leading to improved academic achievement in all subject areas. In addition, learning about and from the environment encourages outdoor activities, which improve both physical and mental health.

Since the 1970s, an active group of education professionals in New Hampshire has used the environment as a context of learning. Members of New Hampshire Environmental Educators (NHEE) have actively been providing resources and professional development opportunities to all educators. The New Hampshire Children in Nature Coalition brings together organizations and individuals who are dedicated to connecting children, youth and families to the outdoors. Members of these two organizations, other educators and individuals joined to form the Environmental Literacy Plan (ELP) Working Group in order to draft New Hampshire's plan. After engaging stakeholders through various means, a draft was created, reviewed and is presented here.



New Hampshire's Environmental Literacy Plan provides an organized framework to ensure environmental literacy for all people outlined by the six Key Areas of the plan. Key Areas 1 and 2 ensure that environmental literacy activities address state education goals and are aligned with student graduation requirements. Key Area 3 focuses on the need for professional development to assist teachers and school districts. Key Area 4 considers the assessment of Environmental Literacy, and Key



Area 5 addresses implementation and funding. Finally, Key Area 6 stipulates that environmental education opportunities be provided in schools and communities. The Environmental Literacy Plan serves as a component creating a pathway for achieving statewide environmental literacy and is a required element for federal funding based on the pending No Child Left Inside legislation.

In today's world, the need for innovative thinkers and problem solvers is great. Initiatives such as Science, Technology, Engineering and Math (STEM) encourage students to get involved in these subject areas to ready themselves for the next generation of the work force. Environmental literacy is an intricate part of preparing New Hampshire's next generations and is recognized as an important aspect of a well-rounded education for a sustainable future.



The future of New Hampshire's precious natural resources lies in an environmentally literate citizenry that is able to make informed decisions. While much is being done to educate our students, there are many challenges ahead. Ensuring environmental literacy is incredibly important to the sustainability of all of New Hampshire's systems.

On behalf of current and future citizens of our state, thank you for your consideration of this important document.

New Hampshire Environmental Literacy Plan Collaborators

New Hampshire Environmental Educators

The mission of NHEE is to advocate for high quality environmental education in New Hampshire and to provide environmental educators with a forum for networking and professional development.



“Founded in 1979, New Hampshire Environmental Educators is the state professional organization for people working and/or interested in environmental education. NHEE is dedicated to promoting, supporting and improving environmental education in New Hampshire and providing professional

support to its members. NHEE is a non-profit organization whose members include environmental and conservation educators, classroom teachers, students, administrators and others.”²

New Hampshire Children In Nature Coalition

*The mission of the New Hampshire Children in Nature Coalition is to foster experiences in nature that improve physical and emotional health and well-being, increase understanding of and care for the natural world, and promote stronger connections to community and landscape; and providing a forum for continued collaboration by Coalition participants and others.*¹

Since 2007, the New Hampshire Children in Nature Coalition has been working actively to connect families to the outdoors. The Coalition’s individual members as well as twenty-two working partners including nature centers, health organizations and state agencies, are dedicated to encouraging families to spend time outside to increase physical and mental health.



Introduction

What is Environmental Literacy?



Environmental literacy¹ requires having an understanding of the natural world and the capacity to interpret environmental systems.

Environmentally literate students are aware of the interconnectedness of the global, social, cultural, economic, political and environmental structures. They are actively developing an attitude of respect and stewardship toward the natural world, and gaining the skills necessary to make informed decisions about the environment. With this

knowledge and understanding, environmentally literate citizens have the ability to take appropriate actions regarding the environment based on scientific, economic, aesthetic and ethical considerations³.

“Environmental literacy demands understandings, skills, attitudes and habits of mind that empower individuals to relate to their environment in a positive fashion and to take day to day and long-term actions to maintain or restore sustainable relations with other people and the environment.”

-Chuck Roth, pioneer in the field of Environmental Education and NH resident

How is Environmental Literacy attained?

Environmental literacy is primarily gained through the process of environmental education*. Environmental education is an interdisciplinary inquiry-based approach to education that integrates hands-on, project-based classroom and community experiences with outdoor, place-based*, in-the-field learning experiences in order to achieve an understanding of the environment as a whole. The environment, along with environmental conditions and issues, can be used as a context through which instruction in reading, writing, mathematics, science, social studies, and the arts are made relevant. The environment can also be used as context for lessons in group dynamics, problem solving, real world, and community issues. This kind of integration creates relevance and context that prevents the confusion students often experience when learning and teaching is approached out of context. It also enhances connections between people, the land, and their communities. Environmental education teaches children and adults how to learn about and investigate the world in which they live and interact, both with each other and with their environment, to attain environmental literacy.



“It is critical that every American understands how our community, economy, and the environment are connected and mutually dependent. Environmental education prepares all citizens with the 21st Century essential skills that contribute to healthier, more environmentally sustainable and economically prosperous communities... Environmental education fosters learning that can transform 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 interrelated elements of sustainable environmental systems-- from ecological, economical and community perspectives.”⁴

What is the Importance of Environmental Education in Today's World?



Research indicates that environmental education not only builds environmental literacy but also increases overall student engagement and motivation⁵. Heightened engagement then leads to improved academic achievement and performance on assessments in all subject areas. Using an interdisciplinary approach, environmental education uses real-world experiences, which highlight the interconnectedness of knowledge, encouraging systems thinking. This also gives students a chance to explore the matters at hand to gain experience investigating, defining and creating solutions to issues, thus improving critical thinking and problem solving skills. Working on real-world examples often benefits communities and increases collaboration and communication skills. In addition, learning about and from the environment encourages outdoor activities, which improve physical and mental health⁶.

In the world today, there is a great need for innovative thinkers and problem solvers. The problems that we face and will continue to face are complicated and involved. Initiatives such as STEM (Science, Technology, Engineering and Mathematics) encourage students to get involved in these subject areas to prepare themselves for the next generation of the work force. Environmental literacy is an intricate part of this initiative and is also recognized as an important aspect of a well-rounded education to ensure preparedness for a sustainable future. Whether becoming a scientist, joining the green jobs economy, running for elected office, teaching or simply being able to make informed decisions, environmental literacy is an important characteristic of New Hampshire citizens.



Why is Environmental Literacy Important to New Hampshire?

New Hampshire has over a century-long legacy of tackling environmental issues, beginning with the establishment of the Society for the Protection of New Hampshire Forests and the passage of the Weeks Act. Today there are many organizations and conservation groups across the Granite State. They are responsible for many initiatives that speak to the desire to have local and sustainable business as well as environmental resource security. From the numerous community-supported agriculture (CSA) systems to green buildings to land conservation, to sustainable timber management to healthy water and wildlife populations, people of New Hampshire are clearly concerned with the future of our state.



New Hampshire has come a long way to re-growing the native forest cover since the 1800s, when most of the state had been cleared for timber and to create grazing pastures. Populations of many animal species that were nearly extinct due to changes in habitat and unregulated harvest have been managed back to sustainable populations. Conservation efforts over the years consistently attempt to protect and conserve the abundant forests and open space within New Hampshire's borders. The

search for balance between conservation and use in order to develop sustainable resource management continues. Efforts are underway to secure and protect water sources across the state, and new programs are focusing on water quality. The recent revision of *Good Forestry in the Granite State* adds to efforts in sustainable forest management on public and private lands. Individual towns are designating green spaces for wildlife, recreation, economics, education, agriculture and enjoyment of residents. Governor John Lynch has set an energy goal for 25% of our state's energy to come from renewable resources by the year 2025. In addition, his Green Jobs Initiative sets aside funding for training in the green job industry to prepare citizens for a sustainable future.

Though many initiatives are underway, with ever-increasing population pressure, Granite Staters are continuously faced with the challenge of responsible growth and land use planning, while considering the value of our forests and natural resources. In addition, our changing climate challenges our current infrastructure and the manner in which we continue to develop. Extreme weather events are becoming more prevalent than ever before, and much planning is needed to manage storm water across the state. Warmer summers and milder winters encourage species formerly exotic to New England including disease-carrying organisms such as deer ticks. Shifts in growing

seasons and extremely variable precipitation rates are having an impact on local agriculture, and warmer winters could mean a decrease in snow-related tourism.



With these many issues facing our state, now more than ever it is important for our citizens to understand the complexity of the economic, cultural, political and environmental systems. Though much is being done in our schools to encourage innovative thinking, New Hampshire needs the next generation to have a solid understanding of science and the environment in order to be ready to join the growing green jobs industry and prepare for the

challenges ahead. Ensuring an Environmentally Literate citizenry is incredibly important to the future of New Hampshire.

What does New Hampshire's Environmental Literacy Plan do?

New Hampshire's Environmental Literacy Plan provides an organized framework to expand environmental education for all people. It provides an opportunity to engage people in the outdoors and the world around them. The Environmental Literacy Plan ensures that environmental education providers, state natural resource agencies, organizations and local citizens are involved appropriately and effectively in schools and communities. The plan also ensures that environmental education activities are aligned with student graduation requirements and address state education goals. It ensures that teacher professional development opportunities in environmental education are aligned with student achievement goals, while assuring consistency and accuracy in environmental knowledge. Finally, the Environmental Literacy Plan serves as a necessary component of a comprehensive state environmental education program⁷. A state Environmental Literacy Plan is also a required element for federal funding based on the pending No Child Left Inside legislation.



The Environmental Literacy Plan Process

Creating New Hampshire's Environmental Literacy Plan

Since the 1970s, New Hampshire has had an active group of education professionals that have focused on using the environment as a context of learning. Members of the New Hampshire Environmental Educators (NHEE) have been involved in providing professional development opportunities resources to educators. Through the years, NHEE has collaborated in several educational planning efforts, including statewide conservation and environmental education plans, as well as being actively involved in the development of the current science and social studies frameworks.

In 2008, efforts began on the NH Environmental Literacy Plan, but only became a reality after a New England Environmental Education Alliance (NEEEA)-sponsored workshop, led by the North American Association for Environmental Education (NAAEE) in the fall



of 2009, that focused on developing state Environmental Literacy Plans. Each of the six New England states, including New Hampshire, embarked on the process, and consequently have been able to provide support to one another via monthly conference calls. This collaboration has been invaluable to the process, as it has allowed for sharing of ideas, methods and processes. Members of NHEE and the New Hampshire Children in Nature Coalition (NHCINC) came together to create a working group. This group created a “Case for Support” document outlining the importance of Environmental Literacy and the specifics of the plan. Representatives of the working group then met with the NH Commissioner of Education to discuss a

potential plan. The commissioner was supportive, and the working group representatives continued with a presentation to the NH Board of Education in June of 2010 to formally establish communication with the Department of Education. The working group then performed a “crosswalk analysis” (comparing NH Frameworks with environmental education concepts) of the current NH Science and Social Studies Frameworks (Appendix C). They engaged key stakeholders and added people to the Environmental Literacy Plan Working Group. Members of the working group (Appendix E) held five community forums and three focus groups across the state to gather ideas from teachers, environmental educators and interested citizens for what an environmentally literate citizenry would look like and how such might be attained. In addition, almost 200 public school teachers and a few dozen private, charter and non-

formal educators from all over New Hampshire participated in an on-line survey to gather ideas regarding environmental education and literacy. The committee then created a timeline for the development of the ELP draft. A graduate student was hired in an internship position to coordinate writing groups, assemble the draft and further assist in the writing process.



A preliminary ELP draft was prepared and presented at the New Hampshire Environmental Educator's conference in March 2011 to gather feedback. In April, the Advisory committee came together to review and make suggested changes and additions to the document.

A final draft was prepared by the graduate student intern and reviewed by the Environmental Literacy Plan Working Group. The draft will then be available for public comment, after which it will be presented to the Commissioner of Education and the NH Board of Education for review.



Key Area 1: **Ensuring Environmental Literacy through Standards** **Current Context**

New Hampshire has content frameworks in areas that are built from and aligned to rigorous standards. These standards reference resources such as the Benchmarks for Science Literacy, National Science Education Standards, National Math Standards and National Curriculum Standards for Social Studies.

As one of the first steps in developing a State Environmental Literacy Plan, the Environmental Literacy Plan working group performed a crosswalk analysis comparing the New Hampshire Social Studies and Science Frameworks with the *Excellence in Environmental Education Guidelines for Learning (K-12)*⁸ of the North American Association for Environmental Education and found a strong alignment between the documents (Appendix C). New Hampshire has recently adopted the national Common Core State Standards in English language arts and mathematics.



Strategies

Support for environmental literacy within educational frameworks happens on a variety of levels including classroom, family, school, school district and state levels. Therefore it is necessary to engage multiple stakeholders in the process. The following are strategies:

- Develop an Environmental Literacy Advisory committee that includes representatives from the New Hampshire Environmental Educators, New Hampshire Children in Nature Coalition and NH Department of Education to pair Nonformal* Environmental Education providers with school administrators and classroom teachers, and Nonformal Environmental Education providers with after school programs, extended learning opportunity providers and state agencies.
- Encourage the development of an environmental education database to connect Nonformal Environmental Education providers and resources with local classrooms. The database will also provide resources to all educators in order to support environmental education efforts across the state.
- The NH Department of Education will encourage teachers to use high quality proven environmental education materials correlated to NH frameworks.

- Partnerships will provide opportunities to integrate meaningful outdoor field and service learning experiences at every grade level.
- Support, including financial, will be provided for teachers to partake in more professional development in environmental literacy.
- Resources will be made available for planning and developing schoolyard habitat and outdoor classrooms.

There are three goals related to standards of environmental literacy in New Hampshire.

1. Educationally Meaningful Outdoor Field Experience

Short Term Outcomes*:

- Begin to organize a database of environmental education resources to be available to and used by stakeholders.
- Teachers are aware of how environmental literacy is integrated into frameworks.

Medium Term Outcomes*:

- Integrate learning about the environment in all content areas and across the curriculum.
- Every child at every grade level has at least one educationally meaningful* outdoor field experience every year.

Long Term Outcome*:

- Every child at every grade level has integrated multiple educationally meaningful* outdoor field experience every year.

2. Partnerships for developing environmental literacy

Short Term Outcomes:

- Teachers are supported by administration in using the environment as a context for learning.
- Districts provide professional development opportunities on environmental literacy.

Medium Term Outcomes:

- Schools have support for developing outdoor learning spaces near the school.
- School districts have a relationship with environmental education content and professional development providers.

Long Term Outcomes:

- Every school has an outdoor learning area with easy access.
- School districts have a partnership with local environmental education nonformal organizations to develop environmental literacy in students.
- An Environmental Literacy liaison is located at either the Department of Education or in one of the state agencies.

3. State and National support for environmental literacy standards

Short Term Outcomes:

- NH Department of Education and/or other state agency partners facilitate regular meetings of the Environmental Literacy Plan Advisory Committee.
- Nonformal EE centers correlate their program to the NH Frameworks where applicable.
- Strong relationship with the Environmental Literacy Plan and the NH STEM initiative.

- Provide examples of models for partnerships between school districts and nonformal environmental education organizations in the environmental database.

Medium Term Outcomes:

- Use principles and practices to select and develop effective environmental literacy programming for students.

Long Term Outcomes:

- NH Department of Education participates in national and regional dialogues and work groups to develop, support and adopt future generations of science and social studies standards that support environmental literacy.



Key Area 2:

Ensuring Environmental Literacy through Graduation Requirements

Current Context



State requirements for high school graduation were last reviewed in 2005. They include:

1. Arts Education: 0.5 unit
2. Computer Education 0.5 unit
3. Health Education: 0.75 unit
4. Industry Arts or Technology: 4 units
5. English: 4 units
6. Mathematics: 2 units
7. Physical Education: 1 unit
8. Science: 2 units
9. Social Studies: 2 units
10. Open Electives: 7 units

Different school administrations may have additional requirements such as community service hours or a community service project. In New Hampshire the local school administrative units are responsible to develop curriculum to meet the graduation requirements.

Strategies

Incorporating environmental literacy competencies for graduates would involve collaboration between NHEE, NH Department of Education and other state agencies, service-learning providers, nonformal environmental education centers, and schools and school administrative units.

- Partnerships will work together to identify strategies to increase the number of environmental literacy opportunities, including service learning projects*, environmental science classes, community clubs and extended learning opportunities.
- NH Department of Education will encourage schools to meet existing science and social studies frameworks.
- Additional recommendations for ways of achieving and demonstrating environmental literacy will be provided to school administrative units.

Short Term Outcome:

- An increase in the number of place-based and service learning projects that incorporate environmental literacy

Medium Term Outcome:

- An increase in the number of districts that include an elective class on environmental science/literacy at the high school level.

Long Term Outcome:

- Fully integrate environmental education across the curriculum.
- Districts develop a requirement for Environmental Competency



Key Area 3:

Ensuring Environmental Literacy through Professional Development **Current Context**

The Elementary and Secondary Education Act of 2001 identifies professional development (PD) as an essential component of a district-wide educational improvement plan. High-quality professional development as defined by this act⁹ identifies many factors that aid in developing effective professional development programs such as administrator support, long-term and sustained training and programs that are grounded in research and clinical knowledge of teaching and learning. The professional development must be aligned with pre-K-12 curriculum and assessment practices for the participant's school, and include age-level appropriate instruction. These are components of professional development programs that lead to changes in teaching practices.

According to an educator survey conducted by the Environmental Literacy Plan Working Group, over half of the teachers who responded strongly agreed that they would like to integrate environmental content into their classes, however only a quarter of the responders strongly agreed that they felt prepared to integrate environmental issues into the classroom.

Many pre-service teacher education degree programs currently do not have an environmental literacy component. Professional development opportunities should be available for informal and formal educators and administrators at all levels including early childhood, pre K-12 as well as the college level.



Strategies

All strategies are guided by the NAAEE *Guidelines for the preparation and professional development of environmental educators*¹⁰, while bearing in mind the definition of “High Quality Professional Development” as laid out by the Elementary and Secondary Education Act of 2001.

- NH Department of Education, together with NH Environmental Educators, will encourage the development and maintenance of an online database of state environmental education resources and programs.
- Schools and teachers will continue to partner with state and federal natural resource agencies in New Hampshire.
- A task force will be created with broad-based representation to develop environmental literacy competencies for K-12 teachers based on NAAEE guidelines, and professional development providers will align their programs with those guidelines.
- Higher education institutions will work together with nonformal EE providers and NH Department of Education to discover aspects of environmental literacy that support other initiatives such as STEM.



There are four aspects of professional development addressed by New Hampshire's Environmental Literacy Plan.

1. Pre-service Professional Development

Short Term Outcomes:

- Establish student-learning outcomes for Environmental Literacy competencies.

Medium Term Outcomes:

- Establish a requirement for Environmental Literacy competencies in higher education programs through coursework, internships, and other experiences.
- Most higher education institutions that provide administrative training will require Environmental Literacy competencies.

Long Term Outcomes:

- Teacher certification includes environmental education components.
- Administrative certification includes environmental education components.

2. In-service Professional Development

Short Term Outcomes:

- Maintain existing environmental education professional development opportunities.
- Educators seek out environmental education professional development.
- Educators begin to integrate environmental education into the curriculum.
- Professional development opportunities should be marketed to educators and administrators.

Medium Term Outcomes:

- Establish new relationships with environmental literacy professional development providers.
- Establish network for sharing environmental literacy professional development funding opportunities and EE resources.

Long Term Outcomes:

- All districts have a working relationship with an environmental literacy professional development provider.
- Majority of educators are integrating environmental education into student coursework.

3. Professional Development Providers

Short Term Outcomes:

- Establish training guidelines amongst Nonformal Environmental Education providers, which are aligned to current professional development guidelines.

Medium Term Outcomes:

- Establish network of field-based training organizations and opportunities providing high quality professional development that encourages environmental literacy.

Long Term Outcomes:

- All teachers have participated in field-based environmental literacy training.
- A network exists to continue high quality field-based training.

4. Professional Development Policy

Short Term Outcomes:

- Administrative units participate in environmental literacy professional development.

Medium Term Outcomes:

- Administrative units identify environmental education as a core component of high quality education.

Long Term Outcomes:

- Schools adjust curriculum requirements to include environmental education.
- Administrative units encourage environmental education professional development and seek out funding for training.



Key Area 4:
Ensuring Environmental Literacy through Assessment
Current Context



The NH Department of Education collects a variety of student information¹¹. This information includes student achievement data for reading, writing, comprehension, mathematics, inquiry, life sciences, earth-space sciences and physical sciences. With appropriate planning, information can be built into the current system to assist in the evaluation related to environmental literacy. This information provides a picture of the content knowledge of students regarding the environment.

Strategies

- The Environmental Literacy Plan Advisory Committee will develop a plan to assess current environmental literacy in students.
- The NH Department of Education and other state agencies, including nonformal Environmental Education providers, will explore how current questions from the New England Common Assessment Program (NECAP) Science assessment can be combined to correlate to environmental literacy.
- Environmental education centers will conduct pre-and post-experience surveys with students to determine learning through their programs.
- Alternative methods for measuring environmental literacy will be provided to districts based on the work of the Environmental Literacy Plan Advisory Committee.

Short Term Outcomes:

- Explore the assessment of environmental literacy using the current NECAP Science assessment data.
- Teachers create a record of environmental projects and include them in student portfolios.
- Multiple ways to assess environmental literacy will exist.

Medium Term Outcomes:

- Include examples of environmental understanding in the Information and Communication Technology*portfolio required for the 8th grade.

Long Term Outcomes:

- Have an environmental literacy index developed from NECAP Science or other testing tools.
- Students at the high school level have a portfolio demonstrating environmental literacy.
- Individual districts create an environmental literacy assessment.

Key Area 5:

Ensuring Environmental Literacy through Funding and Support

Current Context

In these economic times, support for any Environmental Literacy Plan requires examining opportunities for creating partnerships and identifying areas where multiple goals can be reached at the same time environmental literacy can be achieved. Enhanced efforts to support environmental literacy will need to be funded through grants and funding streams outside of the state's current funding systems. It is not expected that school administrative units will be able to devote financial resources to promote environmental literacy, no matter how compelling the case. Environmental literacy partners must work together to make connections with STEM and other well-rounded education initiatives.



Strategies

Many partners are necessary for the implementation and funding of the Environmental Literacy Plan. The Environmental Literacy Plan Advisory Committee must partner with universities, NHEE, state agencies, DOE, local businesses and industries, PTOs and PTAs, and nonformal EE centers. Implementation will require participation at every level from State agencies to school districts to individual teachers.

- ELP Advisory Committee and the DOE will seek funding opportunities from a variety of granting sources.
- ELP Advisory Committee will seek out partnerships with the business community around training for green jobs.
- ELP Advisory Committee will work with STEM collaborative to seek funding for professional development.
- Nonformal centers will work with local schools to identify local funding sources.
- Grant opportunities around developing and building outdoor classroom or schoolyard habitat will be shared with the school community.
- ELP Advisory Committee will develop a process to promote, implement and monitor the ELP by working through their various agencies and networks.

Short Term Outcomes:

- Professional development opportunities that are aligned with STEM and other initiatives will be sought out.
- Funding sources will be located to assist schools in creating field experiences and environmentally focused field trips.
- Educational organizations incorporate appropriate sections of the ELP into their mission, goals and/or strategic plan.

Medium Term Outcomes:

- Strengthen State agency's commitment to providing EE professional development and classroom materials support.

Long Term Outcomes:

- Fully funded opportunities for professional development supporting environmental literacy are provided.
- All students have field experiences at nonformal EE centers and in their schoolyard.
- Schools support the implementation of the ELP into school learning programs and practice.



Key Area 6:

Ensuring Environmental Literacy through Community Connections **Current Context**

New Hampshire's communities play a key role in educating citizens of all ages about local environmental issues. Knowledge of the local environment is passed from generation to generation and requires proper communication to preserve the stories and understandings unique to that place. With this information, communities can work to support and preserve their local resources.

Strategies

Strong communities are those that are diverse, resilient and connected on many levels. In order to properly prepare the next generation to be responsible and knowledgeable citizens, it is crucial that they have experiences with real-world projects and connections with community members. These community members in turn will benefit from continuing involvement and education in their towns.



- Lines of communication will be opened between the many key stakeholders in a community, including school administrators, teachers, business owners, students, NGOs, local government officials and community groups from early childhood education to senior citizen centers. NHEE and NHCiNC can each serve as a vehicle for opening these pathways of new communication.
- Partnerships must be made to educate citizens, coordinate environmental practices and oversee local decisions.
- Local projects and environmental issues must be identified with a plan to involve citizens in decision making and resolution of the problems.

The Environmental Literacy Plan Working Group has defined two goals to support community connections in New Hampshire.

1. Strong Connections

Short Term Outcome

- School projects incorporate and increase service-based learning on the environment and environmental issues.
- Community members volunteer in schools around environmental topics.
- Environmental literacy extended learning opportunities should be developed in communities.
- Programs specifically for early childhood education providers should be offered.

Medium Term Outcome

- Communities and government units support local businesses to adopt sound environmental practices and those businesses use natural resources in sustainable ways.
- Partnerships between community members and schools continue to strengthen environmental projects that are interconnected between school and community.
- Community partners including local government partners like park and recreation departments, businesses, profit and non-profit organizations should work together to maximize efforts.

Long Term Outcome

- The community benefits from strong environmental connections between businesses, schools and government.



2. Local Environment

Short Term Outcome

- Students study relevant environmental issues in their community and work to resolve those issues.

Medium Term Outcomes

- The community's overall health and vitality continues to be strengthened.
- The environment is viewed as a key component to a community.

Long Term Outcome

- Environmental, social and economic impacts on a community and the natural environment are considered.
- Community members have developed skills to investigate issues and develop solutions with consideration for the natural environment.

Appendix A

Logic Models

Key Area 1: Standards Logic Model

<i>Input</i>	<i>Output Activities</i>	<i>Output Audience</i>	<i>Short Term Outcomes</i>	<i>Medium Term Outcomes</i>	<i>Long Term Outcomes</i>
DOE Consultants and partners Partnership of NHEE and DOE DOE School administrators Nonformal EE providers Teachers Agencies Non-formal EE providers State agencies After- school programs Extended learning opportunities providers	DOE Encourage teachers to use high quality proven EE materials correlated to NH Frameworks Develop Database of EE Resources for NH includes providers, lesson plans, and activities Encourage teachers to integrate content areas while using the environment as the context Provide opportunities to integrate meaningful outdoor field and service learning experiences at every grade level	Classroom Teachers	Database of EE resources will be used. Teachers are aware of frameworks and how they integrate with environmental literacy	Integrate learning about the environment in all content areas and across the curriculum Every child at every grade level has at least one educationally meaningful outdoor field experience every year	Every child at every grade level has multiple educationally meaningful outdoor field experience every year

<p>School districts Administrators Teachers Community members Nonformal EE providers PTA's Local community</p>	<p>Establish policies to support academic and/or service oriented clubs</p> <p>Resources are available for planning and developing schoolyard habitat and outdoor classrooms</p> <p>Encourage collaborations with local resources that provide outdoor/environmental learning opportunities</p>	<p>School Districts</p>	<p>Teachers are supported by administration in using the environment as a context for learning</p>	<p>Support for developing outdoor learning spaces near the school</p>	<p>Every school has an outdoor learning area with easy access</p>
<p>State agencies Nonformal EE providers Community members School board Nonformal EE providers</p>	<p>Provide support for teachers to partake in more professional development on environmental literacy</p> <p>District's professional development plans include environmental literacy training in all content areas</p>	<p>Teachers School Districts</p>	<p>Districts provide professional development opportunities on environmental literacy</p>	<p>School districts have a relationship with EE content and professional development providers</p>	<p>School districts have a partnership with local EE non-formal organizations to develop environmental literacy in students</p> <p>An Environmental Literacy liaison is located at either the Department of Education or in one of the state agencies.</p>
<p>ELP Advisory Committee Key stakeholders Schools Businesses Administrators State agencies DOE DES Nonformal EE</p>	<p>Develop a statewide Environmental Literacy group with representatives from state agencies, NH Children in Nature Coalition, schools, business</p>	<p>ELP committee Schools Businesses DOE</p>	<p>DOE and other state agency partners facilitate regular meetings of ELP Advisory Committee</p> <p>Nonformal EE centers</p>	<p>Use principle and practices to select and develop effective environmental literacy programming for students</p>	<p>DOE will participate in national and regional dialogues and work groups to develop, support and adopt future generations of science and</p>

providers NHEE, etc.	EE Database includes models of relationship/partnership with Non-formal EE providers	DES NHEE, etc.	correlate their program to the NH Frameworks where applicable Strong relationship with the NH STEM initiative Provide examples of models for partnerships between school districts and non-formal EE organizations	social studies standards that support environmental literacy
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Key Area 2: Graduation Requirement Logic Model

<i>Input</i>	<i>Output Activities</i>	<i>Output Audience</i>	<i>Short Term Outcomes</i>	<i>Medium Term Outcomes</i>	<i>Long Term Outcomes</i>
Collaboration between DOE and NHEE	<p>NHEE will work with DOE, other state agencies and NGOs to identify strategies to increase the number of environmental literacy opportunities for communities</p> <p>DOE will encourage schools meeting science and social studies frameworks as current standards to contain objectives tied to environmental literacy</p>	<p>School Districts</p> <p>Schools</p> <p>Teachers</p> <p>Service Learning Providers</p>	An increase in the number of place-based and service learning projects that incorporate environmental literacy	An increase in the number of districts that include an elective class on environmental science/literacy at the high school level	Fully integrate environmental education across the curriculum



Key Area 3: Professional Development Logic Model

<i>Inputs</i>	<i>Output Activities</i>	<i>Output Audience</i>	<i>Short Term Outcomes</i>	<i>Medium Term Outcomes</i>	<i>Long Term Outcomes</i>
NHEE DOE	Organize a committee to develop and maintain an online database Explore the development of an online database with state EE resources and programs for teachers and other stakeholders to use.	In-service teachers	Educators refer to EE database for EE professional development opportunities Educators seek out EE Professional Development Educators are beginning to integrate EE into the curriculum Opportunities should be marketed to educators and administrators	Establish network for sharing EL-Professional Development funding opportunities	Majority of educators are integrating EE into student coursework
Schools Teachers State Agencies	Schools and teachers continue to partner with state and federal natural resource agencies in NH	Natural Resource Agencies Non-formal DOE	Maintain existing EL-Professional Development opportunities	Establish new relationships	All districts have a working relationship with an EL-Professional Development provider
Higher education	Provide an Environmental	Pre-service teachers	Establish student	Teacher certification includes EE	Course required by

<p>institutions</p> <p>DOE</p>	<p>Literacy (EL) course for pre-service preK-12 teachers</p> <p>Change requirements for teacher certification</p> <p>Change requirements for pre-service preK-12 teacher graduation</p> <p>Establish an assessment tool to determine effectiveness of EL-PD courses</p>	<p>DOE Pre-service teachers</p> <p>DOE Pre-service teachers</p> <p>Higher Ed institutions DOE</p>	<p>learning outcomes for course</p>	<p>components</p>	<p>most higher education institutions that provide education degrees</p>
<p>ELP Advisory Committee</p>	<p>Endorsement for ELP from school administrators' professional organizations</p>	<p>School administrators</p>		<p>Schools adjust curriculum requirements to include EE</p> <p>Partnering of formal and non-formal EE providers is encouraged by educators/ administration/DOE</p>	<p>Majority of school administrators identify EE as a core component of high quality education</p>

<p>Higher Education institutions</p> <p>NHEE</p> <p>Nonformal EE providers</p> <p>DOE</p> <p>OPEN NH</p>	<p>Create a task force with broad-based representation</p> <p>Network for partnering non-formal and formal educators</p> <p>Work with DOE initiatives that support EL such as STEM</p>	<p>Higher education institutions</p> <p>NHEE</p> <p>DOE</p> <p>Professional Development centers</p> <p>Natural Resource Agencies</p> <p>NHCINC</p> <p>Local businesses</p> <p>Industries</p> <p>Legislators</p> <p>Council for business and social responsibility</p>	<p>Task force establishes EL competencies for K-12 teachers based on NAAEE guidelines</p>	<p>Competencies are established and assessed by in-service Professional Development providers as well as pre-service higher education institutions</p>	
<p>Nonformal EE providers</p> <p>Higher education institutions</p> <p>State and federal natural resource offices</p> <p>NGOs</p>	<p>Provide field-based EL training for teachers</p>	<p>In-service and Pre-service teachers</p>	<p>Establish training guidelines</p>	<p>Establish network of field-based training organizations and opportunities</p>	<p>All teachers have participated in field-based EL training</p>



Key Area 4: Assessment Logic Model

<i>Inputs</i>	<i>Output Activities</i>	<i>Output Audience</i>	<i>Short Term Outcomes</i>	<i>Medium Term Outcomes</i>	<i>Long Term Outcomes</i>
DOE DOEs from RI, ME, VT Schools Non-formal EE providers	Determine how current questions from the NECAP Science assessment can be combined to correlate to environmental literacy EE centers conduct "exit surveys" with students to determine learning through their programs	Statewide	Measure environmental literacy based on current NECAP Science Assessment Teachers create a record of environmental projects and include in student portfolios Multiple ways to assess environmental literacy will exist	Include examples of environmental understanding in the ICT literacy portfolio required for the 8 th grade	Have an environmental literacy index developed from NECAP Science or other testing tool Students at the high school level have a portfolio demonstrating environmental literacy



Key Area 5: Implementation and Funding Logic Model

<i>Inputs</i>	<i>Output Activities</i>	<i>Output Audience</i>	<i>Short Term Outcomes</i>	<i>Medium Term Outcomes</i>	<i>Long Term Outcomes</i>
<p>ELP Advisory Committee Universities NHEE State Agencies DOE</p> <p>ELP Advisory Committee NHEE Business Industry</p>	<p>Statewide environmental literacy group and DOE will seek funding opportunities from a variety of granting sources</p> <p>ELP Advisory Committee will seek out partnerships with the business community around training for green jobs</p> <p>ELP group will work with STEM collaborative to seek funding for professional development</p>	<p>Teachers School Districts</p> <p>Teachers School Districts</p>	<p>Partnership between professional development opportunities around STEM and other initiatives</p>	<p>Strengthen State agency's commitment to providing EE Professional Development and classroom materials support</p>	<p>Funding is fully available for professional development in Environmental Literacy</p>
<p>Nonformal Centers</p> <p>EE Groups PTA State Agencies</p>	<p>EE centers will work with local schools to identify local funding sources</p> <p>Grant opportunities around developing and building outdoor classroom or schoolyard habitat will be shared with the school community</p>	<p>Schools School Districts</p>	<p>Funding sources will be located to assist schools in creating field experiences and environmentally focused field trips.</p>		<p>All students have field experiences at nature or environmental centers and in their schoolyard</p>
<p>NHEE members Colleges Universities State Agencies</p> <p>ELP Advisory Committee</p>	<p>ELP committee will develop a process to promote, implement and monitor the ELP by working through their various agencies and networks</p>	<p>Nonformal EE providers Schools</p>	<p>Educational organizations incorporate appropriate sections of the ELP into their mission, goals and/or strategic plan</p>		<p>Schools support implementation of the ELP into school learning programs and practices</p>

Key Area 6: Community Connections Logic Model

<i>Input</i>	<i>Output Activities</i>	<i>Output Audience</i>	<i>Short Term Outcomes</i>	<i>Medium Term Outcomes</i>	<i>Long Term Outcomes</i>
Collaboration and communication between key stakeholders	Partnerships are formed to strengthen communities Open lines of communication between "audience" members	School teachers Administrative units Students Business owners Local government officials NGOs Community groups Early Childhood Education centers Senior Citizen groups and centers	School projects incorporate service-based learning Community members volunteer in schools Environmental literacy extended learning opportunities should be developed in communities Programs specifically for early childhood education providers should be offered	Communities and government units support local business Community partners including local government partners like park and recreation departments, businesses, profit and non-profit organizations should work together to maximize efforts	Strong connections exists between businesses, schools, government, families and individual citizens
Collaboration and communication between key stakeholders	Partnerships are formed to strengthen communities Open lines of communication between "audience" members	School teachers Administrative units Students Business owners Local government officials NGOs Community groups Early Childhood Education centers Senior Citizen groups and centers	Students study relevant environmental issues in their community and work to resolve those issues	The community's overall health and vitality improves The environment is viewed as a key component to a healthy community	Environmental, social and economic impacts on a community and the natural environment are considered Community members have developed skills to investigate issues and develop solutions with consideration for the natural environment

Appendix B

**Glossary*

Environmental Education: A process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones.¹²

Environmental Literacy: Environmental Literacy is having an understanding of the natural world and the ability to make decisions about the environment based on scientific, economic, aesthetic and ethical considerations¹³.

Information and Communication Technologies (ICT): Each NH student is required to create an electronic portfolio by the end of grade 8

Inquiry-Based Learning: Inquiry is a multifaceted activity that involves making observations; posing questions; examining books and other sources of information to see what is already known; planning investigations; reviewing what is already known in light of experimental evidence; using tools to gather, analyze, and interpret data; proposing answers, explanations, and predictions; and communicating the results. Inquiry requires identification of assumptions, use of critical and logical thinking, and consideration of alternative explanations. (p. 23- National Science Education Standards)

Meaningful Experience: Experiences are: investigative or project-oriented, an integral part of the instructional program, part of a sustained activity, considers the environment as a system¹⁴.

New England Common Assessment Program (NECAP): The New Hampshire Department of Education, Rhode Island Department of Education, and Vermont Department of Education have developed a common set of Grade-Level Expectations, known as the New England Common Assessment Program Grade-Level Expectations (NECAP GLEs), and test specifications in Mathematics, Reading, and Writing. Building on the success of the NECAP collaboration in Mathematics, Reading, and Writing, the states have developed common assessment targets and test specifications for Science. All GLEs are incorporated into the NH Curriculum/Frameworks documents approved by the State Board in June 2006.

Nonformal Education: Organized learning opportunities outside the formal educational system. These tend to be short-term, voluntary and require few if any prerequisites, typically have a curriculum and often a facilitator, and usually are local and community-based.

Open Space: an area of land or water that either remains in its natural state or is used for agriculture, free from intensive development for residential, commercial, industrial or institutional use; it includes agricultural and forest land, undeveloped coastal and estuarine lands, undeveloped scenic lands, public parks and preserves (NYS Department of Conservation <http://www.dec.ny.gov/lands/317.html>)

Place-based Education: The process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science and other subjects across the curriculum¹⁵. Place-based Education emphasizes hands-on, real-world learning experiences. This approach is akin to using the Environment as an Integrating Context (EIC), which has been shown to increase academic achievement¹⁶.

Service Learning: A teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities¹⁷.

Short Term Outcomes: 2-5 years

Medium Term Outcomes: 5-10 years

Long Term Outcomes: 10-15 years



Appendix C

ELP Working Group

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Appendix D

Community and Government Partners

Antioch University New England
Appalachian Mountain Club
New Hampshire Department of Resources and Economic Development: Division of Forest and Lands
New Hampshire Children in Nature Coalition
New Hampshire Department of Education
New Hampshire Department of Environmental Services
New Hampshire Environmental Educators
New Hampshire Fish and Game Department
New Hampshire Sierra Club
Plymouth State University Department of Environmental Science and Policy
Squam Lakes Natural Science Center
Southern New Hampshire University School of Arts and Sciences
The Margret and H. A. Rey Center
United States Forest Service
University of New Hampshire, Durham



Appendix E

References

* See definition in Glossary in Appendix B

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Appendix F

Photo Credits



Appalachian Mountain Club
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New Hampshire Department of Environmental Services
Prescott Conservancy
Squam Lakes Natural Science Center

Appendix G

Crosswalk Analysis: Science and Social Studies

The North American Association for Environmental Education has developed a comprehensive set of standards for Environmental Education entitled “Excellence in Environmental Education: Guidelines for Learning, K-12” (“EE Guidelines”). These guidelines are set for the end of Fourth Grade, Eighth Grade and Twelfth Grade.

Excellence in Environmental Education: Guidelines for Learning, K-12

- Strand 1: Questioning, Analysis and Interpretation Skills
- Strand 2: Knowledge of Environmental Processes and Systems
- Strand 3: Skills for Understanding and Addressing Environmental Issues
- Strand 4: Personal and Civic Responsibility

The New Hampshire Curriculum Frameworks for Science Literacy is divided into four domains, each of which has four or five strands supporting the domain. The frameworks are established for two-year grade spans and are separated into Elementary (K-4), Middle (5-8) and High School (9-12).

K-12 Science Literacy New Hampshire Curriculum Framework

Science Process Skills

- SPS1– Scientific Inquiry and Critical Thinking Skills
- SPS2– Unifying Concepts of Science (including NECAP Science Assessment Targets by Big Idea)
- SPS3– Personal, Social, and Technological Perspectives
- SPS4– Science Skills for Information, Communication and Media Literacy

Earth Space Science

- ESS1– The Earth and Earth materials, as we know them today, have developed over long periods of time, through constant change processes.
- ESS2– The Earth is part of a solar system, made up of distinct parts, which have temporal and spatial interrelationships.
- ESS3– The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time.
- ESS4– The growth of scientific knowledge in Earth Space Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.

Life Science

- LS1– All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).
- LS2– Energy flows and matter recycles through an ecosystem.
- LS3– Groups of organisms show evidence of change over time (e.g. evolution, natural selection, structures, behaviors, and biochemistry).
- LS4– Humans are similar to other species in many ways, and yet are unique among Earth’s life forms.

LS5– The growth of scientific knowledge in Life Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.

Physical Science

PS1– All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size/amount of substance).

PS2– Energy is necessary for change to occur in matter. Energy can be stored, transferred and transformed, but cannot be destroyed.

PS3– The motion of an object is affected by force.

PS4– The growth of scientific knowledge in Physical Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.

The New Hampshire Curriculum Frameworks for Social Studies contains 10 themes which are supported by five content strands. The frameworks are established for two-year grade spans and are separated into Elementary (K-4), Middle (5-8) and High School (9-12).

K-12 Social Studies New Hampshire Curriculum Framework

Theme A: Conflict and Cooperation

Theme B: Civic Ideals, Practices, and Engagement

Theme C: People, Places and Environment

Theme D: Material Wants and Needs

Theme E: Cultural Development, Interaction, and Change

Theme F: Global Transformation

Theme G: Science, Technology, and Society

Theme H: Individualism, Equality and Authority

Theme I: Patterns of Social and Political Interaction

Theme J: Human Expression and Communication

Civics

Economics

Geography

U.S. History

World History



The following analysis compares the EE Guidelines and New Hampshire frameworks in Science Literacy and Social Studies, and demonstrates alignment between them.

Grade 4 Analysis

End of Grade 4	NH Science Curriculum Frameworks-End of Grade 4	NH Social Studies Curriculum Frameworks-End of Grade 4
Strand 1- Questioning, Analysis and Interpretation Skills		
<p>A) Questioning- Learners are able to develop questions that help them learn about the environment and do simple investigations.</p> <ul style="list-style-type: none"> Identify questions they are likely to be able to answer by combining their own observations and investigations of the environment with existing information. Pose questions based on experiences in their own community and local environment as well as from other sources, such as journalistic reports about the environment. Generate ideas and questions about objects, organisms, events, places, and relationships in the environment. 	<p>SPS1:4:1.7 Ask questions about objects, organisms and events in their local environment.</p> <p>SPS1:4:1.8 Pose questions to investigate and practical problems to solve.</p> <p>S:SPS3:4:2.2 Develop questions based upon their observations about the natural world and design a simple investigation.</p> <p>S:SPS3:4:2.3 Develop questions that help them learn about the environment; and design and conduct simple investigations.</p> <p>S:SPS4:4:4.1 Ask questions and plan investigations to find answers.</p>	None at this level
<p>B) Designing investigations- Learners are able to design simple investigations.</p> <ul style="list-style-type: none"> Predict possible answers to their own questions, developing and discussing simple alternative hypotheses. Design ways of answering questions based on systematic observations. For example, devise a way to learn about the life cycle of a caterpillar or the means of transportation that children take to and from their school. Design simple experiments to answer questions and test ideas they have about the environment. 	<p>SPS1:4:2.1 Plan a step-by-step process to solve a practical problem or to carry out a “fair test” or a simple scientific question.</p> <p>SPS1:4:2.2 Select an activity and justify it as an effective means of collecting appropriate data.</p> <p>S:SPS4:4:6.1 Plan and conduct a scientific investigation in group settings.</p>	None at this level
<p>C) Collecting Information- Learners are able to locate and collect information about the environment and environmental topics.</p> <ul style="list-style-type: none"> Observe and record characteristics, differences, and change in objects, organisms, events, places, and relationships in the environment. Find, assess, select, and use resources such as atlases, data bases, charts, tables, graphs and maps. 	<p>SPS1:4:1.1 Extend the senses using simple tools.</p> <p>SPS1:4:1.2 Make and record observations for a given purpose.</p> <p>SPS1:4:1.4 Record observations using</p>	<p>Skill 2.1:A3 Draw on the diversity of social studies-related sources, such as auditory and visual sources, such as documents, charts, pictures, architectural works and music.</p> <p>Skill 2.1:B7 Utilize various types of</p>

<i>End of Grade 4</i>	<i>NH Science Curriculum Frameworks- End of Grade 4</i>	<i>NH Social Studies Curriculum Frameworks-End of Grade 4</i>
<ul style="list-style-type: none"> • <i>Use basic field skills, such as observing, interviewing and measuring, to collect information.</i> • <i>Use tools such as rulers, thermometers, watches, scales, magnifiers, and microscopes to make observations and measurements.</i> • <i>Use computers, calculators and other devices to conduct investigations and manipulate information.</i> 	<p><i>standard units of measurement.</i></p> <p><i>SPS1:4:4.1 Compile and display data in a variety of formats.</i></p> <p><i>SPS1:4:4.2 Select an appropriate format to represent data or observations.</i></p> <p><i>S:SPS3:4:2.4 Locate and collect information about the environment and environmental and natural resources topics.</i></p> <p><i>S:SPS4:4:1.2 Use appropriate tools to measure and graph data.</i></p> <p><i>S:SPS4:4:7.1 Keep a journal record of observations, recognizing patterns, summarizing findings, and reflecting on the observations.</i></p> <p><i>S:ESS4:4:2.1 Demonstrate the use of simple instruments to collect weather data, including thermometers, windsocks, meter sticks, and rain gauges.</i></p> <p><i>S:LS5:4:2.1 Demonstrate the use of appropriate tools and simple equipment, such as thermometers, magnifiers and microscopes to gather data and extend the senses.</i></p>	<p><i>sources such as documents, charts, images, artifacts and maps.</i></p> <p><i>Skill 2.1:D Students will be able to carry out a variety of information-gathering techniques.</i></p>
<p><i>D) Evaluating accuracy and reliability-</i> <i>Learners understand the need to use reliable information to answer their questions. They are familiar with some basic factors to consider in judging the merits of information.</i></p> <ul style="list-style-type: none"> • <i>Provide specific examples of information they believe to be factual, fictitious, or of questionable merit and explain their reasoning.</i> • <i>Identify some factors that might influence the credibility of a specific source of information, for example who created it, how old it is, and what kind of arguments or evidence are used.</i> 	<p><i>SPS2:4:1.2 Realize that the results of similar scientific investigations seldom turn out exactly the same, but if the differences are large it is important to try to figure out why.</i></p> <p><i>SPS2:4:1.3 Know when comparisons might not be fair because some</i></p>	<p><i>None at this level</i></p>

End of Grade 4	NH Science Curriculum Frameworks- End of Grade 4	NH Social Studies Curriculum Frameworks-End of Grade 4
<p>E) Organizing information- Learners are able to describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.</p> <ul style="list-style-type: none"> Summarize observations and describe data. Construct, read, and interpret maps, graphs, tables, diagrams, and other displays of data. Identify patterns in events, designs, organisms, and sets of numbers. Describe mathematical relationships and use those relationships as a way of organizing data. 	<p>conditions are not kept the same.</p> <p>SPS1:4:4.3 Identify and suggest possible explanations for patterns.</p> <p>SPS1:4:4.4 Analyze data and identify discrepancies.</p> <p>S:SPS3:4:2.6 Organize information to search for relationships and patterns concerning the environment and environmental topics.</p> <p>S:SPS4:4:3.3 Organize observations and data into tables, charts and graphs.</p>	<p>Skill 2.2:F1 Group data in categories according to appropriate criteria</p> <p>Skill 2.2:F2 Place in proper sequence, i.e., in order of occurrence, including in timelines, or in order of importance, etc.</p> <p>Skill 2.2:F3 Place data in tabular form: charts, graphs and illustrations.</p>
<p>F) Working with models and simulations- Learners understand that relationships, patterns and processes can be represented by models.</p> <ul style="list-style-type: none"> Interpret information and situations by noting associations and similarities and recognizing patterns, trends, relationships and sequences. Give examples of models or simulations and how they can be used to learn about what they represent. Identify ways in which a model differs from what it represents. Use a number of types of models such as geometric figures, graphs and maps to summarize observations of the environment. 	<p>SPS2:4:3.1 Know that seeing how a model works after changes are made to it may suggest how the real thing would work if the same changes were done to it.</p> <p>SPS2:4:3.2 Use geometric figures, number sequences, graphs, diagrams and pictures as scientific models.</p> <p>SPS2:4:3.3 Recognize that most everything has limits on how big or small it can be.</p>	<p>Skill 2.2:F3 Place data in tabular form: charts, graphs and illustrations.</p>
<p>G) Drawing conclusions and developing explanations- Learners develop simple explanations that address their questions about the environment.</p> <ul style="list-style-type: none"> Summarize information, compare findings and use basic mathematics to analyze data. Identify information that is not relevant to a proposed explanation and explain their reasoning. Use models and examples to explain their thinking. List strengths and weaknesses of the explanations they propose. 	<p>SPS1:4:5.1 Cite evidence or data to support conclusions.</p> <p>SPS1:4:5.2 Determine if an observation or measurement supports a given scientific explanation.</p> <p>SPS1:4:5.3 Draw a conclusion to answer an initial question, based on the evidence collected.</p> <p>S:SPS4:4:2.1 Use a variety of tools and formats (oral presentations, journals,</p>	<p>Skill 2.2:G4 Form opinion based on critical examination of relevant information.</p> <p>Skill 2.2:G7 Take into account when interpreting events or behaviors context of their time and place.</p> <p>Skill 2.2:I1 Secure needed factual information relevant to making he decision.</p> <p>Skill 2.2:I4 Justify interpretation by</p>

<i>End of Grade 4</i>	<i>NH Science Curriculum Frameworks-End of Grade 4</i>	<i>NH Social Studies Curriculum Frameworks-End of Grade 4</i>
	<p><i>and multimedia presentations) to summarize and communicate the results of observations.</i></p> <p><i>S:SPS4:4:4.2 Compile data gathered through observations to record and present results using tally charts, tables and graphs.</i></p> <p><i>S:SPS4:4:4.3 Use evidence to construct explanations.</i></p>	<p><i>citing evidence.</i></p>

NAAEE Guidelines-End of Grade 4	NH Science Curriculum Frameworks-End of Grade 4	NH Social Studies Curriculum Frameworks-End of Grade 4
Strand 2- Knowledge of Environmental Processes and Systems		
2.1- The Earth as a Physical System		
<p>A) <i>Processes that shape the Earth-</i> Learners are able to identify changes and differences in the physical environment.</p> <ul style="list-style-type: none"> Identify some of the forces that cause erosion within their own region, pointing out factors such as freezing and thawing, wind, waves and gravity. Identify some distinctive landforms within their region and, using maps and images, in other areas of the world. Differentiate among climates, considering factors such as precipitation, temperature and resident plants and animals and how they form the different biomes. Understand that the ocean is a major influence on weather and climate no matter where. Observe and record seasonal differences. 	<p>S:ESS1:4:5.1 Identify and describe processes that affect the features of the Earth’s surface, including weathering, erosion, deposition of sediment.</p>	<p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p>
<p>B) <i>Changes in matter-</i> Learners are able to identify basic characteristics of and changes in matter.</p> <ul style="list-style-type: none"> Describe objects in terms of the materials they are made of and their observable properties. Identify the effects of factors such as heating, cooling, and moisture on the properties of materials and how quickly change happens. Describe the basic elements of the hydrologic cycle (including the 	<p>S:ESS1:4:5.2 Explain how wind, water, or ice shape and reshape the Earth’s surface.</p> <p>S:ESS1:4:6.3 Identify minerals by their physical properties, such as color, texture and cleavage, and describe simple tests used in the identification process.</p>	<p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an</p>

NAAEE Guidelines-End of Grade 4	NH Science Curriculum Frameworks-End of Grade 4	NH Social Studies Curriculum Frameworks-End of Grade 4
<p>role of the ocean) and geologic processes (including weather, erosion and deposition). Locate examples of these in the local environment.</p>	<p>S:ESS1:4:6.4 Use results from an experiment to draw conclusions about how water interacts with earth materials (e.g., percolation, erosion, frost heaves).</p>	<p>understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>C) Energy—<i>While they may have little understanding of formal concepts associated with energy, learners are familiar with the basic behavior of some different forms of energy.</i></p> <ul style="list-style-type: none"> • Identify different forms of energy including radiant light, geothermal, electrical, and magnetic energy. • Identify examples of these different forms in their homes, school, community, and natural environment. • Explain some of the ways in which heat, light, or electricity are produced, travel, stored and used. Use examples such as the sun, power generation, batteries, and so forth. 	<p>S:PS2:4:1.1 Recognize that energy has the ability to create change.</p> <p>S:PS2:4:3.1 Identify the various forms of energy, such as electrical, light, heat, sound.</p>	<p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>Strand 2.2- The Living Environment</p>		
<p>A) Organisms, populations, and communities—<i>Learners understand basic similarities and differences among a wide variety of living organisms. They understand the concept of habitat.</i></p> <ul style="list-style-type: none"> • Identify similarities and differences among living organisms ranging from single-celled organisms they can observe under microscopes to plants and animals they encounter through direct observation, videos, books, or other media. • Classify or group organisms using categories such as how animals bear their young, anatomical features, or habitats. • Describe the basic needs of all living things and explain how organisms meet their needs in different types of environments such as deserts, lakes, or forests. 	<p>S:LS1:4:1.2 Sort/classify different living things using similar and different characteristics; and describe why organisms belong to each group or cite evidence about how they are alike or not alike.</p> <p>S:LS1:4:2.3 Identify and explain how the physical structures of an organism (plants or animals) allow it to survive in its habitat/environment (e.g., roots for water; nose to smell fire).</p> <p>S:LS1:4:2.4 Identify the basic needs of plants and animals in order to stay alive (i.e., water, air, food, space).</p>	<p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p>
<p>B) Heredity and evolution—<i>Learners understand that plants and animals have different characteristics and that many of the characteristics are inherited.</i></p> <ul style="list-style-type: none"> • Identify some basic traits of plants and animals. Give examples of how those traits may vary among individuals of the same species. • Identify some similarities among offspring and parents as being inherited and others as resulting from the organism’s interactions 	<p>S:LS3:4:3.1 Recognize that individuals of the same species differ in their characteristics; and explain that sometimes these differences give individuals an advantage in survival and reproduction.</p>	<p><i>None at this level</i></p>

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<p>with its environment.</p> <ul style="list-style-type: none"> Compare fossil life forms and living organisms to identify similarities and differences between organisms that lived long ago and those alive today. 		
<p>C) Systems and connections—<i>Learners understand basic ways in which organisms are related to their environments and to other organisms.</i></p> <ul style="list-style-type: none"> Describe ways in which an organism’s behavior patterns are related to its environment. Identify examples of environmental change and discuss how these changes may be helpful or harmful to particular organisms. Identify ways in which organisms (including humans) cause changes in their own environments. Create a skit that shows how these changes may help or harm both the organisms that caused the change and other organisms. Identify ways in which organisms are interdependent. 	<p>S:LS2:4:1.2 Describe the interaction of living organisms with nonliving things.</p> <p>S:LS2:4:3.2 Describe ways plants and animals depend on each other (e.g., shelter, nesting, food).</p> <p>S:LS3:4:1.3 Using information (data or scenario), explain how changes in the environment can cause organisms to respond (e.g., survive there and reproduce, move away, die).</p>	<p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>D) Flow of matter and energy—<i>Learners know that living things need some source of energy to live and grow.</i></p> <ul style="list-style-type: none"> Explain how most living organisms depend on the sun as the source of their life energy. Give examples that illustrate the understanding that animals ultimately depend on plants for this energy and that plants depend on the sun. Use this idea to trace the energy in the food they eat for lunch back to the sun. Describe how matter can be recycled, sometimes in a changed form from the original material. Use examples from their own experience, such as fleece jackets made from recycled soda bottles or envelopes made from recycled telephone books. Or make their own recycled paper and explain how the use of matter differs between making recycled paper and new (or “virgin”)paper. 	<p>S:ESS2:4:2.1 Recognize that the Sun provides the light and heat necessary to maintain the temperature of the Earth.</p> <p>S:ESS4:4:3.1 Distinguish between and provide examples of materials that can be recycled/reused and those that cannot.</p> <p>S:ESS4:4:3.3 Explain how to dispose of waste so that it does not harm the environment.</p>	<p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>

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<ul style="list-style-type: none"> Explain the process of life, growth, death, and decay of living organisms as a form of recycling. For example, use a compost pile to study recycling of organic materials. 	<p>S:LS2:4:2.2 Recognize that energy is needed for all organisms to stay alive and grow or identify where a plant or animal gets its energy.</p>	
Strand 2.3- Humans and Their Societies		
<p>A) <i>Individuals and groups</i>—Learners understand that people act as individuals and as group members and that groups can influence individual actions.</p> <ul style="list-style-type: none"> Give examples of influences on individual behavior, particularly behavior that affects the environment. Consider influences such as financial costs, convenience, laws, and the opinions of friends and family members. Identify some of the many groups that a person can belong to at the same time. Describe some tensions that a person might feel as a result of belonging to different groups. Discuss why students might belong to school or after school clubs (such as environmental clubs or scouting troops). Consider personal benefits (such as fun and learning) as well as good things the clubs do for the whole school or community. 	<p>None at this level.</p>	<p>Skill 2.3 Real World Applications of Social Studies Skills J Students will develop personal skills. K Students will develop civic participation skills.</p> <p>SS:CV:1: The Nature and Purpose of Government Students will demonstrate an understanding of the nature of governments, and the fundamental ideals of government of the United States.</p>
<p>B) <i>Culture</i>—Learners understand that experiences and places may be interpreted differently by people with different cultural backgrounds, at different times, or with other frames of reference.</p> <ul style="list-style-type: none"> Describe their favorite place or their own community from a variety of perspectives, including their own. Role-play the reactions of different people to a place or historical event—especially one with local significance. Compare how people live in different regions and how different cultures meet basic human needs. For example, prepare a visual display that compares how people support themselves in different regions and discuss how those livelihoods can both affect the environment and depend on the environment. 	<p>None at this level.</p>	<p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p> <p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions</p>

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		<p>between Earth’s physical and human systems.</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p> <p>SS:HI:5: Social/Cultural Students will demonstrate an understanding of the interaction of various social groups, including their values, beliefs and practices, over time.</p> <p>SS:WH:4: Economic Systems & Technology Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>C) Political and economic systems—Learners understand that government and economic systems exist because people living together in groups need ways to do things such as provide for needs and wants, maintain order, and manage conflict.</p> <ul style="list-style-type: none"> • Discuss what might happen if there were no laws to protect the environment in their area. Consider possible positive and negative effects on plants and animals, specific natural areas, landowners, specific businesses, water users, and others. • List jobs in their community that are linked to processing natural resources. Identify clusters of related businesses and interview employees or owners to determine why those economic activities are located in their community. • Identify elements of infrastructure (e.g. communications and transportation systems) in their community. For example, create a map or a skit showing how information, people, and goods move from place to place. Include information about who is responsible for, or who pays for, this infrastructure (e.g., the 	<p>S:ESS4:4:4.1 Identify some jobs/careers that require knowledge and use of Earth science content and/or skills.</p> <p>S:LS5:4:4.1 Identify some jobs/careers that require knowledge and use of life science content and/or skills.</p> <p>S:PS4:4:4.1 Identify some jobs/careers that require knowledge and use of physical science content and/or skills.</p>	<p>SS:CV:1: The Nature and Purpose of Government Students will demonstrate an understanding of the nature of governments, and the fundamental ideals of government of the United States.</p> <p>SS:EC:1: Economics and the Individual Students will learn about their role in a free market, how decisions that they make affect the economy, and how changes in the economy can affect them.</p> <p>SS:EC:4: Financial Institutions and</p>

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<p>government, private business, individuals).</p>		<p>the Government Students will understand how financial institutions and the government work together to stabilize our economy, and how changes in them affect the individual.</p> <p>SS:EC:5: International Economics and Trade Students will recognize the importance of international trade and how economies are affected by it.</p> <p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>D) Global connections—Learners understand how people are connected at many levels—including the global level— by actions and common responsibilities that concern the environment.</p> <ul style="list-style-type: none"> • Identify ways in which individual needs and wants are related to environmental concerns such as energy use, conservation and environmental protection. • Describe how trade connects people around the world and enables them to have things they might not be able or willing to produce themselves. For example, create a map that shows where a learner’s food, clothing and household items are produced, where the raw materials come from, products that are traded into and out from their region, and so forth. 	<p>None at this level.</p>	<p>SS:EC:2: Basic Economic Concepts Students will learn about the pillars of a free market economy and the market mechanism.</p> <p>SS:EC:5: International Economics and Trade Students will recognize the importance of international trade and how economies are affected by it.</p> <p>SS:GE:4: Human Systems</p>

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<ul style="list-style-type: none"> Identify possible environmental concerns that might come up in other regions or countries as a result of producing or shipping products that learners use regularly. Discuss how television, computers, and other forms of communication connect people around the world. 		<p>Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p> <p>SS:WH:2: Contacts, Exchanges & International Relations Students will demonstrate their understanding of the interactions of peoples and governments over time.</p> <p>SS:WH:4: Economic Systems & Technology Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>E) Change and conflict—Learners recognize that change is a normal part of individual and societal life. They understand that conflict is rooted in different points of view.</p> <ul style="list-style-type: none"> Identify aspects of family and community life that have remained constant over generations, as well as aspects that have changed. For example, interview family or community members and develop a visual display about their findings. Give examples of rules related to the environment at home, in school, or elsewhere that have changed and others that have stayed the same. Identify some basic ways in which individuals, groups, and institutions such as schools resolve conflict concerning the 	None at this level.	<p>Theme A: Conflict and Cooperation</p> <p>Theme E: Cultural Development, Interaction and Change</p> <p>SS:CV:1: The Nature and Purpose of Government Students will demonstrate an understanding of the nature of governments, and the fundamental ideals of government of the United States.</p>

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<p>environment. For example, develop and perform short skits about different ways of solving a school problem such as littering on the playground or in hallways.</p>		<p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:WH:1: Political Foundations and Developments Students will demonstrate an understanding of major events, ideas and issues pertaining to the history of governance.</p>
Strand 2.4- Environment and Society		
<p>A) Human/environment interactions—Learners understand that people depend on, change, and are affected by the environment.</p> <ul style="list-style-type: none"> • Identify ways in which people depend on the environment. For example, create an artistic representation of how the environment provides food, water, air, recreation, minerals, and other resources. • Identify ways in which human actions change the environment. For example, list changes that activities such as building houses or stores with parking lots, farming, or damming rivers have caused within their community or region. • Describe how the environment affects human activities in their community or region. For example, describe the effects of weather or climate, the likelihood of earthquakes or flooding, soil and mineral types, or the presence of water on where people live, how they make a living, how they recreate, and so forth. 	<p><i>None at this level.</i></p>	<p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>B) Places—Learners understand that places differ in their physical and human characteristics.</p>	<p><i>None at this level.</i></p>	<p>SS:CV:4: Rights and Responsibilities Students will demonstrate an</p>

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<ul style="list-style-type: none"> • Identify and describe places in their region that they or others think are important. For example, draw pictures, create a video, or take photographs that illustrate what people find unique or important about regional landmarks, downtown areas, parks, farms, wilderness areas, and so forth. • Discuss how humans create places that reflect their ideas, needs, and wants, as well as the physical environment. Illustrate with examples of places within their experience such as playgrounds, parks, classrooms, and homes. • Compare their neighborhood or town with another nearby place, or compare their favorite park with another park they know. List characteristics that make one place different from another. 		<p>understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p> <p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p>
<p>C) Resources—<i>Learners understand the basic concepts of resource and resource distribution.</i></p> <ul style="list-style-type: none"> • Explain what a natural resource is and give examples. • Distinguish among resources that are renewable and nonrenewable, and resources (like running water or wind) that are available only in certain places at certain times. • Identify ways they use resources in their daily lives. • Locate sources of various resources on a map. For example, trace the origins of the local water supply or map the region’s natural resources. • Link patterns of human settlement and other activity with the presence of specific resources such as mineral deposits, rivers, or fertile farming areas. Research the origins of their own community and explain the role of resource availability on how the community developed. 	<p><i>None at this level.</i></p>	<p>SS:EC:2: Basic Economic Concepts Students will learn about the pillars of a free market economy and the market mechanism.</p> <p>SS:GE:1:The World in Spatial Terms Students will demonstrate the ability to use maps, mental maps, globes, and other graphic tools and technologies to acquire, process, report and analyze geographic information.</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among</p>

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		<p>peoples.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>D) Technology—Learners understand that technology is an integral part of human existence and culture.</p> <ul style="list-style-type: none"> Describe technologies as tools and ways of doing things that humans have invented. Give examples of technologies that affect their lives in areas such as transportation, communications, and entertainment. Interview family members or community members to trace technological changes that have taken place over the last three generations. Identify drawbacks and benefits of specific technologies. Consider the fact that technologies can benefit some humans and other organisms while harming others. Identify important technological systems such as agriculture, transportation, and manufacturing. 	<p>S:SPS3:4:3.2 Describe how people have designed and used tools throughout history; and provide examples of how many of these tools, while improved, are still in use today.</p> <p>S:SPS3:4:3.3 Provide examples illustrating that throughout history, people of all ages and from all walks of life have made significant contributions to the fields of science and technology.</p>	<p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p> <p>SS:WH:4: Economic Systems & Technology Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>E) Environmental issues—Learners are familiar with some local environmental issues and understand that people in other places experience environmental issues as well.</p> <ul style="list-style-type: none"> Discuss some local environmental issues by identifying some changes or proposals that people disagree about. Describe or role-play how different people feel about these changes and proposals. Discuss how people in other places with similar conditions might react or perceive the situation in similar ways. 	<p>S:SPS3:4:2.7 Identify and investigate issues in their local environments and communities.</p>	<p>SS:EC:5: International Economics and Trade Students will recognize the importance of international trade and how economies are affected by it.</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions</p>

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		between Earth’s physical and human systems.

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Strand 3- Skills for Understanding and Addressing Environmental Issues		
Strand 3.1- Skills for Analyzing and Investigating Environmental Issues		
<p>A) Identifying and investigating issues—Learners are able to identify and investigate issues in their local environments and communities.</p> <ul style="list-style-type: none"> Identify and describe a current or historical environmental issue in their community. Use primary and secondary sources of information to explore the dilemma confronting people in a current or historical situation that involves the environment. Apply ideas of past, present, and future to local environmental issues. For example, describe what has changed, is changing, and could change or discuss how long the issue has existed. Identify people and groups that are involved. Identify some of the decisions and actions related to the issue. 	S:SPS3:4:2.7 Identify and investigate issues in their local environments and communities.	<p>Skill 2.1:B1 Distinguish between primary and secondary sources.</p> <p>Skill 2.1:B7 Utilize various types of sources such as documents, charts, images, artifacts and maps.</p> <p>SS:HI:5: Social/Cultural Students will demonstrate an understanding of the interaction of various social groups, including their values, beliefs and practices, over time.</p>
<p>B) Sorting out the consequences of issues—As learners come to understand that environmental and social phenomena are linked, they are able to explore the consequences of issues.</p> <ul style="list-style-type: none"> Observe and speculate about social, economic, and environmental effects of environmental changes and conditions, and proposed solutions to issues. For example, describe short- term and long-term effects of existing uses of land or another resource in the home, community, and region. Discuss how an environmental issue affects different individuals and groups. 	None at this level.	<p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of they physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p>
<p>C) Identifying and evaluating alternative solutions and courses of action—Learners understand there are many approaches to resolving issues.</p>	S:SPS3:4:2.7 Identify and investigate issues in their local environments and communities.	Skill 2.2:12 Identify alternative sources of action and predict likely consequences of each.

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<ul style="list-style-type: none"> Identify proposed solutions to an issue and discuss arguments for and against them. Explain why various strategies may be effective in different situations, and that each proposed strategy is likely to have a different effect on society and the environment. Illustrate with examples from a specific issue. Describe some of the different levels at which action can be taken—for example by individuals, families, school classes, different levels of government, or businesses. Identify ways that these groups might take action on a specific issue. Propose alternative approaches to problems. 		Skill 2.3:K Students will develop civic participation skills.
<p>D) Working with flexibility, creativity, and openness—Learners understand the importance of sharing ideas and hearing other points of view.</p> <ul style="list-style-type: none"> Engage in critique and discussion as part of the process of inquiry. Explain why these processes are important. Hear and respect different perspectives and communicate with people whose lives, cultures, and viewpoints are different from their own. Identify ideas and interpretations that differ from theirs. Ask questions about different perspectives and discuss their strong points and drawbacks. 	<p>S:SPS3:4:1.2 Communicate ideas to others.</p> <p>S:SPS3:4:1.3 Give specific feedback about work of others.</p> <p>S:SPS4:4:6.2 Engage in group decision making activities.</p>	<p>Skill 2.2:H Students will be able to present information in a variety of ways.</p> <p>Skill 2.3:J Students will develop personal skills.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p>
<p>Strand 3.2- Decision-Making and Citizenship Skills</p> <p>A) Forming and evaluating personal views—Learners are able to examine and express their own views on environmental issues.</p> <ul style="list-style-type: none"> Identify and express their own ideas about environmental issues and alternative ways to address them. Test their views against what they know and believe, remaining open to new information and ideas. Identify unanswered questions. Identify, clarify, and express their own beliefs and values regarding the environment. 	None at this level.	<p>Skill 2.2:I Students will be able to make informed decisions.</p> <p>Skill 2.3:J Students will develop personal skills.</p>
<p>B) Evaluating the need for citizen action—Learners are able to think critically about whether they believe action is needed in particular situations and whether they believe they should be involved.</p> <ul style="list-style-type: none"> Discuss whether citizens should take action on a particular environmental issue. Consider findings from their issue investigations such as causes of the problem and promising strategies for addressing it. Identify types of citizen action appropriate for a specific issue. 	None at this level.	<p>Skill 2.3:K Students will develop civic participation skills.</p> <p>SS:CV:1: The Nature and Purpose of Government Students will demonstrate an understanding of the nature of governments, and the fundamental</p>

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<ul style="list-style-type: none"> Discuss whether and how they think they would like to be involved. Identify reasons for and against taking specific kinds of action. 		ideals of government of the United States.
<p>C) Planning and taking action—<i>By participating in issues of their choosing—mostly close to home—they learn the basics of individual and collective action.</i></p> <ul style="list-style-type: none"> Develop action plans they can carry out individually, in small groups, or as a class. Include clear reasons and goals for action. Consider the results of their environmental issue investigation and their assessment of the need for action. Set realistic goals for action and measures of success consistent with learners' abilities. Decide whether their plan should be implemented immediately or at another time, changed, or abandoned; and carry through with action when appropriate. 	S:SPS3:4:2.1 Demonstrate a basic conservation action such as recycling or a schoolyard habitat project.	<p>Skill 2.3:J Students will develop personal skills.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p>
<p>D) Evaluating the results of actions—<i>Learners understand that civic actions have consequences.</i></p> <ul style="list-style-type: none"> Describe the apparent effects of their own actions and actions taken by other individuals and groups. Discuss some of the reasons why identifying the effects of actions may be difficult. Consider, for example, the time required to see effects, the influences of others' actions, and other changes in the situation. 	<i>None at this level.</i>	<p>Skill 2.3:J Students will develop personal skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>

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Strand 4- Personal and Civic Responsibility		
<p>A) Understanding societal values and principles—<i>Learners can identify fundamental principles of U.S. society and explain their importance in the context of environmental issues.</i></p> <ul style="list-style-type: none"> Identify examples of beliefs that many U.S. citizens hold in common, such as the importance of individual property rights, the right to pursue happiness, the public or common good, and the well-being of future generations. Create a skit that explores why people might decide to act on environmental issues, 	<i>None at this level.</i>	<p>Theme A: Conflict and Cooperation</p> <p>Skill 2.3:J Students will develop personal skills.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p>

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<p>considering possible connections with these basic beliefs.</p> <ul style="list-style-type: none"> • Discuss how their own beliefs about the environment, environmental issues, and society compare to these general, societal beliefs. • Recognize tensions that occur when basic values and beliefs differ. Illustrate with examples from local environmental issues. 		<p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>
<p>B) Recognizing citizens' rights and responsibilities— <i>Learners understand the basic rights and responsibilities of citizenship.</i></p> <ul style="list-style-type: none"> • Identify examples of the personal, political, and economic rights of U.S. citizens. • Identify examples of the responsibilities of citizenship. • Discuss rights and responsibilities in the context of local environmental issues. 		<p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>
<p>C) Recognizing efficacy—<i>Learners possess a realistic self-confidence in their effectiveness as citizens.</i></p> <ul style="list-style-type: none"> • Describe ways in which individuals and groups act within their community to protect the environment. Identify cases where citizen action has had an effect on an environmental decision or action. • Identify ways in which they have made a difference through their own actions. Give examples from situations over which learners have some control (for example, in the classroom, at home, or in the community) and that are appropriate to their level of understanding. 	<p><i>None at this level.</i></p>	<p>Skill 2.3:K Students will develop civic participation skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>
<p>D) Accepting personal responsibility—<i>Learners understand that they have responsibility for the effects of their actions.</i></p> <ul style="list-style-type: none"> • Identify and describe some of the effects that they and the groups they belong to (e.g., family or school class) have on the environment and on humans and other living beings. • Discuss the notion of responsibility and identify some of their personal responsibilities. 	<p>S:SPS3:4:1.1 Be able to complete an assigned task when given a specific role in a group.</p>	<p>Skill 2.3:K Students will develop civic participation skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>

Grade 8 Analysis

Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
Strand 1- Questioning, Analysis and Interpretation Skills		
<p>A) Questioning—<i>Learners are able to develop, focus, and explain questions that help them learn about the environment and do environmental investigations.</i></p> <ul style="list-style-type: none"> 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. 	<p>SPS1:8:1 Making Observations and Asking Questions</p> <p>SPS1:8:2 Designing Scientific Investigations</p> <p>SPS2:8:1 Nature of Science</p> <p>SPS3:8:1 Collaboration in Scientific Endeavors</p> <p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p><i>SPS4:8—all apply</i></p>	<p>Skill 2.2:H Students will be able to present information in a variety of ways.</p>
<p>B) Designing investigations—<i>Learners are able to design environmental investigations to answer particular questions—often their own questions.</i></p> <ul style="list-style-type: none"> Select types of inquiry appropriate to their questions. 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. 	<p>SPS1:8:1 Making Observations and Asking Questions</p> <p>SPS1:8:2 Designing Scientific Investigations</p> <p>SPS1:8:3 Conducting Scientific Investigations</p> <p>SPS2:8:1 Nature of Science</p> <p>SPS3:8:1 Collaboration in Scientific Endeavors</p>	<p><i>None at this level.</i></p>
<p>C) Collecting information—<i>Learners are able to locate and collect reliable information about the environment or environmental topics using a variety of methods and sources.</i></p>	<p>SPS1:8:1 Making Observations and Asking Questions</p>	<p>Skill 2.1:A Students will be able to find social studies-related information.</p>

Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
<ul style="list-style-type: none"> • 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. 	<p>SPS1:8:3 Conducting Scientific Investigations</p> <p>SPS2:8:1 Nature of Science</p> <p>SPS3:8:1 Collaboration in Scientific Endeavors</p> <p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:8—<i>all apply</i></p>	<p>Skill 2.1:C Students will be able to find information.</p> <p>Skill 2.1:D Students will be able to carry out a variety of information-gathering techniques.</p> <p>Skill 2.2:F Students will be able to clarify information.</p>
<p>D) Evaluating accuracy and reliability—<i>Learners are able to judge the weaknesses and strengths of the information they are using.</i></p> <ul style="list-style-type: none"> • 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. Identify gaps in information that indicate a need for further discovery or inquiry. • Evaluate data and evidence for accuracy, relevance, significance, appropriateness, and clarity. 	<p>SPS1:8:1 Making Observations and Asking Questions</p> <p>SPS1:8:4 Representing and Understanding Results of Investigations</p> <p>SPS1:8:5 Evaluating Scientific Explanations</p> <p>SPS4:8:3 Critical Thinking and Systems Thinking</p> <p>SPS4:8:8 Accountability and Adaptability</p>	<p>Skill 2.1:A Students will be able to find social studies-related information.</p> <p>Skill 2.1:B Students will be able to comprehend the wide range of social-studies related materials by using skills.</p> <p>Skill 2.2:G Students will be able to interpret information.</p> <p>Skill 2.2:I Students will be able to make informed decisions.</p>
<p>E) Organizing information—<i>Learners are able to classify and order data, and to organize and display information in ways that help analysis and interpretation.</i></p>	<p>SPS1:8:4 Representing and Understanding Results of Investigations</p>	<p>Skill 2.2:F Students will be able to clarify information.</p>

Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
<ul style="list-style-type: none"> • Present environmental data in a variety of formats including charts, tables, plots, graphs, maps, and flowcharts. 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. 	<p>SPS2:8:1 Nature of Science</p> <p>SPS3:8:1 Collaboration in Scientific Endeavors</p> <p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:8:2 Communication Skills</p> <p>SPS4:8:3 Critical Thinking and Systems Thinking</p> <p>SPS4:8:7 Self Direction</p>	<p>Skill 2.2:G Students will be able to interpret information.</p> <p>Skill 2.2:H Students will be able to present information in a variety of ways.</p>
<p>F) Working with models and simulations—<i>Learners understand many of the uses and limitations of models.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS2:8:3 Models and Scale</p>	<p>Skill 2.2:G Students will be able to interpret information.</p> <p>Skill 2.2:H Students will be able to present information in a variety of ways.</p> <p>Skill 2.2:I Students will be able to make informed decisions.</p> <p>SS:GE:1: The World in Spatial Terms Students will demonstrate the ability to use maps, mental maps, globes and other graphic tools and technologies to acquire, process, report and analyze geographic information.</p>
<p>G) Drawing conclusions and developing explanations—</p>	<p>SPS1:8:1 Making Observations</p>	<p>Skill 2.2:G Students will be able to</p>

Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
<p><i>Learners are able to synthesize their observations and findings into coherent explanations.</i></p> <ul style="list-style-type: none"> • 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. 	<p>and Asking Questions</p> <p>SPS1:8:4 Representing and Understanding Results of Investigations</p> <p>SPS1:8:5 Evaluating Scientific Explanations</p> <p>SPS2:8:1 Nature of Science</p> <p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:8:2 Communication Skills</p> <p>SPS4:8:3 Critical Thinking and Systems Thinking</p> <p>SPS4:8:4 Problem Identification, Formulation and Solution</p> <p>SPS4:8:6 Interpersonal and Collaborative Skills</p>	<p>interpret information.</p> <p>Skill 2.2:I Students will be able to make informed decisions.</p>

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Strand 2- Knowledge of Environmental Processes and Systems		
Strand 2.1- The Earth as a Physical System		
<p>A) Processes that shape the Earth—<i>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.</i></p>	<p>ESS1:8:1 Atmosphere, Climate and Weather</p>	<p>SS:GE:3: Physical Systems Students will demonstrate an understanding of the physical</p>

NAAEE Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
<ul style="list-style-type: none"> 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. 	<p>ESS1:8:5 Processes and Rates of Change</p> <p>ESS1:8:7 Water</p>	<p>processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>B) Changes in matter—<i>Learners understand the properties of the substances that make up objects or materials found in the environment.</i></p> <ul style="list-style-type: none"> 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 constituent parts and the processes by which they were formed. 	<p>ESS1:8:6 Rock Cycle</p> <p>ESS1:8:7 Water</p> <p>PS1:8:1 Composition</p> <p>PS1:8:2 Properties</p>	<p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>C) Energy—<i>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.</i></p> <ul style="list-style-type: none"> Trace the flow of energy in examples that encompass 	<p>SPS2:8:2 Systems and Energy</p> <p>SPS4:8:3 Critical Thinking and Systems Thinking</p>	<p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human</p>

NAAEE Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
<p>several different transfers and transformations of energy. For example, trace the path of energy in the creation and consumption of fossil fuels.</p> <ul style="list-style-type: none"> • 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. 	<p>ESS2:8:2 Energy</p> <p>LS2:8:2 Flow of Energy</p> <p>PS2:8:2 Conservation</p> <p>PS2:8:3 Energy</p>	<p>settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:GE:5: Environment and Society</p> <p>Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
Strand 2.2- The Living Environment		
<p>A) Organisms, populations, and communities—<i>Learners understand that biotic communities are made up of plants and animals that are adapted to live in particular environments.</i></p> <ul style="list-style-type: none"> • 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 energy more slowly and therefore need to replace it less frequently (e.g., a python). Predict the habitatneeds of these different types of organisms. 	<p>SPS2:8:5 Form and Function</p> <p>LS1:8:1 Classification</p> <p>LS1:8:2 Living Things and Organization</p> <p>LS1:8:3 Reproduction</p> <p>LS2:8:2 Flow of Energy</p>	<p>SS:GE:4: Human Systems</p> <p>Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:GE:5: Environment and Society</p> <p>Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>

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<p>B) Heredity and evolution—Learners have a basic understanding of the importance of genetic heritage.</p> <ul style="list-style-type: none"> 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. 	<p>LS1:8:1 Classification</p> <p>LS1:8:3 Reproduction</p> <p>LS3:8:1 Change</p> <p>LS3:8:2 Evidence of Evolution</p> <p>LS3:8:3 Natural Selection</p> <p>LS4:8:3 Human Identity</p>	<p><i>None at this level.</i></p>
<p>C) Systems and connections—Learners understand major kinds of interactions among organisms or populations of organisms.</p> <ul style="list-style-type: none"> 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. 	<p>SPS2:8:2 Systems and Energy</p> <p>SPS2:8:4 Patterns of Change</p> <p>ESS1:8:1 Atmosphere, Climate and Weather</p> <p>ESS1:8:2 Composition and Features</p> <p>ESS1:8:5 Processes and Rates of Change</p> <p>ESS1:8:6 Rock Cycle</p> <p>ESS1:8:7 Water</p> <p>LS1:8:2 Living Things and Organization</p> <p>LS2:8:1 Environment</p>	<p>SS:GE:3: Physical Systems Students will demonstrate an understanding of the physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p>

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	LS2:8:2 Flow of Energy LS2:8:3 Recycling of Materials	
<p>D) Flow of matter and energy—<i>Learners understand how energy and matter flows among the abiotic and biotic components of the environment.</i></p> <ul style="list-style-type: none"> 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. 	SPS2:8:2 Systems and Energy SPS2:8:4 Patterns of Change ESS2:8:1 Earth, Sun and Moon ESS2:8:2 Energy LS2:8:2 Flow of Energy LS2:8:3 Recycling of Materials	<p><i>None at this level.</i></p>
<p>Strand 2.3- Humans and Their Societies</p>		
<p>A) Individuals and groups—<i>Learners understand that how individuals perceive the environment is influenced in part by individual traits and group membership or affiliation.</i></p> <ul style="list-style-type: none"> 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 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. 	SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation SPS4:8:6 Interpersonal and Collaborative Skills SPS4:8:9 Social Responsibility	<p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people's perceptions of places and regions.</p> <p>SS:HI:5: Social/Cultural Students will demonstrate an understanding of the interaction of various social groups, including their values, beliefs and practices, over time.</p> <p>SS:WH:5: Social/Cultural Students will demonstrate their understanding of the diversity of</p>

NAAEE Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
<p>B) Culture—<i>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.</i></p> <ul style="list-style-type: none"> • 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. 	<p><i>None at this grade level.</i></p>	<p>values, beliefs and practices of individuals and groups over time.</p> <p>SS:CV:3: The World and the United States' Place In It Students will demonstrate an understanding of the relationship of the United States to other countries, and the role of the United States in world affairs.</p> <p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people's perceptions of places and regions.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth's physical and human systems.</p>
<p>C) Political and economic systems—<i>Learners become more familiar with political and economic systems and how these systems take the environment into consideration.</i></p> <ul style="list-style-type: none"> • 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 	<p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p>	<p>SS:CV:2: Structure and Function of United States and New Hampshire Government Students will demonstrate an understanding of major provisions of the United States and New Hampshire Constitutions, and the organization and operation of government at all levels including the legislative, executive, and</p>

NAAEE Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
<p>uses. Discuss difficulties encountered in drawing these distinctions.</p> <ul style="list-style-type: none"> 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 factors. 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 . 		<p>judicial branches.</p> <p>SS:CV:3: The World and the United States' Place In It Students will demonstrate an understanding of the relationship of the United States to other countries, and the role of the United States in world affairs.</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>D) Global connections—<i>Learners become familiar with ways in which the world's environmental, social, economic, cultural, and political systems are linked.</i></p> <ul style="list-style-type: none"> 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. 	<p><i>None at this grade level.</i></p>	<p>SS:CV:3: The World and the United States' Place In It Students will demonstrate an understanding of the relationship of the United States to other countries, and the role of the United States in world affairs.</p> <p>SS:EC:5: International Economics and Trade Students will recognize the importance of international trade and how economies are affected by it.</p> <p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and human geographic features that</p>

NAAEE Guidelines-End of Grade 8	NH Science Curriculum Frameworks-End of Grade 8	NH Social Studies Curriculum Frameworks-End of Grade 8
		<p>define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>E) Change and conflict—<i>Learners understand that human social systems change over time and that conflicts sometimes arise over differing and changing viewpoints about the environment.</i></p> <ul style="list-style-type: none"> • 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. • 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 	<p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p>	<p>Theme A: Conflict and Cooperation</p> <p>SS:CV:3: The World and the United States’ Place In It Students will demonstrate an understanding of the relationship of the United States to other countries, and the role of the United States in world affairs.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p> <p>SS:GE:2: Places and Regions Students will demonstrate an understanding of the physical and</p>

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<p>commuting to work individually in a car or taking public transportation.</p> <ul style="list-style-type: none"> Identify some of the formal and informal ways that groups (including governments) attempt to anticipate, avoid, or resolve conflicts related to the environment. 		<p>human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p>
<p>Strand 2.4- Environment and Society</p>		
<p>A) Human/environment interactions—<i>Learners understand that human-caused changes have consequences for the immediate environment as well as for other places and future times.</i></p> <ul style="list-style-type: none"> 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. 	<p>ESS4:8:1 Design Technology</p> <p>ESS4:8:3 Local and Global Environmental Issues</p> <p>LS2:8:1 Environment</p> <p>LS5:8:1 Design Technology</p> <p>LS5:8:3 Social Issues (Local and Global); Medical Technology; Biotechnology</p>	<p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p> <p>SS:WH:2: Contacts, Exchanges & International Relations Students will demonstrate their understanding of the interactions of peoples and governments over time.</p> <p>SS:WH:4: Economic Systems & Technology Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>

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<p>B) Places—<i>Learners begin to explore the meaning of places both close to home and around the world.</i></p> <ul style="list-style-type: none"> 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. 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. 	<p>ESS4:8:1 Design Technology</p> <p>ESS4:8:2 Tools</p> <p>ESS4:8:3 Local and Global Environmental Issues</p>	
<p>C) Resources—<i>Learners understand that uneven distribution of resources influences their use and perceived value.</i></p> <ul style="list-style-type: none"> Map and discuss distribution and consumption patterns for specific resources, such as metals, fresh 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. 	<p>ESS4:8:2 Tools</p> <p>ESS4:8:3 Local and Global Environmental Issues</p>	<p>SS:EC:2: Basic Economic Concepts Students will learn about the pillars of a free market economy and the market mechanism.</p>
<p>D) Technology—<i>Learners understand the human ability to shape and control the environment as a function of the capacities for creating knowledge and developing new technologies.</i></p>	<p>ESS4:8:1 Design Technology</p> <p>LS5:8:1 Design Technology</p>	<p>SS:GE:5: Environment and Society Students will demonstrate an</p>

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<ul style="list-style-type: none"> • 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. 	<p>PS4:8:3 Social Issues (Local and Global); Energy, Power and Transportation; Manufacturing</p>	<p>understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p> <p>SS:WH:2: Contacts, Exchanges & International Relations Students will demonstrate their understanding of the interactions of peoples and governments over time.</p> <p>SS:WH:4: Economic Systems & Technology Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>E) Environmental issues—<i>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.</i></p> <ul style="list-style-type: none"> • 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 	<p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS3:8:3 Science and Technology, Technological Design and Application</p> <p>SPS4:8:3 Critical Thinking and</p>	<p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p> <p>SS:WH:4: Economic Systems &</p>

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<p>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.</p> <ul style="list-style-type: none"> • 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. 	<p>Systems Thinking</p> <p>ESS4:8:3 Local and Global Environmental Issues</p> <p>LS5:8:3 Social Issues (Local and Global); Medical Technology; Biotechnology</p> <p>PS4:8:3 Social Issues (Local and Global); Energy, Power and Transportation; Manufacturing</p>	<p>Technology</p> <p>Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>

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<p>Strand 3- Skills for Understanding and Addressing Environmental Issues</p>		
<p>Strand 3.1- Skills for Analyzing and Investigating Environmental Issues</p>		
<p>A) Identifying and investigating issues—<i>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.</i></p> <ul style="list-style-type: none"> • 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 	<p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:8—<i>all apply</i></p>	<p>Skill 2.1:B Students will be able to comprehend the wide range of social studies-related materials by using skills.</p> <p>Skill 2.2:G Students will be able to interpret information.</p>

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<p>behind them.</p> <ul style="list-style-type: none"> • Compare the issue with similar issues from other places and times. 		
<p>B) Sorting out the consequences of issues—<i>Learners are able to apply their knowledge of ecological and human processes and systems to identify the consequences of specific environmental issues.</i></p> <ul style="list-style-type: none"> • Describe the effects of human actions on specific elements, systems, and processes of the environment. • 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. 	<p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:8—all apply</p>	<p>Skill 2.2:G Students will be able to interpret information.</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of the physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p>
<p>C) Identifying and evaluating alternative solutions and courses of action—<i>Learners are able to identify and develop action strategies for addressing particular issues.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS3:8:1 Collaboration in Scientific Endeavors</p> <p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:8—all apply</p>	<p>Skill 2.2:I Students will be able to make informed decisions.</p> <p>Skill 2.3:J Students will develop personal skills.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p>

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<p>D) Working with flexibility, creativity, and openness— <i>Learners are able to consider the assumptions and interpretations that influence the conclusions they and others draw about environmental issues.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS3:8:1 Collaboration in Scientific Endeavors</p> <p>SPS3:8:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:8—<i>all apply</i></p>	<p>Skill 2.3:J Students will develop personal skills.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p>
<p>Strand 3.2- Decision-Making and Citizenship Skills</p>		
<p>A) Forming and evaluating personal views—<i>Learners are able to identify, justify, and clarify their views on environmental issues and alternative ways to address them.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS4:8—<i>all apply</i></p>	<p>Skill 2.3:J Students will develop personal skills.</p>
<p>B) Evaluating the need for citizen action—<i>Learners are able to evaluate whether they believe action is needed in particular situations, and decide whether they should be involved.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS4:8—<i>all apply</i></p>	<p>Skill 2.3:K Students will develop civic participation skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national</p>

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<ul style="list-style-type: none"> • 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. 		government through the political process and citizen involvement.
<p>C) Planning and taking action—<i>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.</i></p> <ul style="list-style-type: none"> • 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 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. 	SPS4:8—all apply	<p>Skill 2.3:K Students will develop civic participation skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>
<p>D) Evaluating the results of actions—<i>Learners are able to analyze the effects of their own actions and actions taken by other individuals and groups.</i></p> <ul style="list-style-type: none"> • 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. • 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. 	SPS4:8—all apply	<p>Skill 2.2:I Students will be able to make informed decisions.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p>

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Strand 4- Personal and Civic Responsibility		
<p>A) Understanding societal values and principles— <i>Learners understand that societal values can be both a unifying and a divisive force.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS4:8:9 Social Responsibility</p>	<p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p> <p>SS:HI:5: Social/Cultural Students will demonstrate an understanding of the interaction of various social groups, including their values, beliefs and practices, over time.</p> <p>SS:WH:5: Social/Cultural Students will demonstrate their understanding of the diversity of values, beliefs and practices of individuals and groups over time.</p>
<p>B) Recognizing citizens' rights and responsibilities—<i>Learners understand the rights and responsibilities of citizenship and their importance in promoting the resolution of environmental issues.</i></p> <ul style="list-style-type: none"> • 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 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 	<p>SPS4:8:9 Social Responsibility</p>	<p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>

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<p>one's actions; obeying the law; and respecting the rights and interests of others.</p>		
<p>C) Recognizing efficacy—<i>Learners possess a realistic self-confidence in their effectiveness as citizens.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS4:8—all apply</p>	<p>Skill 2.3:J Students will develop personal skills.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>
<p>D) Accepting personal responsibility—<i>Learners understand that their actions can have broad consequences and that they are responsible for those consequences.</i></p> <ul style="list-style-type: none"> • 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. 	<p>SPS4:8—all apply</p>	<p>Skill 2.2:I Students will be able to make informed decisions.</p> <p>Skill 2.3:K Students will develop civic participation skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state, and national government through the political process and citizen involvement.</p>

Grade 12 Analysis

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Strand 1- Questioning, Analysis and Interpretation Skills		
<p>A) Questioning—<i>Learners are able to develop, modify, clarify, and explain questions that guide environmental investigations of various types. They understand factors that influence the questions they pose.</i></p> <ul style="list-style-type: none"> • Articulate environmental phenomena or topics to be studied at scales ranging from local to global. • Pose a research question and hypothesis, identifying and defining key variables. For example, develop hypotheses about land use in a region by drawing on maps, newspaper articles, databases, and personal observations. • Identify historical and current ideas and beliefs—for example, about the environment, human perceptions of the environment, or the nature of knowledge—that inform their questions. 	<p>SPS1:11:1 Making Observations and Asking Questions</p> <p>SPS1:11:2 Designing Scientific Investigations</p> <p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:12:3 Critical Thinking and Systems Thinking</p> <p>SPS4:12:4 Problem Identification, Formulation and Solution</p>	<p>Skill 2.2 Organizing and Communicating Information</p> <p>Skill 2.3:J Students will develop personal skills.</p>
<p>B) Designing investigations—<i>Learners know how to design investigations to answer particular questions about the environment. They are able to develop approaches for investigating unfamiliar types of problems and phenomena.</i></p> <ul style="list-style-type: none"> • Select appropriate means of inquiry, including scientific investigations, historical inquiry, and social science observation and research. • Select and develop appropriate problem solving strategies for conducting environmental investigations. • Incorporate a wide range of tools and technologies as appropriate, including complex maps, measurement instruments and processes, and computer-based analysis. 	<p>SPS1:11:2 Designing Scientific Investigations</p> <p>SPS1:11:3 Conducting Scientific Investigations</p> <p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:12:3 Critical Thinking and Systems Thinking</p> <p>SPS4:12:4 Problem Identification,</p>	<p>Skill 2.1:D Students will be able to carry out a variety of information-gathering techniques.</p>

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<p>C) Collecting information—<i>Learners are able to locate and collect reliable information for environmental investigations of many types. They know how to use sophisticated technology to collect information, including computer programs that access, gather, store, and display data.</i></p> <ul style="list-style-type: none"> • Use basic sampling techniques such as spatial sampling and random sampling. Evaluate when these techniques are appropriate. • Apply data collection skills in field situations, such as interviewing community members about environmental concerns or sampling water in a local stream. • Gather information from a variety of sources including historical sites, censuses, tax records, statistical compilations, economic indicators, interviews or surveys, geographical information systems, and other data banks. • Adjust information collection strategies to compensate for potential bias in information sources. • Perform basic statistical analyses to describe data using quantitative measures such as mean, median and mode. 	<p>Formulation and Solution</p> <p>SPS1:12:2 Designing Scientific Investigations</p> <p>SPS1:12:3 Conducting Scientific Investigations</p> <p>SPS1:12:4 Representing and Understanding Results of Investigations</p> <p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p>	<p>Skill 2.1 Acquiring Information</p> <p>Skill 2.2 Organizing and Communicating Information</p>
<p>D) Evaluating accuracy and reliability—<i>Learners can apply basic logic and reasoning skills to evaluate completeness and reliability in a variety of information sources.</i></p> <ul style="list-style-type: none"> • Identify logical errors and spurious statements in everyday situations such as political speeches about the environment or commercial advertising. • Look for and explain flaws such as faulty or misleading use of statistics, misrepresentation of data that is presented graphically, or biased selection of data to support a claim. For example, analyze the public debate over an environmental issue. Examine speeches, advertisements, news releases, and pamphlets put out by groups on various sides of the issue. • Explain why some research results are judged to be more 	<p>SPS1:12:4 Representing and Understanding Results of Investigations</p> <p>SPS1:12:5 Evaluating Scientific Explanations</p> <p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p>	<p>Skill 2.2:G Students will be able to interpret information.</p>

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<p>credible than are others. Consider factors such as possible sources of bias in interpretation, funding sources, and research procedures.</p>		
<p>E) Organizing information—<i>Learners are able to organize and display information in ways appropriate to different types of environmental investigations and purposes.</i></p> <ul style="list-style-type: none"> • Attend to details such as the type and accuracy of data, scale, accuracy of representation, and ease of interpretation. • Evaluate the strengths and weaknesses of the particular means of presentation for different purposes. • Work with technology designed to relate and display data, such as database and mapping software. • Integrate and summarize information using a variety of media ranging from written texts to graphic representations, and from audiovisual materials to maps and computer-generated images. 	<p>SPS4:12:2 Communication Skills</p> <p>SPS4:12:5 Creativity and Intellectual Curiosity</p>	<p>Skill 2.2 Organizing and Communicating Information</p>
<p>F) Working with models and simulations—<i>Learners are able to create, use, and evaluate models to understand environmental phenomena.</i></p> <ul style="list-style-type: none"> • Use algebraic and geometric models to represent processes or objects such as movement along earthquake fault lines, traffic flows, or population growth. • Use computers to create models and simulations. For example, project the effects of habitat fragmentation on species diversity, the air-quality effects of a new factory, the economic impacts of proposed water quality rules, or the visual changes a new housing development will make on the landscape. • Compare the applicability of models for particular situations, considering the models' assumptions as one factor. Explain how a single model may apply to more than one situation and how many models may represent a single situation. 	<p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:12:3 Critical Thinking and Systems Thinking</p> <p>SPS4:12:5 Creativity and Intellectual Curiosity</p>	<p>SS:GE:1: The World in Spatial Terms</p> <p>Students will demonstrate the ability to use maps, mental maps, globes and other graphic tools and technologies to acquire, process, report and analyze geographic information.</p>

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<ul style="list-style-type: none"> Evaluate and report the limitations of models used. 		
<p>G) Drawing conclusions and developing explanations— <i>Learners are able to use evidence and logic in developing proposed explanations that address their initial questions and hypotheses.</i></p> <ul style="list-style-type: none"> Use basic statistical analysis and measures of probability to make predictions and develop interpretations based on data. Differentiate between causes and effects and identify when causality is uncertain. Speak in general terms about their confidence in proposed explanations as well as possible sources of uncertainty and error. Distinguish between error and unanticipated results in formulating explanations. Consider the assumptions of models and measuring techniques or devices as possible sources of error. Identify what would be needed to reject the proposed explanation or hypothesis. Based on experience, develop new questions to ground further inquiry. For example, draw on the results of a stream-monitoring project to develop questions that guide an investigation into water quality issues in the community or the watershed. 	<p>SPS1:11:5 Evaluating Scientific Explanations</p> <p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:12:1 Information and Media Literacy</p>	<p>Skill 2.2 Organizing and Communicating Information</p>

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Strand 2- Knowledge of Environmental Processes and Systems		
Strand 2.1-The Earth as a Physical System		
<p>A) Processes that shape the Earth—<i>Learners understand the major physical processes that shape the Earth. They can relate these processes, especially those that are large- scale and long-term, to characteristics of the Earth.</i></p> <ul style="list-style-type: none"> Relate different types of climate to processes such as the 	<p>SPS2:11:5 Form and Function</p> <p>ESS1:11:1 Atmosphere, Climate and Weather</p>	<p>SS:GE:2 Places and Regions Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as</p>

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<p>transfer of heat energy, wind and ocean currents, and the cycling of water.</p> <ul style="list-style-type: none"> • Use examples such as the El Niño effect or the Santa Ana winds to illustrate how changes in wind patterns or ocean temperatures can affect weather in different parts of the world. • Explain distinctive landforms in terms of the physical processes (particularly those related to changes in the Earth's crust or long-term processes such as erosion) that shaped them. • Describe possible relationships between surface water and ground water. For example, create a model or a cross-sectional drawing that shows surface- and groundwater flows in a local drainage. Explain why surface and ground water are related in these ways. 	<p>ESS1:11:2 Composition and Features</p> <p>ESS1:11:5 Processes and Rates of Change</p>	<p>how culture and experience influence people’s perceptions of places and regions.</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of the physical processes that shape the patterns of Earth’s surface and the characteristics and spatial distribution of ecosystems.</p>
<p>B) Changes in matter—<i>Learners apply their understanding of chemical reactions to round out their explanations of environmental characteristics and everyday phenomena.</i></p> <ul style="list-style-type: none"> • Explain everyday chemical reactions such as burning fossil fuels, photosynthesis, or the creation of smog in terms such as the release or consumption of energy, the products of these reactions, and how these products may be involved in further chemical reactions and/or affect biogeochemical cycles. • Explain the chemical components of biological processes such as photosynthesis, respiration, nitrogen fixation, or decomposition, and how biological and physical processes fit in the overall process of biogeochemical cycling. • Explain why elements cycle through the biosphere at different rates, describing influences on reaction rates. (Oxygen and nitrogen cycle quickly, for example, while phosphorus tends to be released from its immobile form more slowly, depending upon factors such as soil acidity.) 	<p>ESS1:11:2 Composition and Features</p> <p>ESS4:11:3 Local and Global Environmental Issues</p> <p>LS1:11:2 Living Things and Organization</p> <p>LS2:11:3 Recycling of Materials</p>	<p><i>None at this level.</i></p>
<p>C) Energy—<i>Learners apply their knowledge of energy and matter to</i></p>	<p>ESS4:11:3 Local and Global</p>	<p>SS:GE:5: Environment and</p>

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<p><i>understand phenomena in the world around them.</i></p> <ul style="list-style-type: none"> • Compare different means of generating electricity (such as coal-burning plants, nuclear fusion reactors, wind, geothermal, and hydropower) in terms of the transformation of energy among forms, the relationship of matter and energy, and efficiency/production of heat energy. • Explain differences in conductivity among materials and relate these ideas to real-world phenomena. • Compare the efficiency of various types of motors or heating systems. • Use the laws of thermodynamics to explain why natural systems need a certain amount of energy input to maintain their organization. 	<p>Environmental Issues</p> <p>LS2:11:1 Environment</p> <p>PS2:11:2 Conservation</p> <p>PS2:11:3 Energy</p> <p>PS4:12:3 Social Issues (Local and Global; Energy, Power and Transportation; Manufacturing)</p>	<p>Society</p> <p>Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>
<p>Strand 2.2- The Living Environment</p>		
<p>A) Organisms, populations, and communities— <i>Learners understand basic population dynamics and the importance of diversity in living systems.</i></p> <ul style="list-style-type: none"> • Discuss the relationship of habitat changes to plant and animal populations. Consider such factors as variations in habitat size, fragmentation, and fluctuation in conditions such as pH, oxygen, available light, or water level. For example, describe the effects of a lake's eutrophication on plant, insect, bacteria, and fish populations. • Discuss some of the ways in which populations can change over time, using ideas such as cyclic fluctuations, equilibrium, and coupled oscillations. Evaluate influences on population growth rate, including reproductive strategies and resource limitations. • Explain how diversity of characteristics among organisms of a species increases the likelihood of the species surviving changing environmental conditions. • Explain how variation among species in a system increases the likelihood that at least some species will survive 	<p>SPS2:11:4 Patterns of Change</p> <p>LS2:11:1 Environment</p> <p>LS3:11:2 Evidence of Evolution</p> <p>LS3:11:3 Natural Selection</p>	<p><i>None at this level.</i></p>

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changes in environmental conditions.		
<p>B) Heredity and evolution—<i>Learners understand the basic ideas and genetic mechanisms behind biological evolution.</i></p> <ul style="list-style-type: none"> Describe the mechanisms of natural selection, incorporating factors such as genetic variation, the effect of inherited characteristics on individual survival and reproduction within a given environment, and the effects of environmental change. Use the theory of natural selection and concepts such as mutation, gene flow, and genetic drift to account for the adaptation of species to specific environments. Explain the idea that the more biological diversity there is today, the more there may be in the future. Offer examples of exceptions to this general rule, and use it to help explain past mass extinctions. 	<p>LS3:11:2 Evidence of Evolution</p> <p>LS3:11:3 Natural Selection</p>	<p><i>None at this level.</i></p>
<p>C) Systems and connections—<i>Learners understand the living environment to be comprised of interrelated, dynamic systems.</i></p> <ul style="list-style-type: none"> Apply the concepts of ecosystem and eco-region to organize the multitude of relationships among organisms and environments encountered in earlier studies. Discuss the interactions among organisms and their environments. Explain ecosystem change with respect to variables such as climate change, the introduction of new species, and human impacts; and explain processes such as desertification and soil formation as mechanisms for such change. Describe succession in ecosystems and their constituent plant and animal communities. Illustrate this idea with examples such as the slow transformation of a volcanic island from barren rock to rain forest as initial plant colonizers create conditions favorable to other species, or the more rapid changes that occur after beavers dam a stream. Describe how adding a species to, or removing one from, an ecosystem may affect other organisms and the entire 	<p>SPS2:11:4 Patterns of Change</p> <p>LS2:11:1 Environment</p> <p>LS2:11:2 Flow of Energy and Recycling of Materials</p>	<p>SS:GE:2 Places and Regions</p> <p>Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p>

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system.		
<p>D) Flow of matter and energy—<i>Learners are able to account for environmental characteristics based on their knowledge of how matter and energy interact in living systems.</i></p> <ul style="list-style-type: none"> • Illustrate how energy for life is provided primarily by continual inputs from the sun, captured by plants through photosynthesis and converted into carbon-based molecules. Describe exceptions such as geothermal and natural nuclear energy. • Trace the flow of matter and energy through living systems, and between living systems and the physical environment. For example, show how oxygen is released to the atmosphere by the interaction of plants, animals, and non-living matter in the carbon cycle. Or use the carbon cycle to explain the existence of fossil energy sources. • Explain how the abundance and distribution of living organisms are limited by the available energy and certain forms of matter such as water, oxygen, and minerals. 	<p>ESS2:11:2 Energy</p> <p>ESS4:11:3 Local and Global Environmental Issues</p> <p>LS1:11:2 Living Things and Organization</p> <p>LS2:11:1 Environment</p> <p>LS2:11:2 Flow of Energy and Recycling of Materials</p> <p>LS2:11:3 Recycling of Materials</p>	<p><i>None at this level.</i></p>
Strand 2.3–Humans and Their Societies		
<p>A) Individuals and groups—<i>Learners understand the influence of individual and group actions on the environment, and how groups can work to promote and balance interests.</i></p> <ul style="list-style-type: none"> • Predict how the environmental effects of their personal actions might change over time. Consider variables such as technological advances, lifestyle changes, or taking on such roles as business owners, employees in various careers, or parents. • Analyze how the actions of societal organizations such as businesses or community groups may have environmental consequences and other impacts that go beyond the intended aims of the group. • Describe how particular groups meet or balance individual needs, group goals, and the common societal good. Use examples such as conservation organizations, organizations 	<p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS3:11:3 Science and Technology, Technological Design and Application</p> <p>ESS4:11:3 Local and Global Environmental Issues</p> <p>LS5:11:3 Social Issues (Local and Global); Medical Technology; Biotechnology</p>	<p>Skill 2.3 Real World Applications of Social Studies Skills</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p> <p>SS:WH:5: Social/Cultural Students will demonstrate their understanding of the diversity of values, beliefs and practices of</p>

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of professionals in environmental or resource management fields, community associations, or business groups.		individuals and groups over time.
<p>B) Culture—<i>Learners understand cultural perspectives and dynamics and apply their understanding in context.</i></p> <ul style="list-style-type: none"> Analyze how cultural change and altered views of the environment are related. For example, discuss how the shift away from a largely rural society to a predominantly urban one may influence changing perceptions of the environment. Recognize diverse cultural views about humans and the environment. Anticipate ways in which people from different cultural perspectives and frames of reference might interpret data, events, or policy proposals. Describe and compare historical and contemporary societal strategies for adapting to environmental or social change while preserving and transmitting culture. For example, describe ways resource dependent communities (those whose economies traditionally relied on activities such as mining or timber harvest) work to maintain their identities in the face of mine closures or declining timber harvests. 	<i>None at this level.</i>	<p>SS:GE:4: Human Systems Students will demonstrate an understanding of human migration; the complexity of cultural mosaics; economic interdependence; human settlement patterns; and the forces of cooperation and conflict among peoples.</p> <p>SS:WH:5: Social/Cultural Students will demonstrate their understanding of the diversity of values, beliefs and practices of individuals and groups over time.</p>
<p>C) Political and economic systems—<i>Learners understand how different political and economic systems account for, manage, and affect natural resources and environmental quality.</i></p> <ul style="list-style-type: none"> Explain the development of economic systems using the economic idea of scarcity and the geographic idea of uneven distribution of resources. Compare the U.S. political and economic systems with other types of systems, focusing on how the systems govern the use of natural resources, control production and consumption, and protect environmental quality. Evaluate the environmental and societal costs and benefits of allocating goods and services in different ways (e.g. through public or private sectors). For example, explain problems such as over-fishing, overgrazing, and 	ESS1:11:7 Water	<p>SS:EC:2: Basic Economic Concepts Students will learn about the pillars of a free market economy and the market mechanism.</p> <p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p> <p>SS:HI:2: Contacts, Exchanges &</p>

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<p>deforestation considering what can happen to resources that are commonly owned and openly accessible. Or examine successful common property management systems that promote sustainable use of resources.</p> <ul style="list-style-type: none"> • Explain current and historical environmental issues in terms of political and economic ideas. For example, analyze the role of private property rights and the concept of general welfare in shaping decisions about the use and protection of wetlands in the United States. • Evaluate the structure and functions of the United Nations and its agencies in addressing global environmental issues. 		<p>International Relations Students will demonstrate an understanding of the events, actions and policies of our nation in relation to other peoples and governments over time.</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p> <p>SS:WH:2: Contacts, Exchanges & International Relations Students will demonstrate their understanding of the interactions of peoples and governments over time.</p> <p>SS:WH:4: Economic Systems & Technology Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>D) Global connections—<i>Learners are able to analyze global social, cultural, political, economic, and environmental linkages.</i></p> <ul style="list-style-type: none"> • Explain regional and national economic specialization and international trade in terms of uneven distribution of resources and differing costs of producing similar goods (due to factors such as climate, labor costs, and energy 	<p>ESS4:11:3 Local and Global Environmental Issues</p> <p>LS4:11:3 Human Identity</p>	<p>SS:CV:3: The World and the United States' Place In It Students will demonstrate an understanding of the relationship of the United States to other countries, and the role of the United States in</p>

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<p>costs).</p> <ul style="list-style-type: none"> Describe global connections in systems such as the economy, transportation, and communication. Evaluate the effects of changes in these systems on communities and the environment on a global scale. Consider instances in which global linkages are strong, and in which they are relatively weak. Evaluate the connections among interests, decisions, and actions taken at the individual, community, regional, national, and global levels. Consider their effect on global issues such as human rights, economic development, health, resource allocation, and environmental quality. For example, examine the influence of factors such as consumer preferences, U.S. foreign policy, international treaties and governing bodies, international nongovernmental organizations, and corporate operations on agricultural practices in developing nations. 		<p>world affairs.</p> <p>SS:EC:5: International Economics and Trade Students will recognize the importance of international trade and how economies are affected by it.</p> <p>SS:WH:2: Contacts, Exchanges & International Relations Students will demonstrate their understanding of the interactions of peoples and governments over time.</p> <p>SS:WH:4: Economic Systems & Technology Students will demonstrate their understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>E) Change and conflict—<i>Learners understand the functioning of public processes for promoting and managing change and conflict, and can analyze their effects on the environment.</i></p> <ul style="list-style-type: none"> Explain how public decision-making about the environment takes into account (or fails to account for) uneven distribution of, or different types of, costs and benefits; future or distant consequences; and difficulties assessing the value of certain costs or benefits such as ecosystem services or clean air. Evaluate the role of social, political, and economic institutions in the United States in managing change and conflict regarding environmental issues. Account for the 	<p>LS3:11:1 Change</p>	<p>Theme A: Conflict and Cooperation</p> <p>SS:HI:2: Contacts, Exchanges & International Relations Students will demonstrate an understanding of the events, actions and policies of our nation in relation to other peoples and governments over time.</p> <p>SS:HI:3: World Views and Value</p>

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<p>influence of institutions such as the legal system and property rights as well as organizations such as banks, nonprofit groups, corporations, and special interest groups.</p> <ul style="list-style-type: none"> • Evaluate the conditions and motivations that lead to conflict, cooperation, and change among individuals, groups, and nations. Look particularly at the effects of these forces on the control of natural resources. For example, examine the origins and effects of international treaties and accords on whaling or commercial fishing. • Evaluate various governmental and non-governmental strategies for promoting social change. For example, trace the strategies used by different groups to reduce energy use in the U.S. 		<p>Systems and Their Intellectual and Artistic Expressions Students will demonstrate an understanding of conceptions of reality, ideas, guidelines of behavior and forms of expression.</p>
<p>Strand 2.4–Environment and Society</p>		
<p>A) Human/environment interactions—<i>Learners understand that humans are able to alter the physical environment to meet their needs and that there are limits to the ability of the environment to absorb impacts or meet human needs.</i></p> <ul style="list-style-type: none"> • Evaluate ways in which technology has changed humans' ability to alter the environment and its capacity to support humans and other living organisms. Consider technologies that have had impacts learners see as positive, as well as negative. • Analyze specific examples of environmental change in terms of qualitative and quantitative costs and benefits for different groups of people and specific species or ecosystems. • Describe factors that limit the physical environment's capacity to support particular types of human activity such as suburban development, flood control, or particular agricultural practices. • Evaluate the cumulative effects of human actions on a specific species or environmental system, such as a stream or a watershed. 	<p>SPS3:11:3 Science and Technology, Technological Design and Application</p> <p>LS2:11:1 Environment</p> <p>LS3:11:1 Change</p> <p>LS4:11:2 Disease</p> <p>LS4:11:3 Human Identity</p> <p>LS5:11:3 Social Issues (Local and Global); Medical Technology; Biotechnology</p> <p>PS4:11:2 Tools</p>	<p>SS:GE:5: Environment and Society Students will demonstrate an understanding of the connections and consequences of the interactions between Earth's physical and human systems.</p> <p>SS:HI:4: Economic Systems & Technology Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>

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<ul style="list-style-type: none"> Use the concepts of carrying capacity and ecological footprint to analyze the sustainability of current trends in world population growth and natural resource consumption. 		
<p>B) Places—<i>Learners understand "place" as humans endowing a particular part of the Earth with meaning through their interactions with that environment.</i></p> <ul style="list-style-type: none"> Analyze how places change over time as the physical environment changes and as human use and perceptions change. For example, examine the effects of automobiles and the interstate highway system on different places. Explain the importance of places to human identity. For example, discuss changes in land use and personal and community identity that occur in a rapidly growing town or city, or one in which the economy has stagnated. Describe how regions change over time, examining factors such as human migration and population change, technological change, environmental degradation, and seismic activity. For example, trace the causes of the desiccation of the Aral Sea and the changes it has prompted in that region of Russia. 	<p>SPS3:11:3 Science and Technology, Technological Design and Application</p> <p>ESS1:11:2 Composition and Features</p> <p>PS4:12:3 Social Issues (Local and Global); Energy, Power and Transportation; Manufacturing</p>	<p>SS:GE:2 Places and Regions</p> <p>Students will demonstrate an understanding of the physical and human geographic features that define places and regions as well as how culture and experience influence people’s perceptions of places and regions.</p>
<p>C) Resources—<i>Learners understand that the importance and use of resources change over time and vary under different economic and technological systems.</i></p> <ul style="list-style-type: none"> Explain differences in the consumption of resources among nations using factors such as population size, cultural practices, and varied geographic or economic distribution of resources. Describe how changes in technology alter the use of resources. Illustrate with examples such as the ability to harvest timber on steep slopes using helicopters or building technologies that incorporate nontraditional or recycled materials. Evaluate public policies related to resource use. Consider 	<p>ESS1:11:7 Water</p> <p>ESS4:11:3 Local and Global Environmental Issues</p> <p>LS5:11:1 Design Technology</p> <p>LS5:11:3 Social Issues (Local and Global); Medical Technology; Biotechnology</p>	<p>SS:EC:2: Basic Economic Concepts</p> <p>Students will learn about the pillars of a free market economy and the market mechanism.</p> <p>SS:GE:5: Environment and Society</p> <p>Students will demonstrate an understanding of the connections and consequences of the interactions between Earth’s physical and human systems.</p>

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<p>variables such as their impacts on the resource and short- and long-term economic effects. For example, anticipate the relationship between water use and the growth of a city like Las Vegas, Nevada, which is in a desert area that receives only four inches of rainfall per year.</p> <ul style="list-style-type: none"> Identify ways in which various resources can be recycled and reused. Evaluate the viability of recycling based on economic and technological factors, spatial variables such as distance from recycling facility to markets, and possible future developments. For example, discuss factors that influenced the development of the steel or plastics recycling industry in the United States. 		
<p>D) Technology—<i>Learners are able to examine the social and environmental impacts of various technologies and technological systems.</i></p> <ul style="list-style-type: none"> Explain how social and economic forces influence the direction of technological development, and how technologies shape societal values and beliefs. For example, consider the ability to build large dams for water storage or hydropower, or the social impact of the first photos of the Earth from space. Using examples of particular technologies (such as genetic manipulation or cyanide heap leach gold mining) or technological systems (such as modern agriculture or energy production and use), discuss the social and environmental costs, benefits, risks, and possibilities associated with technologies through which humans shape and control their environment. Discuss ways in which technological advances have lessened the adverse environmental impacts of human activities. 	<p>ESS4:12:1 Design Technology</p> <p>ESS4:11:3 Local and Global Environmental Issues</p> <p>LS3:11:1 Change</p> <p>LS5:11:3 Social Issues (Local and Global); Medical Technology; Biotechnology</p>	<p>SS:HI:4: Economic Systems & Technology</p> <p>Students will demonstrate an understanding of the changing forms of production, distribution and consumption of goods and services over time.</p>
<p>E) Environmental issues—<i>Learners are familiar with a range of environmental issues at scales that range from local to national to global. They understand that these scales and issues are often linked.</i></p>	<p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and</p>	<p>SS:GE:3: Physical Systems</p> <p>Students will demonstrate an understanding of the physical</p>

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<ul style="list-style-type: none"> Evaluate a range of costs and benefits of particular policies that affect the environment. For example, consider the effects of free trade agreements on the ability of signatory nations to protect the environment, or examine the effects of programs for trading "pollution credits" among companies. Place local issues in the context of broader or larger scale issues, drawing parallels, and noting important similarities and differences. Use the broader issue to point to important local dynamics or perspectives of which to be aware. For example, consider local air pollution problems in the context of larger issues such as global climate change or acid precipitation in other parts of the country. Identify links among issues, for example the relationships among traffic congestion, poor air quality, and suburban sprawl. Explain key relationships among technological, social, ecological, economic, and other aspects of issues. 	<p>Conservation</p> <p>SPS3:11:3 Science and Technology, Technological Design and Application</p> <p>ESS1:11:7 Water</p> <p>ESS4:11:3 Local and Global Environmental Issues</p> <p>LS3:11:1 Change</p>	<p>processes that shape the patterns of Earth's surface and the characteristics and spatial distribution of ecosystems.</p> <p>SS:WH:5: Social/Cultural Students will demonstrate their understanding of the diversity of values, beliefs and practices of individuals and groups over time.</p>

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Strand 3– Skills for Understanding and Addressing Environmental Issues		
Strand 3.1–Skills for Analyzing and Investigating Environmental Issues		
<p>A) Identifying and investigating issues—<i>Learners apply their research and analytical skills to investigate environmental issues ranging from local issues to those that are regional or global in scope.</i></p> <ul style="list-style-type: none"> Define and clearly articulate issues to be investigated. Characterize the issue considering factors such as connections with other issues, the pervasiveness of its effects, whether it is a long-term issue or one that is 	<p>SPS1:11:1 Making Observations and Asking Questions</p> <p>SPS1:11:2 Designing Scientific Investigations</p> <p>SPS1:11:3 Conducting Scientific Investigations</p>	<p>Skill 2.1 Acquiring Information</p> <p>Skill 2.2 Organizing and Communicating Information</p>

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<p>motivated by a sudden change or crisis, and whether it is unique to a particular area.</p> <ul style="list-style-type: none"> Identify key individuals and groups involved. Identify different perspectives on the issue and approaches to resolving it. Discuss assumptions and goals that underlie each position. Examine contextual elements that shape the issue and alternative courses of action. Use these to identify relevant historical antecedents or contemporary parallels to the selected issue. For example, in studying questions surrounding the preservation of natural areas in Central America, students may look for similar issues in other developing nations, regions where people maintain traditional or subsistence uses of the land, or areas with similar governmental regimes. Investigate the issue as well as similar issues and proposals using secondary sources of information. Where needed, conduct original research, applying research methods from the natural and social sciences. For example, survey a community about an environmental issue using a random sample or test soils for the presence of contaminants. 	<p>SPS1:11:4 Representing and Understanding Results of Investigations</p> <p>SPS1:11:5 Evaluating Scientific Explanations</p> <p>SPS2:11:1 Nature of Science</p> <p>SPS3:11:2 Common Environmental Issues, Natural Resources Management and Conservation</p> <p>SPS4:12:1 Information and Media Literacy</p> <p>SPS4:12:3 Critical Thinking and Systems Thinking</p> <p>SPS4:11:4 Problem Identification, Formulation and Solution</p>	
<p>B) Sorting out the consequences of issues—<i>Learners are able to evaluate the consequences of specific environmental changes, conditions, and issues for human and ecological systems.</i></p> <ul style="list-style-type: none"> Evaluate the consequences of an environmental issue. For example, bring to bear historical perspectives, an understanding of the impacts of different technological developments, and knowledge of similar issues. Discuss the social, political, economic, and ethical implications of environmental issues. For example, trace the root causes of a community's solid waste problem and the effects of the problem and likely consequences of siting a landfill in different areas for different groups of people. 	<p>SPS1:11:5 Evaluating Scientific Explanations</p> <p>SPS2:11:1 Nature of Science</p> <p>SPS3:11:3 Science and Technology, Technological Design and Application</p> <p>ESS4:11:3 Local and Global Environmental Issues</p>	<p>Skill 2.2 Organizing and Communicating Information</p> <p>SS:GE:3: Physical Systems Students will demonstrate an understanding of the physical processes that shape the patterns of Earth's surface and the characteristics and spatial distribution of ecosystems.</p>

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<ul style="list-style-type: none"> Project the likely consequences for specific human and environmental systems of failure to resolve the issue. Use the idea of cumulative effects to explain why one set of environmental changes or human actions cannot be considered in isolation from others. 	LS5:11:3 Social Issues (Local and Global); Medical Technology; Biotechnology	
<p>C) Identifying and evaluating alternative solutions and courses of action—<i>Learners are able to identify and propose action strategies that are likely to be effective in particular situations and for particular purposes.</i></p> <ul style="list-style-type: none"> Synthesize different perspectives, types of data, and means of analysis to propose solutions to environmental issues. Apply knowledge of functional relationships, modeling, and statistical analysis to evaluating issues and different approaches to resolving them. For example, do basic traffic flow analyses to project the likely affects of commercial developments at the outskirts of town and evaluate alternative solutions such as widening roads, providing bus service, or changing the location of the development. Predict other likely consequences of different approaches to resolving projected traffic problems associated with the new stores. Evaluate proposed solutions using gauges such as likely impacts on society or the environment and likely effectiveness in resolving the issue. Use methods such as cost/benefit analysis, cumulative effects analysis, environmental impact analysis, ethical analysis, and risk analysis. Describe the strengths and weaknesses of each method, considering the main ideas behind each approach including which effects are important to look at and which values or societal goals it tries to protect. Define and provide examples of citizen action appropriate to proposed solutions. 	<p>SPS4:12:1 Information and Media Literacy</p> <p>SPS4:12:6 Interpersonal and Collaborative Skills</p>	<p>Skill 2.2:I Students will be able to make informed decisions.</p> <p>SS:GE:1: The World in Spatial Terms Students will demonstrate the ability to use maps, mental maps, globes and other graphic tools and technologies to acquire, process, report and analyze geographic information.</p>
<p>D) Working with flexibility, creativity, and openness— <i>While environmental issues investigations can bring to the surface deeply</i></p>	<p><i>None at this level.</i></p>	<p>Skill 2.3:J Students will develop personal skills.</p>

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<p><i>held views, learners are able to engage each other in peer review conducted in the spirit of open inquiry.</i></p> <ul style="list-style-type: none"> • Question, offer alternative explanations, and defend interpretations in group discussions. • Understand and explain the importance of such characteristics as honesty, openness, skepticism, and suspending judgment in the process of building knowledge. • Discuss when and how characteristics such as openness and decisiveness are valuable in addressing environmental issues. 		<p>Skill 2.3:K Students will develop civic participation skills.</p>
<p>Strand 3.2–Decision-Making and Citizenship Skills</p>		
<p>A) Forming and evaluating personal views—<i>Learners are able to communicate, evaluate, and justify their own views on environmental issues and alternative ways to address them.</i></p> <ul style="list-style-type: none"> • Articulate a position on an environmental issue. Justify the position based on an analysis of information from a variety of sources, personal beliefs and values, and clear reasoning. • Evaluate personal beliefs and values using criteria such as personal wellbeing; social and environmental welfare; economic vitality; and concern for other living beings. • Articulate elements of their own environmental ethic and discuss whether personal positions on issues are consistent with this ethic. • Consider viewpoints that differ from their own, and information that challenges their position. Evaluate whether and how such information might affect their views. 	<p>SPS4:12:1 Information and Media Literacy</p> <p>SPS4:12:2 Communication Skills</p> <p>SPS4:12:3 Critical Thinking and Systems Thinking</p> <p>SPS4:12:4 Problem Identification, Formulation and Solution</p>	<p>Skill 2.3:J Students will develop personal skills.</p>
<p>B) Evaluating the need for citizen action—<i>Learners are able to decide whether action is needed in particular situations and whether they should be involved.</i></p> <ul style="list-style-type: none"> • Evaluate whether action is warranted in specific situations, accounting for factors such as available evidence about the issue and proposed solutions; the scale of the issue; legal, social, economic, and ecological consequences; and alternatives to citizen action. 	<p>SPS4:12:2 Communication Skills</p>	<p>Skill 2.3:K Students will develop civic participation skills.</p>

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<ul style="list-style-type: none"> Evaluate whether personal involvement in particular actions is warranted, considering factors such as their own values, skills, resources, and commitment. Communicate decisions clearly, articulating well-reasoned arguments supporting their views and decisions. 		
<p>C) Planning and taking action—<i>Learners know how to plan for action based on their research and analysis of an environmental issue. If appropriate, they take actions that are within the scope of their rights and consistent with their abilities and responsibilities as citizens.</i></p> <ul style="list-style-type: none"> Develop plans for individual and collective action involving groups such as a small group of classmates, a school club, a community organization, or a church. Include clear reasons and goals for action. In planning, refer to their knowledge of a range of citizen action strategies and the results of their environmental issue investigations. Develop action plans based on an understanding of the complexity of the issue. Set realistic goals and include measures of success consistent with their abilities and the capacities of the groups involved. Decide whether their plan should be implemented immediately or at another time, modified, or abandoned; and carry through with action when appropriate. 	SPS4:12:6 Interpersonal and Collaborative Skills	Skill 2.3:K Students will develop civic participation skills.
<p>D) Evaluating the results of actions—<i>Learners are able to evaluate the effects of their own actions and actions taken by other individuals and groups.</i></p> <ul style="list-style-type: none"> Discuss the intended and unintended effects of citizen actions on specific environmental issues. Consider the apparent effects of citizen action on the environment, the political situation, and the individuals involved. Illustrate with examples such as a demonstration at a nuclear test facility, a local watershed festival, or a citizen lobbying effort against proposed environmental regulations. Analyze their own actions, evaluating apparent effects in 	SPS4:12:4 Problem Identification, Formulation and Solution	Skill 2.2:I Students will be able to make informed decisions.

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<p>terms of learners' goals, ethics, and broader societal goals. Develop a "lessons learned" document or presentation.</p> <ul style="list-style-type: none"> Account for some of the difficulties they encounter in evaluating the results of their actions. 		

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Strand 4- Personal and Civic Responsibility		
<p>A) Understanding societal values and principles—<i>Learners know how to analyze the influence of shared and conflicting societal values.</i></p> <ul style="list-style-type: none"> Identify shared political values and principles that unite U.S. citizens and analyze conflicting views about their meaning and application. For example, examine conflicting views about how to protect general welfare and private property rights in a specific land-use decision where a lawsuit has been filed alleging a "taking" of private property rights by the government. Analyze how societal institutions, such as banks, corporations, nonprofit organizations, lobbying groups, government agencies, and the courts, embody and perpetuate certain societal values and principles. Describe and suggest ways that individuals can work to change how societal institutions function and, consequently, to change their environmental impacts. 	<i>None at this level.</i>	Skill 2.3:J Students will develop personal skills.
<p>B) Recognizing citizens' rights and responsibilities—<i>Learners understand the importance of exercising the rights and responsibilities of citizenship.</i></p> <ul style="list-style-type: none"> Evaluate conflicts between individual rights and other societal interests such as a healthy environment. Discuss when individuals' civic obligations require them to subordinate their personal interests or desires to the public 	<i>None at this level.</i>	Skill 2.3:J Students will develop personal skills.

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<p>good.</p> <ul style="list-style-type: none"> • Explain the importance and evaluate the usefulness of civic dispositions such as trust, patience, self-discipline, respect, and open-mindedness to individuals and to society. • Explain the influence of citizen action and public opinion on particular policy decisions that affect the environment. • Reflect on the impact of citizen participation— particularly learners' own—on public concerns related to the environment and on the community. 		
<p>C) Recognizing efficacy—<i>Learners possess a realistic self-confidence in their effectiveness as citizens.</i></p> <ul style="list-style-type: none"> • Evaluate the extent to which individual and group action creates change, meets individual needs, and promotes the common good. • Identify ways in which learners, individually and collectively, are able to help maintain environmental quality and resolve problems and issues. Provide examples from the range of communities (e.g., family, club or group, school, town, state, nation, world) in which learners see themselves as members. 	<p>LS3:11:1 Change</p>	<p>Skill 2.3:J Students will develop personal skills.</p>
<p>D) Accepting personal responsibility—<i>Learners understand that their actions can have broad consequences and accept responsibility for recognizing those effects and changing their actions when necessary.</i></p> <ul style="list-style-type: none"> • Evaluate the effects of their actions (and the actions of the larger social groups of which they are part) on the environment, other humans, and other living things. • Explain ways in which the decisions of one generation create opportunities and impose constraints for future generations. Illustrate this idea with examples from the past, and incorporate it into their analyses of issues. • Evaluate the importance of fulfilling personal responsibilities for themselves, society, and the environment. 	<p>ESS4:12:3 Local and Global Environmental Issues</p> <p>LS3:11:1 Change</p>	<p>Skill 2.3:J Students will develop personal skills.</p> <p>SS:CV:4: Rights and Responsibilities Students will demonstrate an understanding of the rights and responsibilities of citizenship, and the ability to apply their knowledge of local, state and national government through the political process and citizen involvement.</p>

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<ul style="list-style-type: none"> Demonstrate a willingness to work individually and collectively toward the resolution of environmental issues and to participate thoughtfully and effectively in environmental decision-making. 		



Excellence in Environmental Education: Guidelines for Learning, K-12 <http://eelinked.naaee.net/n/guidelines>

K-12 Science Literacy New Hampshire Curriculum Framework <http://www.education.nh.gov/instruction/curriculum/science/index.htm>

K-12 Social Studies New Hampshire Curriculum Framework http://www.education.nh.gov/instruction/curriculum/social_studies/index.htm

New Hampshire Environmental Literacy Plan



New Hampshire Environmental Educators



New Hampshire Children in Nature Coalition



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www.NHEnvironmentalLiteracyPlan.wordpress.com

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