Education and Workforce Development Cabinet
Kentucky Department of Education
Kentucky Environmental Education Council

Kentucky Environmental Literacy Plan

The Kentucky Board of Education approved implementation of the Kentucky Environmental Literacy Plan by the Kentucky Department of Education in December of 2011. Development of the Plan was sponsored by the Kentucky Environmental Education Council and the Kentucky Department of Energy Development and Independence with American Reinvestment and Recovery Act funds.

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Executive Summary

The Kentucky Environmental Literacy Plan is the culmination of a collaborative, stakeholder process that spanned two years. During this time, experts in the fields of education, administration, and environmental education convened to draft a plan that is both exemplary and achievable. This plan was revised in 2018 effort to transform the plan into a living document that can be updated and revised to reflect the changing world of environmental education.

The Plan outlines seven major goals that will provide Kentucky with high school graduates who are environmentally literate. Students will come to appreciate the natural world as they are given opportunities to explore and learn outdoors during and after their school day. Research has shown that environmentally based education helps students in many different aspects including increased academic scores, better attendance, and reduced discipline issues.

Implementation of the Plan will require support from a broad network of stakeholders. In the schools, support from administration and teachers are critical. Students play a key role in this endeavor and can offer significant contributions to the school and community while practicing problem-solving and teamwork skills. The local community can support school districts through volunteerism, technical support, and in-kind or monetary resources. A number of nonprofits and state universities offer environmental education resources and training. At the statewide government level, the Education and Workforce Development Cabinet, Kentucky Board of Education, Kentucky Department of Education, and Kentucky Environmental Education Council are united in support of implementing this Plan. The Kentucky Association for Environmental Education is the Commonwealth's nonprofit environmental education professional organization and has been instrumental in working diligently to support these efforts through funding and integrated trainings to bring formal and nonformal partners together.

Developing our 21st Century Workforce and graduating students that are college and career ready are major goals of the Kentucky Department of Education. Students that are happy, healthy, and engaged as learners and as citizens are essential for the well-being of the Commonwealth. The Kentucky Environmental Literacy Plan is a valuable tool that can help us achieve these aims.

For Kentucky's Children,

Billy Bennett

Executive Director, Kentucky Environmental Education Council

Introduction

Daniel Boone once described Kentucky as a “second paradise.” Its fertile soil, favorable climate, and wide diversity of species create a unique and precious environment for residents and visitors. Despite their proximity to this unique environment, many Kentuckians lack a basic understanding of their local natural resources and the ecosystems that grace the Commonwealth (KEEC & UKRC, 2009).

Every five years, the Kentucky Environmental Education Council publishes results from a survey of Kentuckians’ Environmental Knowledge, Attitudes, and Behaviors in a document titled Land, Legacy and Learning. The most recent edition, Land, Legacy and Learning IV, found that while Appalachia is one of the most biodiverse places on Earth, only 28% of Kentuckians could correctly identify the definition of biodiversity as “the many different kinds of plants and animals,” (KEEC & INSANS, 2014). Longitudinal data from the survey indicates that more Kentuckians understand the difference between renewable and non-renewable resources than have in the past; however, the study reveals that over 20% of Kentuckians believe that coal is a renewable resource (KEEC & INSANS, 2014). The findings demonstrate a lack of understanding in content knowledge that state education standards say should be achieved by the fourth grade. Similarly, only 28% of Kentuckians correctly identified storm water runoff from lawns and farms as the most common source of water pollution in Kentucky (KEEC & INSANS, 2014). In order to create a sustainable society, people need to understand their local environment and how they play a role in their ecosystem.

As Kentucky policy makers and citizens work to address environmental challenges in the 21st century, including creating green jobs and working toward energy independence, it is clear that our citizens need a better understanding of their natural environment and the interconnection between ecological and human systems. This understanding can help lay the groundwork for establishing a sustainable balance between the economy, society, and the environment—an essential step along the path to a prosperous future for Kentucky.

The sustainable utilization of Kentucky’s natural resources are dependent upon future generations being fundamentally connected to the place they call home. First, students need a basic understanding of environmental systems with a connection to civic engagement and responsibility. To achieve this, it is essential to give students a solid understanding of current environmental challenges while providing them with basic tools to find solutions and make informed choices in their own lives. Only then can learners make the transformative connections between local and state choices to national and global impacts. The goal of the Kentucky Environmental Literacy Plan (KELP) is to provide students and educators with the tools and resources vital to building environmental literacy in the Commonwealth.

Defining Environmental Literacy

Environmental literacy is the ability to recognize the components of healthy natural and man-made systems and the actions necessary to maintain, restore, or improve them. Environmentally literate individuals have the knowledge and skills necessary to implement positive actions for achieving and maintaining a sustainable balance between human and environmental systems.

As a pathway to environmental literacy, environmental education prepares students for real-world challenges. As defined in Kentucky Statute (KRS 157.905), environmental education is:

> *An education process dealing with the interrelationships among the natural world and its man-made surroundings; is experience-based; interdisciplinary in its approach; and is a continuous lifelong process that provides the citizenry with the basic knowledge and skills necessary to individually and collectively encourage positive actions for achieving and maintaining a sustainable balance between man and the environment.*

Ensuring every child in Kentucky receives a balanced, academically centered environmental education is central to achieving environmental literacy and securing healthy, prosperous lives. Environmental education is truly interdisciplinary, as it helps students connect and apply learning from all content areas (such as math, science, language arts, social studies, physical education, practical living, and arts & humanities). Because the traditional curriculum is often subject specific, environmental education often falls through the cracks in our educational system, leaving a gap in the essential knowledge that ensures environmental literacy. Whether in the classroom or beyond, the desired outcome of environmental education is environmental literacy.

Why Develop the Kentucky Environmental Literacy Plan?

Recent federal legislation, the U.S. Department of Education's *Every Student Succeeds Act (ESSA): The Reauthorization of the Elementary and Secondary Education Act (2015)*, explicitly states the importance for environmental literacy ("Elementary and Secondary Education Act of 1965", 2018, p. 227,) attained through environmental education as one of the components of a well-rounded P-12 education ("Elementary and Secondary Education Act of 1965", 2018, p. 219).The KELP provides schools guidance so that students of Kentucky's P-12 education system graduate environmentally literate.

Benefits of Environmental Education

Research documents the multifaceted benefits of environment-based education. These benefits include academic achievement; child health and cognitive development; workforce development; and environmental sustainability.

Academic Achievement

Systematic environmental education is associated with improvements in student academic achievement. Multiple research studies indicate that when environment-based education is incorporated into schools, student achievement on standardized tests and other measures of academic progress increases (Ardoin, Bowers, Roth, & Holthuis N. 2017; McCormick, 2017; Athman & Monroe, 2004; Falco, 2004; Lieberman & Hoody 1998; NEETF, 1999; Norman, et. al, 2006; SEER, 2005). Various studies also document significant improvements in student motivation as measured by increased attendance, decreased tardiness, and fewer discipline referrals (Lieberman & Hoody, 1998; NEETF, 1999; SEER, 2005). Attendance and timeliness are particularly important because of the fiscal implications of absenteeism on district funding.

Whole Child Development

The natural environment provides all the things humans need to live: clean air and water, shelter, and wholesome food – as well as a place to learn. Environment-based education often utilizes the outdoors, and research shows that time spent in the outdoors benefits both physical health and cognitive development (McCormick, 2017; NEETF, 2011). Research on the impact of urban green spaces on human health found “consistent negative association between urban green space exposure and mortality, heart rate, and violence, and positive association with attention, mood, and physical activity.” (Kondo, Fluehr, McKeon, & Branas, C. 2018)

Many recent research studies show that children need a daily dose of time spent in green spaces (defined as vegetated land or water) to remain healthy and happy, and that time spent outdoors positively impacts children’s health by increasing their physical activity and enhancing development of motor skills (McCormick, R., 2017; NEETF, 2011). There is also research indicating that schools that assess and address the environmental conditions of the school, such as access to green spaces and air quality, can identify cost effective methods for reducing chronic absenteeism (MacNaughton, Eitland, Kloog, Schwartz, & Allen, 2017). An article in Sports Medicine stated that schools should be re-designed to incorporate diverse natural features to increase children’s physical activity, and consequently their health and wellbeing (Sharma-Brymer, & Bland, 2016). According to the Kentucky Cabinet for Health and Family Services website the Centers for Disease Control and Prevention, Kentucky has the fifth-highest rate of obesity in the nation. About one-third of U.S. adults (33.8 percent) are obese. Approximately 17 percent or 12.5 million of children and adolescents ages 2-19 years are obese according to data from the National Health and Examination Survey (Obesity, n.d.). In the 2017 update to the state health assessment the Kentucky Department for Public Health reports that From 2007 to 2015, the percentage of Kentucky high school students who were obese increased from 15.4% to 18.5% (Kentucky Department for Public Health, 2017) Increased physical activity, especially in an outdoor setting, is an important avenue for addressing this health concern.

Research also validates that contact with the natural world stimulates cognitive development (Wells, 2000). Environment-based education exposes students to activities that require teamwork, problem solving and higher-order thinking skills. Findings also indicate that time spent outdoors increases students’ ability to pay attention (Kuo, Browning, & Penner, 2018; Taylor, Kuo, & Sullivan, 2001). This type of education also provides opportunities to gain social skills while aiding students’ development of independence and autonomy. An increased incidence of mental health problems is linked to a sedentary childhood spent indoors (Wells & Gary, 2003). In contrast, daily contact with nature buffers the impact of stressful life events and has the potential to minimize anxiety, depression, aggression, and sleep problems (Wells & Gary, 2003).

Workforce Development

In November 2006, the Kentucky Council on Postsecondary Education (CPE) approved the convening of a Science, Technology, Engineering, and Math (STEM) Task Force comprised of leaders from government, business, P-12 and higher education sectors within the Commonwealth of Kentucky. This CPE STEM task force issued a set of eight recommendations. One of these recommendations was to "target energy sustainability problems and opportunities in Kentucky and the nation as a primary objective of statewide STEM enhancements." The KELP will help ensure that students have the requisite background knowledge regarding energy conservation and sustainable energy sources necessary to address this goal.

Additionally, the Kentucky Department of Education (KDE) is a member of the Partnership for 21st Century Learning. A major focus of the partnership is the development of a vision for learning known as the Framework for 21st Century Learning. This Framework describes the skills, knowledge, and expertise students must master to succeed in work and life; it is a blend of content knowledge, specific skills, expertise, and literacies. Included in this framework are essential skills for success in today's world, such as critical thinking, problem solving, communication and collaboration. The KELP provides many opportunities for students to obtain and enhance these 21st century skills. As Kentucky students consider environmental problems and collaborate to envision potential solutions, they will practice these skills in relevant and rigorous ways.

Environmentally related skills and jobs are a 21st century workforce priority as Americans strive to free themselves from dependence on foreign fuel sources and seek more ecologically sound sources of energy. By promoting environmental literacy, educators will develop students' knowledge and skills to make important contributions to this national goal As time progresses, more citizens will be called upon to address complex problems affecting their shared natural resources. Environmental education provides a path for students to gain these 21st century skills.

Environmental Sustainability

Significant childhood experiences in the environment, rather than just knowledge about the environment, determine an adult's ability to bridge the gap between awareness and environmental stewardship (Chawla, 1998; Lang, 2006). Children's positive encounters with nature can lead to the development of an environmental ethic. This is referred to in some research as the the human-nature connection (HNC) (Giusti, Svane, Raymond, & Beery 2018) This often provides the motivation to make the personal, daily choices that reduce local and global environmental impacts. These experiences can take place within the school context. More recent research involving a meta-analysis of environmental education in the formal K-12 classroom show positive environmental outcomes (Ardoin, Bowers, Roth, & Holthuis N. 2017)

Environmental Education in Kentucky

Kentucky has a rich history of promoting an understanding of the environment. There has been a place for environmental education in Kentucky's academic standards during our entire reform era. Most of the current structure of K-12 public education in Kentucky was created by the passage of 1990's sweeping Kentucky Education Reform Act (KERA). Among many other substantive changes, the KERA legislation established six learning goals and supporting academic expectations for each goal. These learning goals and academic expectations from the curricular backbone of public education in Kentucky and remain a legal requirement of all Kentucky public schools.

The six KERA learning goals are:

1. Students are able to use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives.
2. Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies and vocational studies to what they will encounter throughout their lives.
3. Students shall develop their abilities to become self-sufficient individuals.
4. Students shall develop their abilities to become responsible members of a family, work group, or community, including demonstrating effectiveness in community service.
5. Students shall develop their abilities to think and solve problems in school situations and in a variety of situations they will encounter in life.
6. Students shall develop their abilities to connect and integrate experiences and new knowledge from all subject matter fields with what they have previously learned and build on past learning experiences to acquire new information through various media sources.

Environmental literacy achieved through environmental education can help students achieve these goals. The strategies suggested in this plan are powerful components of an overall strategy that assist our educational system in producing responsible and informed citizens.

The KELP was a joint undertaking between the Kentucky Environmental Education Council (KEEC) and the Kentucky Department of Education. Its creation helps KEEC meet legislative mandates, while fostering progress in KDE goals for 21st century skills and educational reform. Kentucky has many programs and policies in place that provide environmental education. The KELP is designed to provide support to achieve P-12 environmental literacy.

KEEC was created on July 13, 1990 when the Kentucky General Assembly passed a series of statutes that founded the agency and defined its mission. In the statement of legislative purpose for KEEC, the General Assembly declared that "maintaining a clean and healthy environment is a state priority and is the individual and collective responsibility of all citizens of Kentucky." The agency has made progress toward the goals set forth in KRS 157.915. This statute requires that the Council:

1. Create and update a 5-year master plan for environmental education.
2. Establish an interagency committee to advise the council on environmental education matters.
3. Establish and help coordinate the activities of regional environmental education centers at all state universities.
4. Establish a competitive system for awarding grants for the establishment and maintenance of these regional environmental education centers.
5. Seek and receive private support to fund state and regional environmental education initiatives.
6. Assist in the integration and evaluation of environmental education in existing school curricula.
7. Monitor and report on environmental literacy in Kentucky.

8. Make recommendations and seek changes through regulations, legislation, and other means to promote environmental literacy in Kentucky.

KEEC is charged with developing an environmental education master plan, titled Land, Legacy and Learning (1999, 2004, 2009, 2015). Kentucky is one of the few states in the nation that maintains a comprehensive state environmental education plan.

An entire section of Land, Legacy and Learning is devoted to teaching our children, and many of the recommendations of the environmental education master plan reflect a vision of environmental literacy. Additionally, several of the goals found within the master plan closely align with the North American Association for Environmental Education (NAAEE) guidelines for developing a state environmental literacy plan, which were used as the foundation for this document. Thus, implementation of the KELP will help Kentucky meet requirements of the state's master plan for environmental education.

Under the guidance of KEEC, the state has implemented standards-based, nationally accredited Professional Environmental Educator Certification (PEEC) course for both formal and non-formal educators (i.e.,teachers, college faculty, state park naturalists and extension agents). KEEC has also collaborated with the nonprofit professional EE organization, the Kentucky Association for Environmental Education (KAEE), to bring together formal classroom teachers and non-formal educators for help in developing classroom lessons and units as well as serving as host sites for classroom field trips. Other programs already in place include the Kentucky University Partnership for Environmental Education (KUPEE), a network of environmental education centers located at Kentucky state universities and the Kentucky Community and Technical College System, that actively collaborate to further the goals of environmental education in both formal and non-formal settings. KUPEE and the Colleges of Education at most state universities support an environmental education endorsement for teachers, recognized by the Educational Professional Standards Board (EPSB). Two resources available for schools in implementing an environment-based education include: Kentucky Green and Healthy Schools program and the Kentucky Green Ribbon Schools program.

The KELP gives the Commonwealth an opportunity to strengthen and expand our existing environmental education efforts. Environmental education provides an interdisciplinary framework to help students make enhanced connections between different content areas and apply what they are learning to their own lives.

Development of the KELP

In spring of 2010, Dr. Terry Holliday, Commissioner of the Kentucky Department of Education (KDE), appointed an environmental literacy plan task force that included stakeholders from across the Commonwealth. After an introductory meeting, a working group representing KDE, KEEC, the Kentucky Association for Environmental Education (KAEE) and a variety of other formal and non-formal environmental education organizations began soliciting information and ideas from interested parties throughout the state. Using regional focus groups, educator and administrator surveys, presentations at state educator conferences, and individual conversations, the working group compiled information to draft Kentucky's Environmental Literacy Plan (KELP). A final draft of the plan was presented to the task force for remaining revisions and approval. Following a period for public comment, the plan was presented to the Kentucky Board of Education for adoption and was subsequently approved for implementation in conjunction with the Next Generation Science Standards in December of 2011.

Implementation and Timeline

When the plan was approved for implementation, KDE and KEEC selected and convened an advisory team to make recommendations for implementation of the KELP.

Revision Process

in 2018 KEEC established a small working group In partnership with KDE and KAEE with funding from the Pisces Foundation to draft revisions to the KELP that would transform the plan into a living document that could be updated on a consistent basis. This draft document was then distributed to educators across the Commonwealth for comments and input.

Organization of the Kentucky Environmental Literacy Plan

Each section of the plan begins with a broad goal. These seven goals are intended to address the most important aspects of environmental literacy education. Under each goal, specific objectives are outlined, as well as possible local and/or statewide strategies for implementation. Each strategy represents a possible pathway to meet each objective, but not all strategies must be implemented by all school districts. In other words, school districts will be able to choose options to develop a plan customized to meet their needs. Suggestions for implementation are included with each goal. Additional strategies will be developed and implemented as the KELP moves forward. A glossary is included as Appendix A, defining relevant terms and acronyms. Appendix B lists regulations relevant to improving the sustainability of school buildings and grounds. Appendix C lists the Task Force Chairs and Working Group members.

Goal 1

Identify specific content standards, content areas, and courses or subjects where instruction will take place.

Objectives

1. Examine specific content standards, content areas, courses, subjects and school settings where instruction could take place.
2. Use KDE standards as a basis for incorporating environmental literacy into school practices.

Statewide Strategies

A. Content specific groups and environmental educators examine the current content standards to identify those that directly address environmental concepts or could potentially be taught in an environmental context.
B. Correlation documents to the North American Association for Environmental Education's (NAAEE) Excellence in Environmental Education Guidelines for Learning (PreK-12) (2008) are currently available for content areas in which Kentucky Academic Standards (KAS) have been adopted.
C. As new academic standards are adopted by the state, content specific teams may: 1) review existing correlation documents and 2) create a correlation document illustrating the areas of alignment between the existing Kentucky content standards and the NAAEE's Excellence in Environmental Education Guidelines. Correlation documents from content areas will be synthesized to create a comprehensive list of alignment gaps.

Local Strategies

C. Grade level teams identify existing courses or suggest new courses to implement environmental education in schools.
D. Identify and/or develop model curriculum and instructional units in all content areas to guide teachers in the effective implementation of identified standards.
E. Identify non-traditional opportunities, both during and beyond the school day, to integrate environmental education into the school setting (e.g., field study experiences, cafeteria programs, facilities management, green schools programs, outdoor classrooms, service learning, civic engagement).

Suggestions for Implementation

All deliverable products will be available through KDE's website. Teachers and administrators will be made aware of these resources and receive guidance on their effective use through professional development sessions offered at annual conferences of Kentucky's academic professional organizations. Sessions can also be offered at meetings and conferences of other interested professional associations. KDE's Content Leadership networks can disseminate materials and raise awareness in all content areas for which Kentucky has a content standard. Additional mechanisms for sharing resources will be listed in the KELP Implementation Plan.

NOTE: As Kentucky is currently undergoing a legislatively mandated revision to all content standards, the alignment and identification of standards described above will need to be completely revised as new standards are adopted.

Goal 2

Incorporate K-12 experiences that lead to students being environmentally literate upon graduation.

Objectives

1. Identify a variety of ways that schools can ensure that their high school graduates are environmentally literate.
2. Identify existing high school graduation requirements that could be adapted to meet this goal (e.g., formal service learning projects and place-based projects) by incorporating environmental literacy.

Statewide Strategies

A. Develop a list of ways districts can adapt existing high school graduation requirements to include environmental literacy. Samples of these requirements will be listed in the Implementation Plan.

Local Strategies

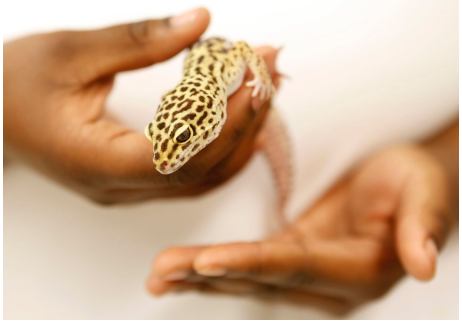
B. Modify existing community service requirements to focus on environmental service learning projects.
C. Include environmentally oriented careers in all career development activities including Individual Learning Plans and Career Pathways. Kentucky has adopted 14 of the established 18 Pathways. Each Pathway has distinct career clusters and each cluster has specific curricula. Effort can be made to identify and promote those curricula which contribute to environmental literacy.

Suggestions for Implementation

The statewide strategies would take place when the graduation requirements are opened by the Kentucky Board of Education (KBE) for other considerations, such as adding foreign languages requirements. In addition, KBE should be consulted about the locally awarded, advanced academic studies certificates they are currently developing. Two of these certificates, STEM and 21st Century Learner, could be modified to include environmental literacy as an element.

Existing KDE Career and Technical Education programs can be used to meet this goal. Within the Agriculture, Food, and Natural Resources Career Cluster, there are several Career Pathway curricula such as environmental science and forestry that would help meet this objective.

Instructional resources for the inclusion of environmental literacy are identified in conjunction with the implementation of Goal 1.



Goal 3

Provide programs for professional learning of K-12 educators and administrators to improve their environmental content knowledge, skill in teaching about environmental issues, and field-based pedagogical skills while ensuring utilization of this information.

Objectives

1. Identify successful practices for implementing environmental literacy professional learning throughout the state.
2. KDE will work with KEEC, KAEE, Kentucky Education Association (KEA), KUPEE, Kentucky Educational Television (KET) and other appropriate agencies to develop a comprehensive professional learning series for pre-service and in-service teachers.

Statewide Strategies

A. Identify the available programs and approaches to environmental education professional learning.
B. Utilize an electronic environmental education clearinghouse that would serve as a repository for environmental education resources. This resource could:
    a. Serve as a means to connect formal educators with professionals who can assist with the integration of environmental concepts into all content areas.
    b. Provide online professional development opportunities, as appropriate, to improve environmental content knowledge.
D. KDE, EPSB, KAEE, KEEC and KUPEE will cooperate to integrate environmental literacy requirements into pre-service education programs.
E. KDE, EPSB, KAEE, KEEC and KUPEE will collaborate to promote and enhance the environmental education endorsement program for in-service teachers, including incentivizing teacher participation in the environmental education endorsement programs and the Professional Environmental Education Certification (PEEC) Course.
F. KDE will collaborate with the KUPEE network to support research that establishes a baseline and documents the effectiveness of environment-based education and related professional learning on student learning.

Local Strategies

Professional development options for local districts include, but are not limited to, the following:

F. Provide professional development that incorporates established best practices in environmental education, including:
    a. Establishing Professional Learning Communities (PLCs) to identify problem areas (curriculum, audience, etc.).
    b. Developing Communities of Practice (CoPs) to implement pedagogical content knowledge.
    c. Fostering mentorships.
    d. Offering on-site, active, hands-on workshops.
G. Provide training for district level instructional supervisors and administrators that explain how to integrate environmental education into all content areas, share research on the benefits of EE, and highlighting case studies of successful integration of EE.
H. Provide training for teachers in:
    a. Integration of environmental education into existing standards and courses.

   b. Environmental content knowledge.
   c. Outdoor safety and classroom management practices.

J. Engage School-Based Decision Making Councils in successful environmental education integration.
K. Engage parent organizations in successful environmental education integration.
L. Provide training on the use of appropriate technology to enhance the implementation of environmental education into all content areas.

Suggestions for Implementation

Identify partnerships, mechanisms, and resources to train non-formal educators in the goals and objectives of the environmental literacy plan and identify how to help teachers with implementation. Include non-formal educators in trainings and resources made available to K-12 teachers as new national standards are adopted.

Efforts should be made, when practical, to integrate environmental literacy into existing school and district professional development offerings. KEEC and/or KDE staff can identify districts that are already integrating environmental education professional development and promote these examples as models for other districts.

A variety of effective and efficient ways to deliver professional development to all audiences should be considered. Suggestions include Professional Learning Communities, webinars, workshops held at annual meetings of various Kentucky educator professional organizations, and the Kentucky Virtual University. One tool already in place is the environmental education endorsement offered at six state universities and one private university. In addition, diverse sources of funding for these trainings should be investigated, including National Geographic grants through the Kentucky Geographic Alliance.

Goal 4

Develop a system of assessments to measure the environmental literacy of Kentucky students.

Objectives

1. Create a plan for using identified environmental literacy assessments, emphasizing collection of data from multiple sources to determine if Kentucky students are environmentally literate.
2. Create a plan for effectively analyzing data from various measures to inform the success of the environmental literacy programs.

Statewide Strategies

A. Develop an appropriate Environmental Literacy evaluation instrument. The Environmental Literacy evaluation instrument will:
    1. Improve teaching and learning for all students in the environmental literacy program.
    2. Allow all students equal access to the skills that will assist them in being productive citizens.
    3. Allow students to demonstrate their environmental literacy in ways other than a paper-and-pencil test.

B. KAEE, KEEC, KUPEE, and KDE will collaborate to develop an instrument that will measure best practices in an environmental literacy program and identify environmental related clusters on all existing questions.

C. Develop guidelines to include environmental literacy as a component of the Comprehensive School Improvement Plan.

D. Develop a survey similar to the Teaching, Empowering, Leading and Learning survey administered by KDE and given to educators (teachers, principals and other certified education professionals) to serve as a formative assessment, to document baseline opinions and outlooks, and identify the greatest needs in implementing environmental literacy education in Kentucky.

E. Collaborate with KDE to develop sample assessment types that could be mirrored to measure environmental skills.

Local Strategies

F. Develop a district Environmental Literacy Plan (ELP) that includes strategies to effectively analyze and utilize data for all relevant assessments.

Suggestions for Implementation

The KUPEE network can serve as consultants in helping districts develop their ELPs and assist in analyzing their assessment data. District-level PLCs could provide suggestions for improvement based on analysis of assessment data. These assessments would fall under the responsibility of the District Assessment Coordinator. Existing environmental literacy assessments can be reviewed for possible modification and use.

Goal 5

Secure support for implementation of the KELP.

Objective

1. Collaborate with Kentucky organizations receiving funding for environmental education to examine ways they can help meet the requirements of the KELP.
2. Develop a system that enhances support of the implementation, including state agencies, industries, municipalities, and educational institutions.

Statewide Strategies

A. Investigate the possibility of collaborating with Kentucky industries that could provide environmental education support.
B. Pursue and establish a collaborator within KDE who supports implementation of the KELP.
C. Research environmentally related agencies and organizations to ascertain possible sources of sustainable funding and foster potential partnerships.
D. Develop a list of all public and private funds currently available for environmental education in Kentucky. The list will be available through the TREE (Teaching Resources for Environmental Education).

Local Strategies

E. Districts and/or schools could designate environmental literacy coordinators or experts to assist with implementation efforts.
F. Determine which local industries and community resources could provide assistance to implement components of KELP effectively.
G. Identify a variety of sources for funding, focusing particularly on sustainable sources.

Suggestions for Implementation

Environmentally related agencies, organizations and businesses should be surveyed to determine where they could support implementation of KELP, including possible funding streams. Educational co-ops may be helpful in finding additional sources of sustainable funding.

Master teachers with the environmental education endorsement or a certified environmental educator would be considered highly qualified as an expert.

Goal 6

Encourage school districts to improve the sustainability of their buildings and grounds and use these facilities to improve student environmental literacy.

Objectives

1. Increase student environmental literacy by using the school buildings and grounds as a learning laboratory.
2. Increase the number of healthy, energy efficient school buildings and properties based on sustainable infrastructure principles, such as the Guidelines for Leadership in Energy and Environmental Design (LEED), the Kentucky Green and Healthy Schools Design Manual, Energy Star and American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Statewide Strategies

A. Encourage schools and districts to participate in established state and national programs as identified by the TREE.
B. Share resources that encourage environmental literacy through the TREE.
C. Identify additional funding mechanisms or resources to implement sustainable physical plant construction and renovation requirements as determined by the statutory requirements of KRS 157.450-455..

Local Strategies

These strategies are possible ways for local districts to support sustainable school practices.

D. Encourage the formation of sustainability teams in each school that involve teachers, students, administrators, and facilities services staff to focus on issues such as energy efficiency, water conservation, and solid waste management.
E. Promote recycling or other energy saving measures within the school and district, including the development of outdoor classrooms.
F. Support the implementation of the Kentucky Green and Healthy Schools program at all grade levels.
G. Use input from facilities services staff to develop a checklist that will help them improve sustainability of the school physical plant.
H. Involve students in the design and daily operations of the school facility, especially when it has curricular connections. For example, students may contribute ideas for design of a new school or become involved in the planning and design of an outdoor classroom.
I. Identify and encourage student participation in local, state, and national programs that support sustainable practices.
J. Encourage school districts to partner with area school districts in hiring the services of a school energy manager, whose primary responsibility is energy management.

Suggestions for Implementation

The Kentucky Green and Healthy Schools program is an appropriate way for the school buildings and grounds to be used as a learning tool and for students to become involved in the daily operations of the school through curricular applications. These applications are an excellent way to meet STEM discipline goals and 21st century learning skills.

Examples of national programs that schools can participate in to earn recognition include the National Wildlife Federation Eco-Schools, Project Learning Tree Green Schools, and the U.S. Department of Education Green Ribbon Schools program. Explore partnering with any existing school energy managers, the KY School Plant Managers Association, DEDI/NEED-sponsored High Performance School Buildings, Kentucky Energy Efficiency Program for Schools, and United States Green Building Council.

Goal 7

Encourage teachers and administrators to provide students with opportunities for positive interactions with the natural environment through outdoor experiences.

Objectives

1. Facilitate ways to incorporate outdoor experiences into P-12 curriculum.
2. Identify resources that support districts in providing outdoor experiences for students.

Statewide Strategies

A. Develop resources for teachers, administrators and other educators to plan and participate in significant outdoor experiences for the school community, such as:
    a. Utilizing the TREE to share best practices for outdoor learning, including classroom management strategies and outdoor safety.
    b. Identifying partners such as state agencies, educational organizations, businesses, health organizations, and tourism/recreation associations that can support teachers, students and school districts in providing students with positive outdoor experiences.
    c. Compiling and summarizing research highlighting the academic, social and health benefits of outdoor experiences.
B. Collaborate with other agencies to identify possible overnight/residential environmental literacy field experiences available during the school year.
C. Recommend the inclusion of an outdoor classroom on every campus by:
    a. Providing information for the design and construction of sustainable outdoor classrooms.
    b. Providing information for funding opportunities for the building of outdoor learning areas.
    c. Including outdoor learning areas as a possible component of a new schools' facilities plan.

Local Strategies

D. Identify safe outdoor spaces on the school grounds for appropriate instruction.
E. Including facility services staff in the design, construction and maintenance of outdoor classrooms. Ensure facility services staff have the knowledge, skills and abilities to properly care for learning areas.
F. Identify appropriate community sites for including outdoor experiences for students at all grade levels.
G. Create policy allowing for flexible scheduling that provides adequate time for outdoor instruction.

Suggestions for Implementation

There are several programs and organizations that provide guidelines for developing outdoor classrooms, including the KEEC's Developing Outdoor Learning Areas: A Kentucky Guide, Project WILD's School Sites, Kentucky Department of Fish and Wildlife Resources Schoolyard Habitat Certification Program, and National Wildlife Federation's Schoolyard Habitat. This is another area where the KUPEE network could serve as consultants. Districts can work with School-Based Decision Making Councils to develop outdoor classroom policies to ensure safe and sustainable use. Student organizations such as PRIDE clubs or science clubs can be encouraged to help maintain outdoor instructional sites. Another way to promote and sustain outdoor instruction within a school district is the establishment of an advisory board. KEEC and KDE should publish a document that provides guidelines for outdoor classroom management, safety strategies and model maintenance policies. A more exhaustive list of partners and resources will be created in the implementation phase of this plan.

Next Steps

The Kentucky Environmental Literacy Plan is ambitious but achievable. The implementation of this plan leverages and extends existing partnerships throughout the state. The Plan's goal is to improve quality and coherence of environmental literacy education in our P-12 schools using research-based best practices. Implementation of the plan will take place in concert with other education reform efforts such as the adoption of new state standards and assessments. This will allow the Commonwealth to move forward in achieving the best possible education for all students.

In December of 2011, the KELP was presented to the Kentucky School Board for adoption and approved for implementation in conjunction with the Next Generation Science Standards. After adoption, KDE collaborated with KEEC to develop an implementation plan. These agencies selected and convened an advisory team to make recommendations on implementing the KELP. The team included environmental educators, content consultants from KDE, and representatives from K-12 schools, universities, non-formal education centers and statewide education advocacy groups.

This plan was updated and revised in June of 2018 by a small writing team, then distributed to teachers, administrators and other educational professionals for comment and input.

Appendix A

Terms and Abbreviations

CoPs: Communities of Practice

Comprehensive School Improvement Plan: A plan based on data from testing and needs assessments for improving teaching and learning in a school by setting goals, objectives and measures. The plan is made up of components that include the activities and strategies the school will use to reach its goals.

CPE: Council on Postsecondary Education

DEDI: Kentucky Department of Energy Development and Independence

Environmental Ethic: A discipline of philosophy that focuses on the moral relationship of humans to the environment.

ELP: Environmental Literacy Plan

EKU: Eastern Kentucky University

Environmental Literacy: The ability to recognize the components of healthy natural and man-made systems and the actions necessary to maintain, restore, or improve them.

EPSB: Kentucky Educational Professional Standards Board

Green Career: Employment within the green economy.

KAEE: Kentucky Association for Environmental Education

KBE: Kentucky Board of Education

KAS: Kentucky Academic Standards

KCTCS: Kentucky Community and Technical College System

KDE: Kentucky Department of Education

KEA: Kentucky Education Association

KEEC: Kentucky Environmental Education Council

KELP: Kentucky Environmental Literacy Plan

KERA: Kentucky Education Reform Act

KET: Kentucky Educational Television

KGA: Kentucky Geographic Alliance

KGHS: Kentucky Green and Healthy Schools

KUPEE: Kentucky University Partnership for Environmental Education

LEED: Leadership in Energy and Environmental Design

NAAEE: North American Association for Environmental Education

NCSL: National Council of State Legislatures

NEED: National Energy Education Development

Outdoor Classroom: Any outdoor space used for learning, from a field to a parking lot, tree to an amphitheater. Outdoor classrooms can be formalized with seating, roof cover, and learning stations.

PLC: A Professional Learning Community is an extended opportunity to foster collaborative learning among colleagues within a particular work environment or field. It is often used in schools to organize educators into working groups focused on improving student learning.

PRIDE: Personal Responsibility in a Desirable Environment

School-Based Decision Making Council: The governing body with the responsibility to set school policy and make decisions as outlined in KRS 158.645 and KRS 158.6451. Membership of each council includes parents, teachers, and a school administrator.

School Report Card: A state mandated report which provides information about every school and district, including test performance, teacher qualification, student safety, and much more.

Service Learning: A method of teaching, learning and reflecting that combines academic classroom curriculum with meaningful service within the community.

STEM: Science, technology, engineering and mathematics

TREE: Teaching Resources for Environmental Educators - kaee.org/tree

USGBC: United States Green Building Council

Appendix B

Kentucky Statutes Related to Greening Schools

KRS 157.450-455 - In July of 2010, the Kentucky General Assembly mandated in KRS 157:450 that the state Department of Education:

- Support the construction of new school buildings and the renovation of existing school buildings in a manner that will create a healthy environment for students and teachers while saving energy, resources, and operational expenses.
- Encourage use of a life-cycle cost, holistic approach to building design that considers school design, construction, operation, and maintenance in the initial decision-making process.
- Furthermore, KRS 157:455 strongly encourages all school districts engaged in new construction or major building renovation to:
    - Meet or exceed efficient school design standards in planning and designing all new buildings and major renovation projects;
    - Use life-cycle cost analysis to evaluate different design proposals; and
    - Consider the possibility that each new school building or major renovation of a building could be a net zero building, either during the construction or during renovation, or later as resources become available.
- Additionally, the statute requires KDE and Department of Energy Development and Independence to identify ways that efficient school design and its energy-saving components can be integrated into the school curriculum.

Appendix C

KELP Task Force

2018 KELP Revision Working Group Members

Billy Bennett	Executive Director, Kentucky Environmental Education Council (KEEC)
Vivian Bowles	Retired Teacher, Madison County Schools
Wesley Bullock	Administrative Specialist, KEEC
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Ashley Hoffman	Executive Director, Kentucky Association for Environmental Education
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Melinda Wilder	Director, EKU Division of Natural Areas
Brittany Wray	Education Director, Kentucky Association for Environmental Education

2010 KELP Working Group Members

Members of KELP Task Force represent both traditional and non-traditional interests within the state's environmental education communities. The following individuals were a subgroup of the larger task force, and contributed significant time and creative talent to represent various agencies, higher education, teacher education, teachers and other stakeholder groups.

Co-Chairs

Billy Bennett	EKU, Center for Environmental Education
Felicia Smith	KDE, Office of Teaching and Learning
Melinda Wilder	EKU, Division of Natural Areas

Working Group

Debbie Anderson	KDE, Career and Technical Education	Phyllis Shuttleworth	KDE, Office of Assessment and Accountability
Sean Elkins	KDE, Office of Teaching and Learning		
Jane Eller	KEEC, retired	Amy Sohner	Bluegrass Greensource
Ashley Hoffman	KAEE	Tammie Wilson	East KY PRIDE
Jenny Howard	KAEE	Karen Reagor	Kentucky NEED Project
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Clovis Perry, Jr.	KCTCS	Merin Roseman	KGHS
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Appendix D

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For more information about the Kentucky Environmental Literacy Plan (KELP), visit the KEEC Web site: keec.ky.gov/publications.

Documents available for download include:

- Electronic version of the KELP
- KELP Implementation Plan
- Correlations between the Kentucky Academic Standards (KAS) and the North American Association for Environmental Education's *Guidelines for Excellence in Environmental Education*.

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