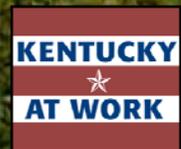
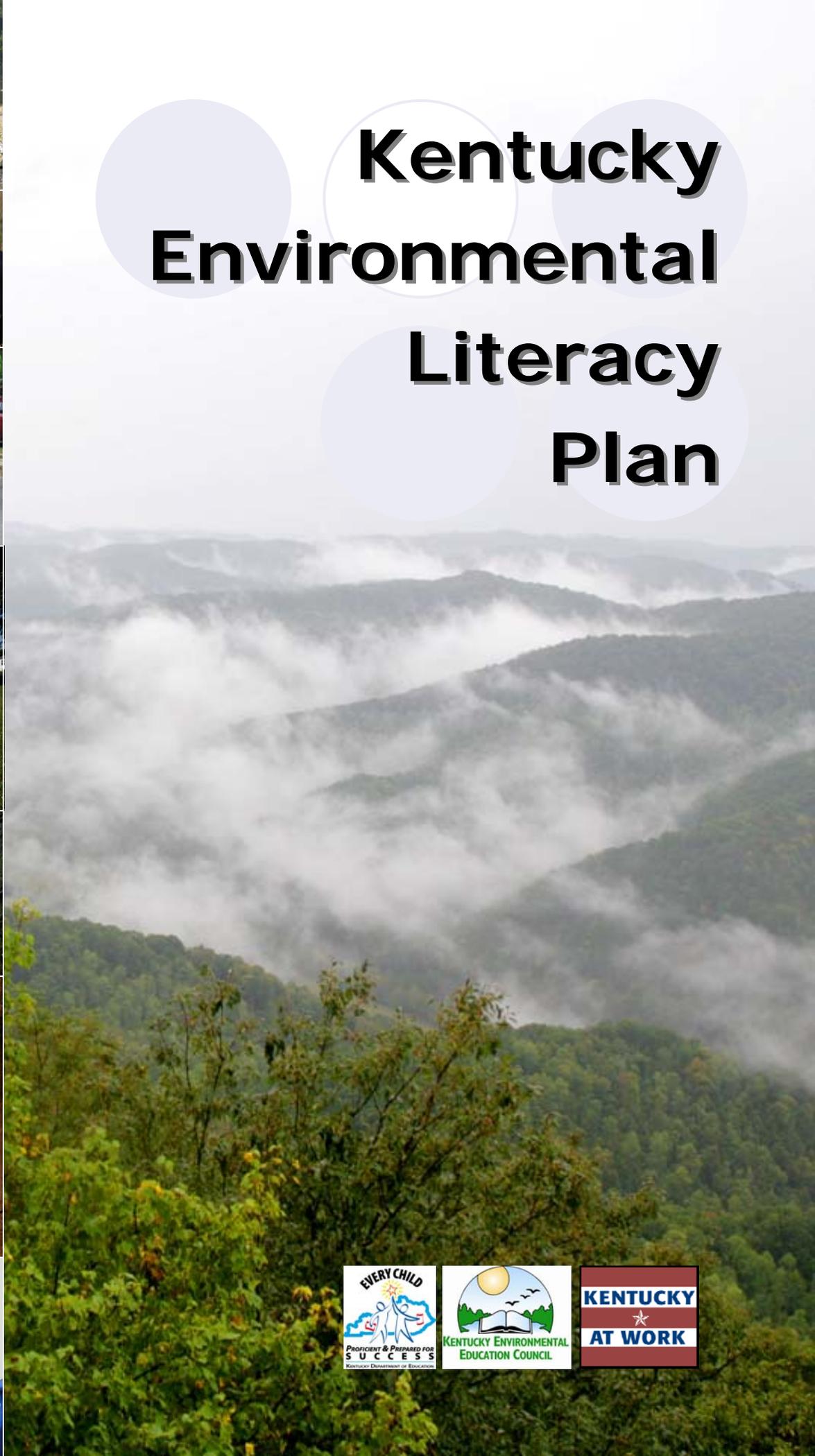


Kentucky Environmental Literacy Plan



Kentucky Environmental Literacy Plan



Smokey Lake Play, Carter Caves State Park.

Photo Credit: Kentucky State Parks

THE KENTUCKY BOARD OF EDUCATION APPROVED THE 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.

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





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Eagle Falls, Cumberland Falls State Park.

Photo Credit: Kentucky State Parks



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.

The Plan outlines seven major goals that will ensure Kentucky's high school graduates are environmentally literate. Students will explore the environment as a place to learn and play throughout their schooling, whether they are in an urban or rural community.

Implementation of the Plan will require support from a broad network of stakeholders. Within the school framework, support from administration and teacher trainings 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 non-profits 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.

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 in both learning 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,

Elizabeth Schmitz

Executive Director, Kentucky Environmental Education Council

Kentucky Environmental Literacy Plan



Kingdom Come State Park.

Photo Credit: Kentucky State Parks

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 III*, found that while Appalachia is one of the most biodiverse places on Earth, only 46% of Kentuckians could correctly identify the definition of biodiversity as “the many different kinds of plants and animals,” (KEEC & UKRC, 2009). 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 30% of Kentuckians believe that coal is a renewable resource (KEEC & UKRC, 2009). The findings demonstrate a lack of understanding in content knowledge that state education standards say should be mastered at the fourth grade level. Similarly, only 60% of Kentuckians correctly identified that coal-burning power plants are the major source of electricity in the United States (KEEC & UKRC, 2009) – astounding in a state that obtains over 95% of its electricity from burning coal (NMA, 2009). Despite Kentuckians’ proximity to and historical dependence on coal, research suggests that they are uninformed of issues surrounding this natural resource. 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 as described in the Commonwealth’s energy policy, *Intelligent Energy Choices for Kentucky’s Future* (Beshear, 2008), 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 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 who are 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

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Harvesting in the Governor's Garden.

Photo Credit: Kentucky Energy and Environment Cabinet

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 life-long 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?

Recently proposed federal legislation, including U.S. Department of Education's *A Blueprint for Reform: The Reauthorization of the Elementary and Secondary Education Act* (2010), explicitly states the need for environmental literacy attained through environmental education as one of the components of a well-rounded P-12 education. To assist with implementation of this proposed legislation, incentives in

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Sturgeon release.

Photo Credit: Kentucky State Parks

the form of new environmental education grant programs may become available for states with environmental literacy plans. The KERP will ensure that graduates of Kentucky's P-12 education system will be environmentally literate. The KERP will also provide the requisite framework for our school systems to expand and improve their environmental education programs.

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 (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 that 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 children’s physical health and cognitive development (NEETF, 2011).

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 time spent outdoors positively impacts children’s health by increasing their physical activity and enhancing development of motor skills (NEETF, 2011). Childhood obesity is at a record high of 37.1% in Kentucky (NCSL, 2007), and increased physical activity 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 (Taylor, Kuo, & Sullivan, 2001). This type of education also provides opportunities to gain social skills while aiding students’ development of independence



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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 Skills. 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 (Campbell, 2009). As time progresses, more citizens will be called upon to address complex problems affecting their shared natural resources. Environmental education provides a path to students gaining these 21st century skills.

Benefits of Environmental Education

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 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.



Mining restoration project on Arbor Day.

Photo Credit: Kentucky Energy and Environment Cabinet

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Fishing.

Photo Credit: Kentucky Fish and Wildlife

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 for 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 form 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.



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The KELP is 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. However, in order to achieve P-12 environmental literacy, additional assistance is needed from stakeholders across the Commonwealth. The KELP is designed to provide this support.

The Kentucky Department of Education had an environmental education curriculum specialist on staff until 1989. Those responsibilities were assigned to KEEC when it was formed by the legislature in 1990. 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." However, at that time KEEC was an unfunded mandate. The Council members were not appointed by the Governor for several years, and then operated with only an unpaid board of directors (council members). The Council acquired funding from environmental fines and penalties and hired an Executive Director in 1995. Since that time, 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.

Environmental Education in Kentucky



Caving.

Photo Credit: Kentucky Adventure Tourism

In KRS 157.915, KEEC is charged with several goals, including developing an environmental education master plan, titled *Land, Legacy and Learning* (1999, 2004, 2009). Kentucky is one of the few states in the nation that maintains a comprehensive state environmental education plan.



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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 professional development programs for non-formal educators such as state park naturalists and 4-H extension agents. Other programs already in place include the Kentucky University Partnership for Environmental Education (KUPEE), a network of environmental education centers located at each state university in Kentucky that actively collaborate to further the goals of environmental education in both formal and non-formal settings. The KUPEE and the Colleges of Education at most state universities support a graduate environmental education endorsement for teachers, recognized by the Educational Professional Standards Board (EPSB). The Kentucky Green and Healthy Schools Program (KGHS)—a joint program of KEEC and KDE—is another available resource for schools to implement environment-based education.

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, 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. 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 approved for implementation.



The Kentucky Environmental Literacy Plan Implementation Advisory Team, pictured with Kentucky Department of Education Commissioner Dr. Terry Holliday, March 2012.

Photo Credit: Kentucky Environmental Education Council

Kentucky Environmental Literacy Plan

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. At that point, a timeline was developed to ensure resources are in place before school districts are required to incorporate these changes. This timeline helps determine what steps can happen without additional funding in place.

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.



Presenting the results.

Photo Credit: Fayette County Public Schools

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 are currently under development for those content areas in which Kentucky Core Academic Standards (KCAS) already exist. Content-specific teams designated by KDE will review these existing crosswalk documents prepared by KAEE/KUPEE members. Additionally, KDE may draw on content-specific professional development organizations to serve on these teams.

As new content standards are adopted by the state, additional content specific teams will be responsible for 1) reviewing existing correlation documents and 2) creating a correlation document illustrating the areas of alignment between the existing Kentucky content standards and the *North American Association for Environmental Education's Excellence in Environmental Education Guidelines for Learning (PreK-12)* (2008). Correlation documents from all content areas will be synthesized to create a comprehensive list of alignment gaps.

C. Grade level teams identify existing courses or suggest new courses to implement environmental education in schools.

D. Identify model curriculum and instructional units in all content areas to guide teachers in the effective implementation of identified standards.

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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. As of December 2010, the Common Core Standards in Mathematics and English/Language Arts standards have been adopted. It is anticipated that similar national standards for science and social studies will be adopted when they are completed.



Students conduct a dumpster dive while exploring the topic of solid waste. The activity can be used to teach math skills such as measuring and graphing.

Photo Credit: Fayette County Public Schools

2

Incorporate requirements that will ensure high school graduates are environmentally literate.

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. At the next opportunity, KDE will include environmental literacy as one of the unifying concepts in the current high school graduation requirements for science.
- B. At the next opportunity, KDE will include the term “environmental literacy” in the overall high school graduation requirements.
- C. 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

- D. Modify existing community service requirements to focus on environmental service learning projects.
- E. 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.

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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 that 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 the 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.



Water quality testing offers many connections to STEM and 21st Century Learning Goals. Data can often sent to a larger database. Teacher professional development and partnerships are beneficial.

Photo Credit: Eastern Kentucky University

3 Provide programs for professional development 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 development throughout the state.
2. KDE will work with KEEC, Kentucky Education Association (KEA), KUPPEE, Kentucky Educational Television (KET) and other appropriate agencies to develop a comprehensive professional development series for pre-service and in-service teachers.

Statewide Strategies

- A. KDE and KEEC will collaborate to develop recommendations and standards for environmental education professional development, including programs for use as part of a district's professional development plan.
- B. Identify the available programs and approaches to environmental education professional development.
- C. Utilize an electronic environmental education clearinghouse such as www.eeinkentucky.org that would serve as a repository for environmental education resources. This resource could:
 1. Serve as a means to connect formal educators with professionals who can assist with the integration of environmental concepts into all content areas.
 2. Provide online professional development opportunities, as appropriate, to improve environmental content knowledge.



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D. KDE, EPSB, KEEC and KUPEE will cooperate to integrate environmental literacy requirements into pre-service education programs.

E. KDE, EPSB, 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.

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:

1. Establishing Professional Learning Communities (PLCs) to identify problem areas (curriculum, audience, etc.).
2. Developing Communities of Practice (CoPs) to implement pedagogical content knowledge.
3. Fostering mentorships.
4. Offering on-site, active, hands-on workshops.

G. Provide training for district level instructional supervisors that explain how to integrate environmental education into all content areas.

H. Provide training for administrators, highlighting case studies of successful integration of environmental education that demonstrates increased student engagement and improved student performance (including a discussion of PLCs and CoPs).

I. Provide training for teachers in:

1. Integration of environmental education into existing standards and courses.
2. Environmental content knowledge.
3. Outdoor safety and classroom management practices.

J. Engage School-Based Decision Making Councils in successful environmental education integration.

K. Engage Parent Teacher Associations/ Parent Teacher Student Association (PTA/ PTSA) and other parent groups 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 can 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 needs to be considered, such as 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 five 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.

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Students designed conservation posters as part of a contest and awareness campaign.

Photo Credit: Kentucky Environmental Education Council

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

Objectives

1. KDE will identify current state assessments that can be used or adapted to measure the environmental literacy of Kentucky's students.
2. KDE will create a plan for implementation of those assessments, emphasizing collection of data from multiple sources.
3. KDE will create a plan for effectively analyzing and utilizing data from the assessments.

Statewide Strategies

A. Develop appropriate Environmental Literacy Program Review procedure. The results of the Program Review will be included in the School Report Card. To the degree possible, this Program Review should mirror those already mandated by the Kentucky legislature and conform to the existing definition. A "Program Review" is:

"a systematic method of analyzing components of an instructional program, including instructional practices, aligned and enacted curriculum, student work samples, formative and summative assessments, professional development and support services, and administrative support and monitoring," KRS 158.6453(1)(i) (KDE, 2010).

In addition, the Environmental Literacy Program Review will serve the same three functions outlined by KDE:

1. Improving teaching and learning for all students in the environmental literacy program.
2. Allowing all students equal access to the skills that will assist them in being productive citizens.
3. Allowing students to demonstrate their environmental literacy in ways other than a paper-and-pencil test.

NOTE: Implementation of the Program Review should be considered a long-term goal, to be employed after the currently mandated Program Reviews are established



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and fully functional. The Environmental Literacy Program Review will exist outside the legislatively mandated accountability model.

B. Identify environment related questions on all existing state assessments. Report the achievement on these questions as a subset of the exam scores.

C. Identify the questions on the End of Course exams that relate to environmental literacy topics and report the scores as a data set of the exam scores.

D. Develop open response and/or constructed response questions targeting environmental literacy that will then be embedded into the state's annual assessment.

E. Develop guidelines to include environmental literacy in the Comprehensive School Improvement Plan.

F. Include environmental literacy as a component of the School Report Card and School Improvement Plan.

G. 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.

H. KDE will collaborate with the KUPPEE network to support research that establishes a baseline and documents the effectiveness of environment-based education and related professional development on student learning.

Local Strategies

I. Develop a district Environmental Literacy Plan (ELP) that meets the Program Review criteria. This plan should include a plan to effectively analyze and utilize data for all relevant assessments.

Suggestions for Implementation

The KUPÉE 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.

NOTE: It may be that implementation of customized assessments is a long term goal since the state (KDE) currently has a negotiated assessment contract and Kentucky has only adopted language arts and mathematics standards. Assessment development in science and social studies cannot begin until new standards are adopted.



Kentucky has many unique ecosystems, including the cave and karst landscape represented here by Carter Caves State Park in northeastern Kentucky.

Photo Credit: Kentucky State Parks

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Field investigation.

Photo Credit: Kentucky Department of Education

5 Secure funding and other necessary support for implementation of the KERP.

Objective

1. Collaborate with Kentucky organizations receiving funding for environmental education to examine ways they can help meet the requirements of the KERP.
2. Identify a variety of sources for additional funding, focusing particularly on sustainable funding sources.
3. Institutionalize environmental education at the state level.

Statewide Strategies

- A. Create and fund an environmental education consultant position within KDE.
- B. Research other environmentally related agencies and organizations to ascertain possible sources of sustainable funding and foster potential partnerships.
- C. Develop a list of all public and private funds currently spent on environmental education in Kentucky. The list will be available through the environmental education clearinghouse.
- D. Investigate the possibility of collaborating with Kentucky industries that could provide environmental education funding.

Local Strategies

- E. Determine which local industries and community resources could become funding sources or provide other types of assistance to implement components of KERP effectively.

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Suggestions for Implementation

Possible state funding sources include voluntary contributions on state tax forms, similar to the Child Victim's Trust Fund. 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.

Some districts currently have environmentally themed schools. This plan calls for all schools to participate in appropriate environmental literacy instruction rather than focus on themed schools. To do this, districts could also designate environmental literacy coordinators or experts within each school. Master teachers with the environmental education endorsement would be considered highly qualified for such an assignment.



Students point to a rain barrel on their school grounds, a Kentucky Green and Healthy Schools project coordinated by the students, their teacher, and the district sustainability coordinator.

6 KDE will encourage school districts to improve the sustainability of their buildings and grounds in order to use the facilities to improve student environmental literacy.

Note: There are currently several laws in place that strongly support schools in constructing and operating schools in an environmentally sound and energy efficient manner. Therefore, this goal emphasizes the importance of these practices, especially in an instructional context. A summary of these regulations is found in Appendix B.

Objectives

1. Increase student environmental literacy by using the school buildings and grounds as a learning laboratory.
2. Increase the number of high performance school buildings and properties based on low-impact design and green 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. Identify schools and resources available for an annual tour of successful environmental education campuses, outdoor classrooms and high performance schools for administrators, School-Based Decision Making Council members and school board members.
- B. Encourage schools and districts to participate in established state and national programs that recognize sustainability efforts, particularly energy efficiency efforts of both students and staff.
- C. Share resources that encourage environmental literacy learning through use of more sustainable facilities: grants, funding opportunities, school sustainability successes and ways to implement objectives, through the environmental education clearinghouse.

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Students highlight the Energy Star Plaque at Rosa Parks Elementary, a Kentucky Green Ribbon School.

Photo Credit: Kentucky Environmental Education Council

An example of school sustainability project success is The Energy Education Collaborative, which was an effort funded by the Kentucky Department of Energy Development and Independence (DEDI). Through the Energy Education Collaborative, DEDI brought together the KEEC, the Kentucky Chapter of the National Energy Education Project, the Kentucky Energy Efficiency Program for Schools and the Kentucky School Board Association's School Energy Manager Project. Working together, these individual groups were able to coordinate their individual program resources for mutual benefit to all involved.

D. 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 and KRS 160.325.

Local Strategies

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

E. Strongly 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.

F. Promote recycling or other energy saving measures to further fund environmental literacy efforts within the school and district, including the development of outdoor classrooms.

G. Support the implementation of the Kentucky Green and Healthy Schools program at all grade levels.

H. Use input from facilities services staff to develop a checklist that will help them improve sustainability of the school physical plant.

I. 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.

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Outdoor classrooms can be as simple as a tree and patch of grass.

Photo Credit: Kentucky Department of Education

J. Identify and encourage student participation in local, state and national programs that support sustainable practices.

K. 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.

7 KDE will encourage teachers and administrators to provide students with opportunities for positive interactions with the natural environment.

Objectives

1. Ensure outdoor experiences are incorporated into the P-12 curriculum.
2. Identify resources that support districts in providing outdoor experiences for students.

Statewide Strategies

A. Develop motivational resources for teachers, administrators and other educators to plan and participate in significant outdoor experiences for the school community, including:

1. Utilize the environmental education clearinghouse to share best practices for outdoor learning, including classroom management strategies and outdoor safety.
2. Identify partners such as state agencies, educational organizations, businesses, health organizations, and tourism/recreation associations that can support teachers, students and school districts in getting students outside.
3. Compile and summarize research highlighting the academic, social and health benefits of outdoor learning.

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:

1. Creating a process for the design and construction of sustainable outdoor classrooms.
2. Establishing a funding mechanism for the building of outdoor classrooms.
3. Including outdoor classrooms as an incentivized component of a new school's facilities plan.



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4. 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 outdoor classrooms.

D. The Kentucky Board of Education should establish a policy that ensures school districts create guidelines for instructional use of the outdoors within their school safety programs and addresses restrictive liability concerns.

Local Strategies

E. Identify safe outdoor spaces on the school grounds for appropriate instruction.

F. Identify appropriate community sites for including outside experiences for students at all grade levels.

G. Create policy allowing for flexible scheduling that provides adequate time for outdoor instruction.

H. Create incentives that encourage teachers to take their students outside.

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 Division of Fish and Wildlife Resources *Schoolyard Habitat Certification Program*, and National Wildlife Federation's *Schoolyard Habitat*. This is another area where the KUPPEE 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.

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 implementation of 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, nonformal education centers and statewide education advocacy groups.

This plan will be implemented in two phases. Phase I began with a review of the KELP to identify components requiring little to no funding. A timeline and plan was developed for putting these elements into practice in the short term. Phase II will be dependent on the availability of funding provided by proposed federal legislation. An application for funding will be submitted when a federal request for proposals is announced. In addition to federal monies, other funding sources will be explored.

[Editor's note: the implementation plan was undergoing internal review when this document was printed.]

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Measuring tracks.

Photo Credit: Kentucky Department of Education

Glossary of 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

Crosswalk Document: A resource that describes a relationship between two or more sets of educational standards.

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

End of Course Exam: An assessment designated by KDE that is required each time a student completes certain courses.

Environmental Education Clearinghouse: An electronic portal website that acts as a repository for all types of environmental education information.



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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.

EP SB: Kentucky Educational Professional Standards Board

Green Career: Employment within the green economy.

KAEE: Kentucky Association for Environmental Education

KBE: Kentucky Board of Education

KCAS: Kentucky Core 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



Appendix A: Glossary

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 space outdoors 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

PTA/PTSA: Parent Teacher Association/Parent Teacher Student Association

Program Review: A systematic method of analyzing components of an instructional program in order to improve the quality of teaching and learning for all students.

School-Based Decision Making Council: The governing body with the responsibility to set school policy and make decisions as outlined in KRS



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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

USGBC: United States Green Building Council

Kentucky Regulations 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 regulation 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.

KRS 160.325 - Mandatory participation in Kentucky Energy Efficiency Program

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Repurposed bird feeders.

Photo Credit: Kentucky Department of Education

Appendix C: KELP Task Force

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.

Task Force 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

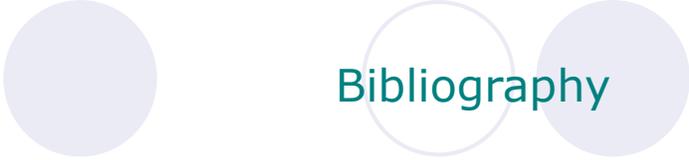
Debbie Anderson	KDE, Career and Technical Education
Sean Elkins	KDE, Office of Teaching and Learning
Jane Eller	KEEC, retired
Jenny Howard	KAEE
Michael Kral	KEA
Clovis Perry, Jr.	KCTCS
Karen Reagor	Kentucky NEED Project
Bob Roquemore	KEEC
Merin Roseman	KGHS
Maxine Rudder	Bluegrass PRIDE
Elizabeth Schmitz	KEEC
Phyllis Shuttleworth	KDE, Office of Assessment and Accountability
Amy Sohner	Bluegrass PRIDE
Ashley Williams	KAEE
Tammie Wilson	East KY PRIDE

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Canoeing at General Butler State Park.

Photo Credit: Kentucky State Parks



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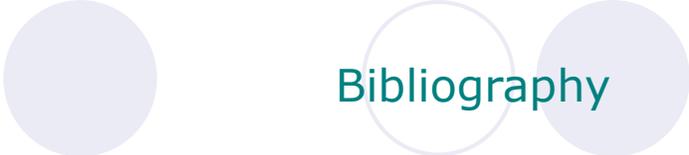
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