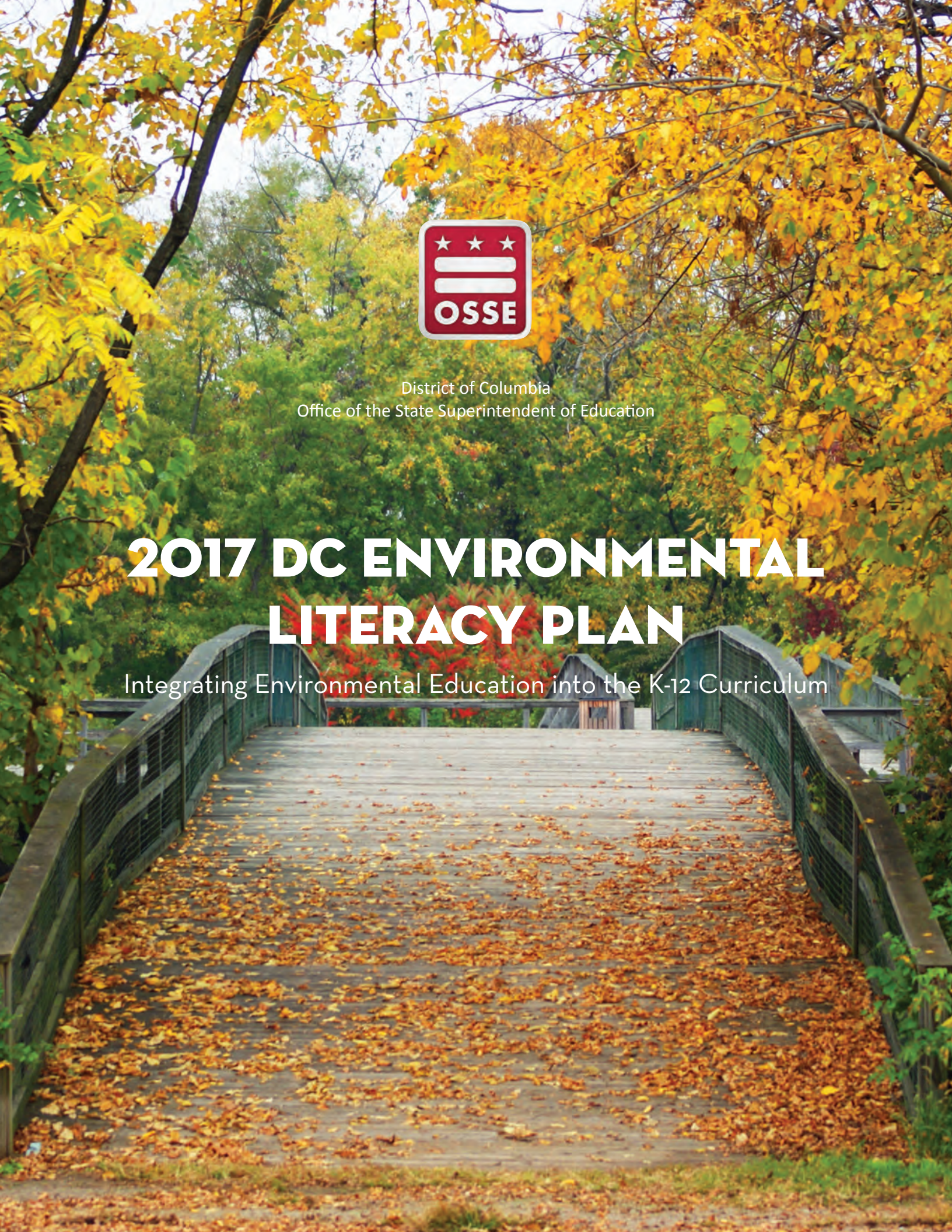

District of Columbia
Office of the State Superintendent of Education

2017 DC ENVIRONMENTAL LITERACY PLAN

Integrating Environmental Education into the K-12 Curriculum

2017 DC ENVIRONMENTAL LITERACY PLAN

Prepared by the Office of the State Superintendent of Education on behalf of the DC Environmental Literacy Plan Workgroup

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Department of Parks and Recreation

Department of General Services

Department of Employment Services

DC Environmental Education Consortium

See Appendix A for a complete list of collaborators.

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EXECUTIVE SUMMARY

The environment around us is changing and these changes manifest in many different ways. Understanding how we as citizens can address, adapt, and impact these changes is critical for even our youngest learners. The District of Columbia's environmental education community has worked in concert with schools, students, and families across the city to generate a thriving culture of environmental stewardship. This approach to environmental education is best illustrated by the DC Environmental Literacy Plan, which ensures that schools are creating unique and empowering opportunities both in and outside of the classroom for students to grow into environmental stewards, and gain the skills they need to flourish as future leaders in the District.

Environmental literacy is defined as the development of knowledge, attitudes, and skills necessary to make informed decisions concerning the relationships among natural and urban systems. In the District, an environmentally literate person discusses and describes ecological and environmental systems and human impacts on these systems; engages in hands-on, outdoor learning experiences that involve discovery, inquiry, and problem solving; formulates questions and analyses information pertaining to his or her surrounding environment; and understands how to take actions that respect, restore, protect, and sustain the health and well-being of human communities and environmental systems.

With the unanimous passage of the Healthy Schools Act of 2010, the Council of the District of Columbia (DC Council) instituted legislation that prioritized the health and wellness of students throughout the District. This landmark piece of legislation addresses poor nutrition and inadequate physical activity. It also asserts that the environment plays a central role in supporting learning outcomes and maintaining life-long healthy behaviors.

The Healthy Schools Act calls for an environmental literacy plan in the District – a road map that will lay the foundation for District-wide implementation and integration of environmental education into the K-12 curriculum. This initiative, also supported by the District's Sustainable DC Plan, facilitates the collaboration between key community stakeholders, including District education agencies, public schools in the District, environmental education providers, health advocates, and many others. The DC Environmental Literacy Plan provides a framework to further guide these efforts and ensure that District students will be prepared to make informed decisions concerning the opportunities and challenges of the 21st century.

The Office of the State Superintendent of Education leads this effort, and has collaborated with District agencies, nonprofit organizations, and other community members to update the original DC Environmental Literacy Plan that was submitted to DC Council in 2012. The plan remains the local component for regional and national environmental literacy efforts, such as the Chesapeake Watershed Agreement (issued June 16, 2014) and the No Child Left Inside Act of 2015 (introduced into both chambers of Congress on Feb. 11, 2015). Combined, these initiatives seek to empower future generations to make effective environmental decisions and become caretakers of our shared community.

The DC Environmental Literacy Plan outlines the following objectives and goals for reaching them:

1) Integrate environmental literacy concepts into the K-12 curriculum.

- Align environmental literacy concepts with current standards.
- Create District-wide scope and sequence document for environmental science that aligns with the Advanced Placement (AP) Environmental Science exam.
- Engage every student in at least one Meaningful Watershed Educational Experience (MWEE) at each grade band (elementary, middle, and high school), with an ultimate goal of having one experience per grade level.
- Create systems of support for principals and District local education agency (LEA) leadership to build awareness and engagement around environmental literacy.
- Ensure environmental literacy materials are readily available online.
- Provide students with exposure and opportunities to participate in green jobs and environmental careers.

2) Increase and improve environmental education and training for all stakeholders.

- Prepare pre-service and in-service teachers to be able to teach environmental education and foster environmental literacy.
- Expand scope of outreach to school stakeholders to include administrative, operations, and facilities staff.
- Provide workshops and training for professionals in the environmental education field.
- Provide ongoing support for communities of practice to collaborate and increase capacity and implement environmental literacy programs at schools.

3) Integrate environmental literacy into the secondary school experience.

- Identify and evaluate available environmental science courses and pathways at public secondary and postsecondary institutions in the District.
- Ensure that all public high schools in the District offer an environmental science-based course.
- Ensure that every public high school student has at least one Meaningful Watershed Educational Experience (MWEE) in their high school career, as outlined in the 2014 Chesapeake Bay Watershed Agreement.
- Increase participation in environmental service-learning for the community service graduation requirement.
- Increase number of public school students exposed to environmental careers via work-based learning and job shadowing opportunities.

4) Create meaningful measures of student environmental literacy (assessment).

- Collect baseline information of student performance in environmental literacy concepts within current science, health, and social studies standards.
- Create environmental literacy assessment opportunities that are not test-driven.
- Continue to incorporate environmental literacy into student assessment tools.

5) Maximize school facilities and grounds to create learning opportunities for all students.

- Utilize school facilities to support environmental concepts and practices.
- Create and maintain outdoor schoolyard spaces to encourage and support outdoor learning experiences.
- Encourage schools to apply to the U.S. Green Ribbon Schools program.
- Create opportunities for students to utilize school buildings and grounds for learning.

6) Encourage collaboration and engagement across all sectors involved in implementing the DC Environmental Literacy Plan.

- Cultivate and foster the knowledge and awareness necessary for the development and implementation of the environmental literacy plan at LEAs.
- LEAs develop school-based environmental literacy programs based on the Environmental Literacy Framework.
- Each District agency demonstrates commitment and ownership of an Environmental Literacy Scope of Work and Implementation Plan that supports schools.
- Create state infrastructure for implementation of the environmental literacy plan.

To read the complete plan, please visit: http://osse.dc.gov/service/environmental-literacy-program-elp

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INTRODUCTION

In response to the growing health, educational, and environmental concerns across Washington, DC, the Council of the District of Columbia (DC Council) unanimously passed the Healthy Schools Act of May 2010. This unprecedented legislation seeks to improve the health and wellness of all students attending public schools in the District of Columbia. Specifically, the act addresses nutrition, health education, physical education and physical activity, Farm-to-School programs, and school gardens. The act also acknowledges that creating and sustaining an environmentally friendly school environment and integrating environmental education into the schools' curriculum are essential to the health and wellness of students, as well as the health of the local environment and community.

The Healthy Schools Act also includes provisions that incorporate environmental stewardship behaviors (such as recycling and energy reduction) into building practices, meet Leadership in Energy and Environmental Design (LEED) Gold Level certification when renovating or constructing new schools, assist schools in receiving Green Ribbon Schools recognition from the U.S. Department of Education, and develop an environmental literacy plan for public schools, public charter schools, and participating private schools. The Healthy Schools Act Amendments of 2011 clarified the components to be included in the DC Environmental Literacy Plan, and added the provision that a draft be submitted to the DC Council in June 2012. In 2014, the Sustainable DC Omnibus Amendment Act further amended the Healthy Schools Act by formally adopting the plan, and set forth the requirement that the plan be updated every three years.

COMPONENTS OF A STATE ENVIRONMENTAL LITERACY PLAN

An **environmental literacy plan** creates the framework for standards, achievement, professional development, assessment, and leadership for individuals and organizations to thrive and achieve innovation in education.

As mandated in the Healthy Schools Amendment Act of 2011, the DC Environmental Literacy Plan describes the following:

- relevant teaching and learning standards adopted by the District of Columbia State Board of Education;
- professional development opportunities for teachers;
- how to measure environmental literacy;
- governmental and nongovernmental entities that can assist schools; and
- implementation of the plan.

These components are consistent with the requirements described in the North American Association for Environmental Education (NAAEE)'s guidance document, *Developing a State Environmental Literacy Plan* (NAAEE, 2008).

DEFINITION OF ENVIRONMENTAL LITERACY

In August 2011, the DC Environmental Literacy Workgroup[1] developed and adopted the following definition of environmental literacy:

> *Environmental literacy is the development of knowledge, attitudes, and skills necessary to make informed decisions concerning the relationships among natural and urban systems.*

An environmentally literate person:

- discusses and describes ecological and environmental systems and human impacts on these systems;
- engages in hands-on, outdoor learning experiences that involve discovery, inquiry, and problem solving;
- formulates questions and analyzes information pertaining to his or her surrounding environment; and
- understands how to take actions that respect, restore, protect, and sustain the health and well-being of human communities and environmental systems.

BROADER LANDSCAPE OF ENVIRONMENTAL LITERACY

At the national level, there have been three prongs of advocacy for environmental literacy. First, the No Child Left Inside Act is a bi-partisan bill first introduced in the House of Representatives in 2008 and the Senate in 2009. As with bills formerly introduced, the No Child Left Inside Act of 2015 (S.492 and H.R.882) includes a provision that federal funding for environmental literacy would become available provided that the state education agency has a formally adopted environmental literacy plan. The second strategy is emerging as part of the Every Student Succeeds Act (ESSA), the reauthorization of the Elementary and Secondary Education Act. For the first time, this bill includes language making environmental education and environmental literacy programs explicitly eligible for federal funds, specifically in two formula grant programs described in Title IV of the bill: well-rounded education and 21st Century Community Learning Centers (NAAEE, 2016). These initiatives will empower future generations to make effective environmental decisions and become caretakers of our natural resources. Finally, two federal agencies have been promoting environmental literacy. The U.S. Department of the Interior has spearheaded the Every Kid in a Park initiative – a program that provides fourth graders and their families free access to all federal lands and waters: an opportunity for youth to discover the country's wildlife, natural resources, and history for free, which can lead to creating a life-long interest in conservation and stewardship. Furthermore, the U.S. Department of Education continues to host the Green Ribbon Schools program – the first comprehensive green schools recognition program at the federal level.

Regional environmental literacy efforts are driven by the Chesapeake Bay Watershed Agreement, which asserts that the long-term success of the Chesapeake Bay restoration efforts depends on the work of individuals and communities living throughout the watershed. First signed in 1987 by the mayor of the District of Columbia and the governors of states and jurisdictions in the Chesapeake Bay watershed, the 2014 agreement includes the following environmental literacy goal: enable students in the region to graduate with the knowledge and skills to act responsibly to protect and restore their local watershed. This goal is measured via three outcomes: student engagement in meaningful watershed educational experiences, sustainable schools, and state-level environmental literacy planning (CBP, 2014). These goals and outcomes are based on the 2012 Mid-Atlantic Elementary and Secondary Environmental Literacy

[1] See Appendix A in the 2012 Environmental Literacy Plan for a list of Workgroup members: http://osse.dc.gov/sites/default/files/dc/sites/osse/page_content/attachments/DCELP_Final_Appendices.pdf

Strategy, developed by the Chesapeake Bay Education Workgroup, which outlined how the federal government should support state efforts to advance environmental literacy.

THE DISTRICT'S STATE ENVIRONMENTAL LITERACY PLAN

The DC Environmental Literacy Plan is the local component for these national and regional environmental literacy efforts. The DC Environmental Literacy Plan is a road map that will lay the foundation for District-wide implementation of the integration of environmental education into the K-12 curriculum. This initiative facilitates the collaboration between environmental education providers, health advocates, District education agencies, and public schools in the District. The DC Environmental Literacy Plan provides a framework to further guide these efforts and ensure that students attending school in the District will have meaningful environmental education experiences and will be well prepared to make informed and responsible decisions about the environment.

The 2017 DC Environmental Literacy Plan slightly modifies the format used in the 2012 DC Environmental Literacy Plan. The updated plan remains divided into sections that describe the objectives and goals in the following areas: Content Standards, Professional Development, Graduation Requirements, Student Assessment, School Facilities, and Implementation. The most substantial changes to the plan can be found in the tables at the end of each section, where action items and implementation recommendations have been updated for the next three years.

Each section includes the following components:

BACKGROUND AND RATIONALE: Research that justifies the need for these environmental literacy initiatives.

LOCAL CONTEXT: A snapshot of "where we are" in the District regarding environmental literacy.

STATUS: Progress that has been made through the course of the development of the DC Environmental Literacy Plan.

OBJECTIVES, GOALS, ACTION ITEMS, AND IMPLEMENTATION RECOMMENDATIONS: A table describing what will be accomplished in the next three years.

CONTENT STANDARDS & YOUTH LEARNING EXPEREINCES

Background and Rationale

Across the country, many states are making significant progress in advancing national educational goals by creating and implementing environmental literacy plans to enrich the curriculum with environmental education (NAAEE, 2015). Research continues to indicate that environmental education improves learning in other subjects. For the past 20 years, studies conducted by the State Environmental Education Roundtable (SEER) have shown that environment-based programs have positive effects on student achievement, classroom discipline, and student attendance (SEER, 2014). According to a literature review of 119 peer-reviewed studies published from 1994-2013 that empirically measured K-12 student outcomes associated with environmental education, environmental education has resulted in a number of positive impacts: improving academic performance, enhancing critical thinking skills, increasing civic engagement, fostering positive environmental behaviors, and developing personal growth and life-building skills including confidence, autonomy, and leadership (Ardoin *et al.*, 2016).

Local Context

The adoption of new learning standards over the last few years has provided the District of Columbia a perfect opportunity to integrate environmental experiences into standards implementation efforts. In 2013, the District adopted the Next Generation Science Standards (NGSS). These standards emphasize a three-dimensional approach to student learning, incorporating science and engineering practices, disciplinary core ideas, and crosscutting concepts. Moreover, the standards are an effective entry point for integration of environmental literacy initiatives. Coyle (2014) notes that the NGSS have major content focus on science as it relates to the environment, namely through energy, nature, climate, sustainability, and the earth. The District is currently in the third year of implementation, and has emphasized environmental literacy as a core component of its implementation strategy. Created in 2014, the Environmental Literacy Framework is a key guidance document that depicts how the local environment can be the context through which NGSS can be taught (see Appendix F). Using the framework as a starting point, the District has launched several initiatives to encourage alignment and implementation of the NGSS and environmental literacy:

- Environmental Literacy Summer Institute: More than 35 District teachers came together to create NGSS-aligned curriculum units.
- Next Generation Science Assessment Items and Environmental Content Correlations: OSSE developed environment-based scenarios for field testing assessment items (see Table 1).
- Environmental Education Program Alignment: Nonprofit partners have collaborated to describe how their programs can assist with NGSS implementation.
- NGSS Training for Nonformal Educators: Partners received training on NGSS to determine how to improve their programming to best fit the educational needs of students and teachers.

Table 1. Next Generation Science Assessment Sample Items and Environmental Content Correlations

Grade and Sample Item Scenario	Topics Covered in Sample Items
Grade 5 Trevor and Kayla's school takes part in the District of Columbia School Garden Program.	• Do plants grow better in soil or in water? • Food webs • Pond food chains • Energy in plants • Composting in the garden • Solutions to combating rodents in the garden
High School Biology David and Maria go for a run in Rock Creek Park in Washington, DC.	• Energy from food consumption • Animals and plants work together to form a cycle of matter and energy using photosynthesis and cellular respiration • Anaerobic conditions in different environments

Source: DC Science 2015 Sample Items Booklet (OSSE, 2015a)

Collaboration across OSSE's NGSS and environmental literacy implementation initiatives have resulted in streamlining efforts and leveraging resources, while increasing access to resources for both teachers and nonformal environmental education providers.

While the science standards are strong in emphasizing local, relevant applications to science content, it is difficult to determine how these standards are taught. OSSE recommends the following for science instructional time, based on guidance from the National Science Teachers Association and the District's high school graduation requirements:

- Kindergarten to grade 5: 225 minutes per week;
- Grades 6-8: 60 minutes per day (or one semester of 2.5 blocked period); and
- High School: Four lab science courses (biology required).

Although these are OSSE's recommendations, the amount of science instructional time that a student receives is often left to the discretion of the school's principal. Since frequency and duration of science instruction is not tracked District-wide at elementary schools, data is not available to determine the amount of science instruction taking place at elementary schools. At some elementary schools, a principal chooses to hire a dedicated science resource teacher to teach science once a week for 45-60 minutes, while in other elementary schools, science is taught by the grade-level teacher, and the subject may not have dedicated time in the teaching schedule. However, some elementary schools are ensuring that science is offered every day.

In the 2015-16 school year, District of Columbia Public Schools (DCPS) launched its Cornerstones initiative to promote educational equity by providing all students across the school district with similar learning experiences via rigorous units imbedded into curricula. For science instruction, this includes one 10-hour unit per grade level in K-5 and four units per grade level in secondary science classrooms. Of note in the elementary division, the science and engineering units address NGSS performance expectations that incorporate and help advance student understanding of environmental literacy. Additionally, DCPS updated its K-12 science scope and sequence documents in summer 2016 and created curriculum guides based on Discovery Education's Techbook. With its initial adoption in the 2016-17 school year, Techbook is the first digital textbook resource utilized by DCPS that is NGSS aligned.

Since the passage of the Healthy Schools Act, there has been a noticeable growth in school garden and outdoor space efforts, which provide opportunity for bringing students outside. Some public and public charter schools have created opportunities for environmental and outdoor education. At least 25 organizations provide school-based outdoor learning experiences and 22 provide field experiences for District students (see Appendix E). Nevertheless, a survey of teachers, conducted by the DC Environmental Education Consortium (2007), revealed barriers to participating in environmental education to include lack of principal support, scheduling conflicts, and the lower priority placed on environmental education compared to reading, mathematics, and test taking. A survey conducted by Chapman (2014) supports the DC Environmental Education Consortium's finding, noting similar challenges across 12 states, primarily teacher workload, lack of funding, and schedule/time constraints. Many teachers anecdotally report that many of these barriers still exist today.

Status

Various environmental education pilot projects have provided teachers a platform for showcasing ways to integrate curriculum content with real-world challenges. Over the last couple of years, the District's Department of General Services (DGS) piloted several green schools challenges, such as a Sprint to Savings Energy Challenge, Recycle Right Competition, and Reduce First Competition. The District's Department of Energy and Environment's (DOEE) Sustainable DC Model Schools pilot project developed the Environmental Literacy Framework, which provides guidance for how teachers to integrate environmental topics that are aligned to NGSS and also address the Sustainable DC Plan goals via outdoor learning experiences (see Appendix F). Moreover, the Sustainable DC Model Schools pilot informed the creation of OSSE's Environmental Literacy Leadership Cadre, which works with elementary schools to provide environmental education programs at every grade level within the school.

The 2012 DC Environmental Literacy Plan included descriptions of existing science and high school social studies standards that support environmental literacy. The next step will be to look for opportunities within the health and physical education standards that were adopted by the District in 2016.

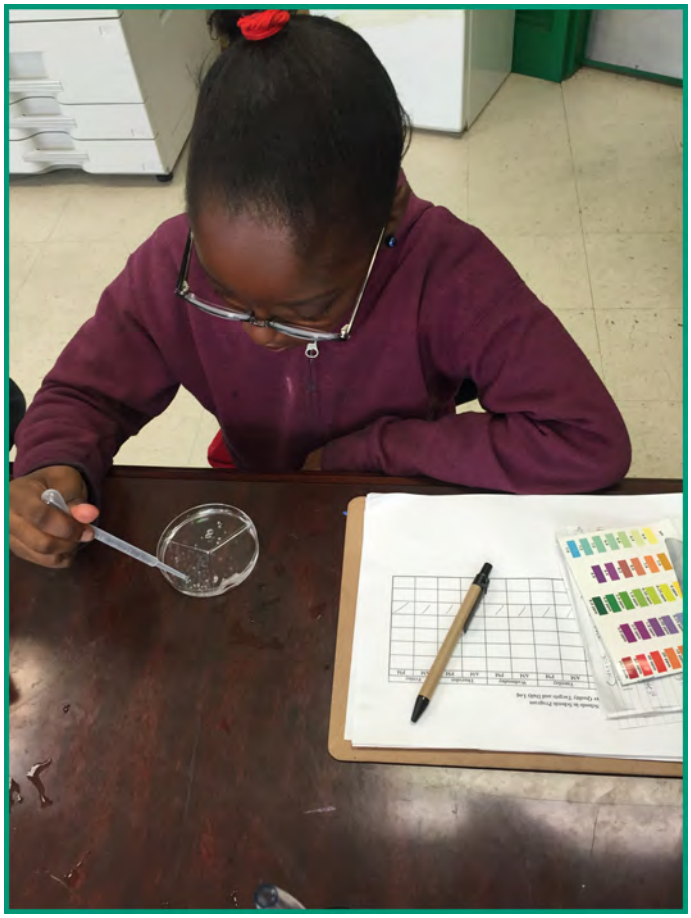
By adopting the Common Core State Standards for Literacy, DCPS has integrated science and social studies content into the English/language arts unit overviews, in order to broaden the curriculum and increase students' acquisition and understanding of core knowledge and concepts, respectively. There is at least one English/language arts unit per elementary grade level with science content. With the adoption of NGSS, DCPS prepared teachers prior to implementation with professional development sessions during summer and fall 2013, and continued providing guidance for unpacking the standards during the first NGSS implementation year in the 2014-15 school year. During the second year of implementation in the 2015-16 school year, DCPS-wide professional development days and additional workshops in summer 2015 provided further training to shift instruction to incorporate three-dimensional learning.

Public charter schools have exclusive control over their curriculum and educational programs, and some public charter schools choose to weave environmental education into their individual curricula. Of the 38 charter schools designated as "high performing" by the District of Columbia Public Charter School Board's Performance Management Framework (2016a), 28 schools have environmental education components in their curricula and/or engage members

of the DC Environmental Education Consortium for environmental education programming (OSSE, 2016a). Case studies of public and public charter schools in the District with examples of best practices can be found in Appendix G.

A key to successful integration of environmental education into school curriculum has been partnerships with environmental education providers. Certain District agencies and non-governmental organizations and certain District agencies support environmental education in public schools within the District by providing resources to students and teachers, both during the school day and as enrichment. For example, DOEE provides funding to organizations to provide meaningful watershed educational experiences to District students, RiverSmart Schools, Green Zone Environmental Program, and the Aquatic Resources Education Center. The District's Department of Parks and Recreation (DPR) continues to operate two environmental education centers at Twin Oaks Garden and Lederer Environmental Education Center, which offer environmental and gardening programs and workshops year-round for residents of all ages (DPR, 2016). For summer 2017, DPR is planning to partner with two environmental nonprofit organizations to manage youth field trips from DPR summer camp programs, hosted at the department's recreation centers, to the Lederer Youth Garden and Kingman Island Nature Center to learn about gardening, nutrition and nature.

Many organizations offer standards-based resources to assist District schools with integrating environmental literacy into a school's individual curriculum. OSSE has compiled a directory of environmental organizations that provide these resources (see Appendix E).



OBJECTIVE 1: INTEGRATE ENVIRONMENTAL LITERACY CONCEPTS INTO THE K-12 CURRICULUM.

Goal	Action Items	Lead Organizations	Implementation Recommendations	Timeline
A. Align environmental literacy concepts with current standards.	i. Analyze current standards and identify those that include EL concepts, to include Health and PE standards.	OSSE	Develop grade-band learning progressions for environmental literacy and corresponding one-page guidance documents and ensure they are aligned with NGSS and College, Career, and Civic Life (C3) Framework for Social Studies State Standards.	2018
	ii. Integrate environmental literacy concepts into existing DCPS scope and sequence documents by grade band.	DCPS	Create more opportunities for collaborative design between teachers and environmental education providers of learning experiences aligned to curriculum (e.g., teachers are reviewing scope and sequence documents and redesigning with a community partner).	2017
	iii. Utilize Environmental Literacy Leadership Cadre to identify and promote best practices currently in place in District schools.	OSSE	Expand OSSE's Environmental Literacy Leadership Cadre to include middle and high school teachers, or create a similar opportunity to develop teacher leaders.	Ongoing
	iv. Develop a vetting process for environmental education providers to validate quality programs that support standards.	OSSE UDC DCEEC	Offer training for NAAEE's Environmental Education Materials: Guidelines for Excellence.	2019
B. Create Districtwide scope and sequence document for environmental science that aligns with AP Environmental Science exam.	i. Identify team of educators and community partners to draft the document.	OSSE	Form a community of practice for high school environmental science teachers to create a more comprehensive program across District high schools.	summer 2018
	ii. Select LEAs to pilot documents during the 2017-18 school year.	OSSE		2019
	iii. LEAs choose to adopt or align their own documents.	DCPS charter LEAs		2020
C. Engage every student in at least one Meaningful Watershed Educational Experience at each grade band (elementary, middle, and high school), with an ultimate goal of having one experience per grade level.	i. Provide schools with a comprehensive list of outdoor opportunities on school grounds and throughout the District to be updated every three years.	DCEEC	Develop pilot project that identifies green space within a walking distance from schools to be used as an extension of the school grounds for learning.	2018
	ii. Create a new standards-based environmental literacy framework specifically for middle and high schools (current one is best for elementary schools) that includes Meaningful Watershed Educational Experience integration to scaffold into their curriculum.	OSSE DCEEC	Build upon high school environmental science teachers' community of practice to develop additional guidance documents, to include end of year goals for every grade level.	2020

D. Create systems of support for principal and District LEA leadership to build awareness and engagement around environmental literacy.	i. Identify interested school sites and host at least two opportunities per year that range from briefing meetings to immersive professional learning experiences.	OSSE DCPS charter LEAs	Identify partners to launch a school leadership institute.	Begin in summer 2017
E. Ensure environmental literacy materials are readily available through online dissemination.	i. Promote the use of existing resources and websites by adding website content at least twice per year.	DCEEC	Create video for outreach on overview of environmental education specific for DC.	2020
	ii. Update DCPS internal online platform quarterly to include environmental literacy-specific page for curriculum and/or resources.	DCPS	Parent and family engagement around this work - create FAQs to assist them to form questions that can be asked at school and/or out-of-school time programs.	summer 2017
	Iii. Submit environmental literacy resources information to be published in the OSSE LEA Look Forward and PCSB Bulletin at least four times per year.	OSSE	Ensure OSSE's website effectively organizes, catalogues, and stores environmental literacy resources.	Beginning summer 2017
F. Provide students with exposure to green jobs and environmental careers and encourage student participation in these opportunities.	i. At least 300 students in District summer employment programs (such as DOEE's Green Zone Environmental Program and the Marion Barry Summer Youth Employment Program) receive exposure (minimum of one day) to environmental careers.	DOEE DOES UDC	Track number of students and hours engaged in environmental activities. Begin to create a catalog of opportunities and experiences to develop environmental career profile sheets.	Ongoing 2018

PROFESSIONAL DEVELOPMENT

Background and Rationale

According to the report *Environmental Literacy in the United States* (2015), teachers who may have little or no exposure to, or interest in, environmental topics are often called upon to teach about the environment and sustainability in their classroom. The report further suggests that from 2005-15, there have not been large advances in preparing classroom teachers as environmental educators (NEEF, 2015). Research by the North American Association for Environmental Education (NAAEE) and the Environmental Literacy Council shows environmental education is taught by 83 percent of elementary school teachers, but only 44 percent of high school teachers (Coyle, 2005). A study by Ruskey, Wilke, & Beasley (2001) found that although more than half of the teachers surveyed report teaching environmental subjects, only 10 percent of teachers have had specific training on environmental education teaching methods, and only one in four has had any environmental science or related courses.

Research overwhelmingly suggests that teacher training should not end upon receipt of a degree and certification in the field. Teachers benefit from continued professional development and training, not only regarding teaching strategies, but also focused on specific content that must be taught. Studies have shown that the vast majority of American adults may have been exposed to issues relating to environmental literacy, but lack a true understanding of those issues. This absence in environmental education professional development for teachers potentially trickles down resulting in citizens with insufficient knowledge and skills related to environmental literacy. For example, Coyle (2005) states that only 1-to-2 percent of adults in America have sufficient environmental knowledge and skill to be considered environmentally literate, meaning most adult decision-makers, such as business leaders, elected officials, community volunteers, and ordinary voting citizens, are lacking in environmental education and literacy.

Local Context

Federal law requires all public elementary and secondary school students to be taught by teachers who are certified as being "highly qualified." This means teachers in the core academic areas (defined as: English, reading/language arts, mathematics, science, foreign languages, civics/government/economics, arts, history, and geography) must hold a bachelor's degree, have full state certification, and demonstrate subject matter competency. Teachers at public charter schools are exempt from needing full state certification (PCSB, 2016b). According to the 2010-11 school year State Report Card on Teacher Quality, 90 percent (3,108) of District teachers possessed a valid teaching license while teaching in District schools (OSSE, 2012). Additionally, the 2014-15 school year State Report Card shows that 73 percent of the core classes taught in the District was taught by highly qualified teachers (OSSE, 2014a).

Teachers can follow different pathways to become certified teachers in the District. For pre-service teachers, OSSE manages the DC State Accreditation and Program Approval and publishes the Directory of Approved Educator Preparation Programs. Of the 14 institutions or organizations with state-approved programs, 12 offer either or both traditional and alternative route educator preparation programs in elementary education. Half of these programs

offer secondary biology and physics, and fewer than half offer secondary chemistry and general science programs. Currently, none of the institutions or organizations offer an environmental science program (OSSE, 2013).

The current process for District teachers to renew a Standard Teacher Credential was updated in July 2016. As of Jan. 1, 2017, applicants must submit evidence of one of the following within four years prior to the date of licensure application submission: 1) a summative LEA administrator evaluation rating of effective or equivalent for a minimum of three years during the four-year term of validity, or 2) a minimum of eight college semester hours or 120 hours of professional development activities. Professional development must increase content knowledge and competence in the subject area of the credential, or increase knowledge of local, state, or national educational initiatives and goals (OSSE, 2016b).

Because research demonstrates that the best way to improve student achievement for all students is through effective teaching (Sanders & Rivers, 1996; Rivkin, Hanushek, & Kain, 2005), the District has committed to increasing the number of highly effective teachers in its classrooms through efforts such as incentives funded by the Raising the Expectations for Educational Outcomes Omnibus Act of 2012 (DC Council, 2012) and DCPS' Leadership Initiative for Teachers (LIFT) (DCPS, 2016a). In 2016, DCPS launched a new professional development initiative called LEAP, LEarning together to Advance our Practice. LEAP creates content-specific, school-based learning teams that engage in a weekly cycle of lesson planning, formative observations, and student work analysis. Working under the guidance of and with support from the new Office of Instructional Practice in DCPS' central office, the LEAP cycle is grounded in DCPS curricular resources and facilitated by a content-specific leader at all schools for English/language arts and math. At the high school level, school-based science LEAP leaders can be the assistant principal, an instructional coach, or a department chair (one per school), and currently support biology, chemistry, and physics. Currently, there are not any plans to extend LEAP leaders in science for elementary and middle schools (DCPS, 2016b).

Training in national environmental education activity guides can be a useful introduction for teachers to become familiar with environmental education concepts and objectives and may put teachers on a course of professional development to become comfortable with more advanced environmental education opportunities (Monroe, Wojcik, & Biedenweg, 2016). In 2016, 27 organizations provided professional development for District teachers in areas that support environmental literacy. These opportunities may be offered by one organization or in collaboration with other nonprofits. OSSE is the state coordinator for training in Project Learning Tree, a suite of national environmental education curricula, and also has organized workshops to support the implementation of garden curriculum, such as LifeLab's Growing the Garden Classroom, by school garden coordinators and other service providers. DOEE serves as state coordinator for training in Project WILD, and offers professional development in the national environmental education curricula Project WILD Aquatic and Growing Up WILD.

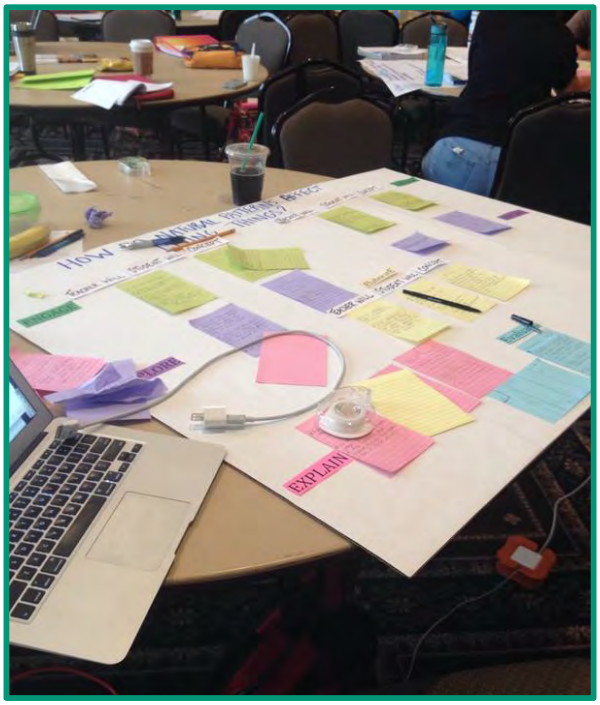
OSSE and DOEE also continue to support and coordinate professional development training with members of the DC Environmental Education Consortium (DCEEC) and other nonprofit organizations. Examples include the department's RiverSmart Schools program and DCPS elementary science Cornerstones training on Engineering is Elementary curricula.

Status

In the 2016-17 school year, DCPS has designated seven half-day professional development days where all science teachers from across the school district form course-specific professional learning communities to engage in professional learning opportunities. These communities will work within cohorts of sixth to 12th grade teachers who teach the same course and one cohort for elementary science resource teachers. The three-hour sessions will focus on the Nature of Science from NGSS, unit tasks such as Cornerstones, and planning for units with high-quality resources. In addition, high schools and one middle school will have two weeks of professional learning time led by LEAP leaders in the school for teachers to plan for upcoming instruction. The third aspect of LEAP includes Modules of Professional Learning comprised of weekly school-based LEAP cycles. The four topics that will be covered over the course of the year include NGSS three-dimensional instruction, student investigations and data analysis, engineering solutions, and literacy in science.

Also new for the 2016-17 school year are science curriculum guides, which include resource guides correlated with NGSS included in each unit. DCPS is continually compiling suggested environmental resources for inclusion into the curriculum guides. However, it continues to be difficult to provide systemic science-based professional development for elementary teachers. A platform does not exist to reach most DCPS elementary school teachers during designated professional development days because the majority of the training continues to be focused on Common Core State Standards for English/language arts and mathematics content. At public charter schools, each charter LEA is responsible for its own professional development for its teachers. Because professional development is not coordinated across all charter schools, professional development opportunities are delivered differently for each LEA.

Because OSSE offers professional opportunities that are system-wide (both DCPS and public charter schools), there is potential to have science professional development with an environmental literacy focus as an offering in a future professional development calendar.



OBJECTIVE 2: INCREASE AND IMPROVE ENVIRONMENTAL EDUCATION AND TRAINING FOR ALL STAKEHOLDERS.

Goal	Action Items	Lead Organizations	Implementation Recommendations	Timeline
A. Prepare pre-service teachers to be able to teach environmental education and foster environmental literacy.	i. Establish pilot program to engage pre-service programs to provide environmental education as part of their coursework (such as teaching methods) with a target of 6 contact hours of training in environmental education.	OSSE UDC DDOE DCEEC	Contact local teacher preparation programs and conduct a gap analysis of programs offered and potential for integrating environmental education into coursework.	2020
	ii. Identify and partner with a higher education institution to provide certification opportunities for middle and secondary teachers with a concentration in environmental science.		Pilot an initiative in higher education using integrated workshops for national environmental education curricula (such as Project Learning Tree and Project WILD) with a local focus.	2020
B. Provide in-service teachers with workshops about how to teach environmental education and foster environmental literacy.	i. Create a crosswalk of the DCPS Essential Practices (new Teaching and Learning Framework) and the NAAEE *Guidelines for the Preparation and Professional Development of Environmental Educators* to determine existing overlap and any gaps.	DCPS DCEEC	Collaborate with DCPS to plan and align LEAP efforts with professional development for elementary, middle, and high school science courses to address current environmental education needs.	2017
	ii. Deliver high-quality workshops for teachers by competent EE professionals that increase content knowledge of teachers and increases comfort with teaching outside of the classroom.	DOEE OSSE UDC DCEEC	Require teachers at the K-12 levels to obtain a minimum of 1 Continuing Education Unit (CEU) in subject areas that support environmental literacy each year. While this cannot also be required of public charter school teachers, it is strongly recommended that each LEA adopt a similar policy. Provide training for elementary teachers to use Discovery Education's Techbook to make direct connections between lessons and local environmental concepts.	 2018
	iii. Create a Summer Academy for teachers that provides intensive training in relevant grade bands.	UDC OSSE	Build upon the 2014 OSSE Environmental Literacy Summer Institute in 2014, and plan an institute every three years.	2020 2017

C. Expand scope of outreach to school stakeholders to include administrative, operations, and facilities staff.	**i.** Provide opportunities for school administrators to engage in authentic experiences that show the value of environmental education and create buy-in. **ii.** Include school maintenance and facilities managers/ operations staff to encourage collaboration across school building operations.	OSSE DGS	Expand definition of stakeholders to include school administrative personnel, school operations staff, and environmental education providers.	2020
D. Provide workshops and training for professionals in the environmental education field.	i. Hold at least three workshops per year for environmental education providers – intro courses and supplemental workshops.	DOEE DCEEC OSSE	Explore topics such as program alignment with NGSS, nature near schools, and national environmental education curricula.	Ongoing
E. Provide ongoing support for communities of practice to collaborate and increase capacity and implement environmental literacy programs at schools.	i. Create Professional Learning Communities or other networks focused on environmental literacy.	OSSE	Collaborate with other teacher training programs, such as the Center for Inspired Teaching's Institute for STEM Educators SCALE: Science Curriculum Advancement through Literacy Enhancement. Maintain a catalog of all training programs and ensure offerings are in OSSE's Professional Development Calendar and LEA communication channels.	Ongoing

HIGH SCHOOL GRADUATION REQUIREMENTS

Background and Rationale

In March 2016, Gallup's annual environment poll indicated that Americans are taking global warming more seriously now than at any time in the past eight years, with 64 percent of adults in the United States saying they are worried a "great deal" or "fair amount," and 41 percent saying they believe global warming will eventually pose a serious threat to them or their way of life (Gallup, 2016). Young people also seem to share similar environmental concerns. In 2011, The Nature Conservancy conducted a poll of American youth between the ages of 13 and 18 to assess the time they spend in nature and their connections with the environment. Results included:

- 51 percent indicated that "the condition of the environment and nature" as an "extremely" or "very serious" problem.
- 73 percent agree that "previous generations have damaged our environment and left it to our generation to fix it."
- 76 percent strongly believe issues like climate change can be solved if action is taken now.
- 86 percent say that it is "cool" to do things to protect the environment.

While polls suggest the concern about the state of the environment and environmental issues such as climate change, a study by the Yale Project on Climate Change Communication indicates that as little as 25 percent of American middle and high school students surveyed understand how the climate system works, and the causes, impacts, and potential solutions to global warming, compared to 30 percent of American adults (Leiserowitz, Smith, & Marlon, 2011), raising concerns that the public may not be informed enough to make educated decisions.

At the national level, since the introduction of the College Board's AP Environmental Science Exam in 1996, the number of students taking this exam nationwide has grown from 5,186 in 1996 to 35,208 in 2006, and to 149,096 in 2016 (College Board, 2016a). Environmental science continues to be ranked as one of the fastest growing AP courses in the country (Robelen, 2012). However, students' scores in Environmental Science remain the lowest when compared to the other 10 AP Science, Technology, Engineering, and Math (STEM) subject exams. In 2016, fewer than half of students (45.6 percent) received a score of 3 or higher, which would allow them to receive college credit (College Board, 2016b).

In addition to a growing interest in learning about the environment, the number of high school students participating in environmentally themed community service and/or service-learning is also growing. According to the National Youth Leadership Council, young people who engage in service-learning during their high school careers will be more likely to graduate high school and will see themselves as agents of positive change in their communities because they feel connected to what they are learning, see teachers as mentors, and have a voice in their education (Meuers, 2016). In a literature review of research on the development of conservation behaviors, Chawla & Derr (2012) found that recurring direct experiences and opportunities to learn through action, such as those offered in environmental

service-learning, are necessary for youth to practice the skills of active environmental citizenship. For example, students who participated in service-learning activities in high school scored 6.7 percent higher in reading and 5.9 percent higher in science, and graduated from college at a rate that was 22 percentage points higher than those who did not participate in service-learning (Davila & Mora, 2007).

Local Context

Students in the United States need to be prepared to be competitive in the global marketplace, and those enrolled in the District's public schools are no exception. Raise DC, the District of Columbia's cradle-to-career collective impact organization, regularly releases a progress report on key data points around student outcomes from pre-K through college. The most recent report, published in 2015, finds that 43 percent of high school graduates who enrolled in postsecondary education completed a bachelor's degree within six years. Analysis conducted by Raise DC and the Deputy Mayor for Education in 2014 shows that almost 40 percent of District high school graduates do not enter postsecondary education (DME, 2014).

Since 2006, the District has instituted school reform interventions and accountability measures to improve academic achievement, increase graduation rates, and demonstrate mastery in state standards (OSSE, 2015b). The adjusted cohort consisted of 4,880 students who entered ninth grade in the 2012-13 school year. Of those, 3,377 students (69 percent) graduated high school on time (at the close of the 2015-16 school year), which is an increase of 3.8 percent over the previous school year. For DCPS, the graduation rate rose to 69 percent, up from 64 percent; and the graduation rate for public charter schools rose to 73 percent, up from 72 percent (OSSE, 2016c).

In recent years, there has been an increase in the number of AP course offerings in District schools, as well as a significant increase in the rigor of state standards and assessments. The District began testing students on the Partnership for the Assessment of Readiness for College and Careers (PARCC) assessments in spring 2015 and field-testing for the new DC science assessment began in 2015.

Currently, District students can elect to focus on environmental issues via two of the graduation requirements needed to obtain a high school diploma in the District of Columbia Public Education System include: four units of science (including biology, two lab sciences, and one other science) and 100 community service hours [(Section 2203.3 of the District of Columbia Municipal Regulations (DCMR) Title 5-E, Chapter 22 (5-E 22 DMCR § 2203)] (SBOE, 2016). Twenty DCPS high schools and 12 public charter high schools offer AP or the standard environmental science course. These courses reached approximately 2,195 students (OSSE, 2016b). Only one high school, Capital City Public Charter School, requires all students to take one of the following science courses that has an environmental focus to graduate: Urban Ecology or Environmental Science (Capital City PCS, 2016). In 2011, Maryland became the first state in the nation to pass an environmental literacy high school graduation requirement, which mandates that every local school system in the state must provide a comprehensive, multi-disciplinary environmental education program in all pre-K-12 public schools (COMAR, 2011).

Status

Since 2011, the District of Columbia State Board of Education has proposed changes to District's graduation requirements, most of which have been repealed (DCMR, 2016). While the availability of AP and standard environmental science courses has increased, student enrollment in these courses has been declining (OSSE, 2016a).

However, there is potential to integrate environmental experiences into other academic programs to ensure that students are still exposed to environmental concepts. For example, the 2012 Career and Technical Education strategic plan identified 12 priority sectors to focus career and technical education for secondary and postsecondary programs of study based on an analysis of Bureau of Labor Statistics data. Environmental science content can be related to sectors and occupations identified using labor market information for the region (District of Columbia Career and Technical Education Task Force, 2012). While environmental science is not explicitly connected into this work, many connections can be made between career sectors and priority occupations (see Table 2 below for examples).

Table 2. Potential Alignment with Career and Technical Education Programs.

Career Sector	Selected Priority Occupations in the District	Environmental Career Connections
Science, Engineering, Math, and Technology	• Natural Sciences Managers • Biological Scientists	• Manager at a state environmental agency • Wildlife Biologist
Information Technology	• Computer and Information Systems Managers	• GIS (Geographic Information Systems) Specialist/Manager
Business Management and Administration	• Management Analysts	• Analyst at an environmental company
Architecture and Construction	• Architects • Construction and Building Inspectors	• Green building experts
Law, Public Safety, Corrections, and Human Services	• Lawyers • Social and Community Services Managers	• Attorney for environmental advocacy organization
Marketing	• Market Research Analysts and Marketing Specialists	• Consultant to determine needs for environmental products and services
Transportation, Distribution, and Logistics	• Automotive Service Technicians and Mechanics	• Hybrid vehicle or alternative fuel vehicle experts
Finance	• Budget Analysts	• Finance team member at an environmental company
Education and Training	• Training and Development • Elementary School Teachers • Teachers and Instructors	• Teachers in DCPS and public charter schools
Health Science	• Health Educators	• Practitioners familiar with health benefits of spending time outdoors and/or diseases triggered by environmental factors
Arts, AV Technology, and Communications	• Public Relations Specialists	• Director of Public Relations at an environmental nonprofit organization
Hospitality and Tourism	• Meeting and Convention Planners	• Conference planners knowledgeable about local environmental practices (sustainable food sources, carbon offsets for travel, composting, etc.)

Another example is through National Academy Foundation (NAF) academy programs in high schools. For the past two years, professionals from local green industries have met and presented to students in H.D. Woodson Senior High School's NAF Engineering Academy. These creative approaches to exposing students to environmental science are important, since environmental science jobs are expected to grow by 15 percent from 2012-22, faster than the average for all occupations; additionally, 78 percent of business and organizations believe that the value of job candidates' environmental knowledge will increase in importance as a hiring factor (NEEF, 2016).

Outside of instructional time, District youth can still learn about the environment through volunteer activities. The Department of Parks and Recreation, the University of the District of Columbia, as well as many environmental organizations in the District currently provide meaningful volunteer opportunities to District youth to help fulfill the graduation requirement to complete 100 community service hours. The DC Environmental Education Consortium plans to continue to compile volunteer information to disseminate to community service coordinators within DCPS and to the public charter schools at the beginning of each school year.

Student exposure to environmental science and environmental careers can be fostered by Increasing the number of environmental tracks, courses, and programs offered at every high school, including AP Environmental Science courses; adding environmental/engineering pathways through Career and Technical Education Pathways, NAF Academies, and Project Lead the Way pathways; and work-based and service-learning opportunities. By offering a multitude of engagement opportunities of varying degrees and depth, students will be better prepared for the demands of the future green economy.

OBJECTIVE 3: INTEGRATE ENVIRONMENTAL LITERACY INTO THE SECONDARY SCHOOL EXPERIENCE.

Goal	Action Items	Lead Organizations	Implementation Recommendations	Timeline
A. Identify and evaluate available environmental science courses and pathways at public secondary and postsecondary institutions in DC.	i. Conduct an annual inventory of environmental science courses.	DCPS charter LEAs		2018
	ii. Collect and analyze course grades and test scores.	OSSE		2018
B. Ensure that all District high schools offer an environmental science course (or similar course, such as urban ecology).	i. Identify the existing barriers to schools offering these courses.	DCPS charter LEAs	Allow flexibility for public charter schools to offer courses based on LEA focus areas.	2018
	ii. Create plan to remove barriers at schools that do not offer any environmental courses.	OSSE	Increase funding capacity for schools to hire environmental science teachers. If possible, explore the possibility of cross-training higher-level math and science teachers to add an environmental science class outside of their area of focus or training.	2019
	iii. Create a community of practice for teachers to develop resources and Implement new scope and sequence documents.	OSSE	Explore possibility of teachers "externing" at local environmental agencies/organizations to build proficiency in integrating local environmental issues into their classroom.	2017
C. Ensure that every high school student has at least one Meaningful Watershed Educational Experience (MWEE) in their high school career, as outlined in the 2014 Chesapeake Bay Watershed Agreement.	i. Analyze the implementation and results of MWEEs in other state/jurisdictions to determine best practices and applications for the District.	OSSE	Amend the current graduation requirements to integrate environmental literacy, which will also support the District's goal of increasing the number of students who graduate ready to succeed in college and careers.	
	ii. Develop a pilot environmental literacy program for high schools to include MWEEs.	OSSE UDC	Meet with schools that host NAF academies and CTE pathways to determine if one monthly experience can be job shadowing or another outreach experience related to an environmental career.	2020

D. Increase participation in environmental service-learning as part of the community service graduation requirement.	i. Update and send comprehensive information to the DCPS Office of Secondary School Transformation for inclusion in the DCPS Community Service Handbook and post on the OSSE website for all LEAs to access.	DCEEC OSSE		Begin in summer 2017
	ii. Meet with the DCPS community service coordinators and charter LEA representatives so they know about opportunities available.	OSSE DCPS charter LEAs	Increase the visibility of and access to environmental community service projects. Create a coordinated approach to deliver this information to school counselors, community service coordinators, teachers, parents, and students.	Begin in fall 2017
	iii. Enhance school collaboration with environmental education providers to increase meaningful volunteer opportunities to students.	DPR UDC DCEEC	Create a guidance document to describe successful service- learning opportunities.	2018
	iv. Determine current number of students participating in environmental service-learning; determine whether the number increases over time.	DCPS charter LEAs	Develop incentives to increase student participation.	Begin in summer 2017 Ongoing
E. Increase number of students exposed to environmental careers via work-based learning and job shadowing opportunities.	i. Develop materials for students and families informed by an employer-driven continuum of career readiness that will share information about educational qualifications and income levels for occupations in high-skill, high-demand sectors.	OSSE	Increase community awareness of environmental science academic and employment pathways. Begin to develop career awareness in grades pre-K through 5, provide opportunities for career engagement in grades 6-8 engagement, and explore opportunities for work-based learning in high school practices.	2017

STUDENT ASSESSMENT (EVALUATION)

Background and Rationale

Numerous studies have shown positive links between environmental literacy, student performance, and academic achievement. In the report *Back to School: Back Outside* (2010), Coyle includes an overview of research that supports the integration of environmental education into school time. Of the research cited, the following studies suggest a symbiotic relationship between sustained environmental education and improved academic achievement:

- Bartosh (2003) found that schools with integrated environmental education programs comprised of three or more years had consistent improvement and/or higher test scores in mathematics, reading, and writing compared to those schools without environmental education.
- The National Environmental Education Foundation showed improvements in academic performance across the curriculum, i.e., reading, mathematics, science, and social studies, in schools that used environmental education as the focus of their curriculum (Glenn, 2000).
- Lieberman & Hoody (1998), in their now seminal State Education and Environment Roundtable (SEER) study, showed that students attending schools with integrated environmental learning curricula exhibit increased achievement. Subsequent studies (SEER, 2000; 2005) showed that students in environment-based instructional programs scored as well or better on standardized measures in reading, mathematics, language, and spelling. In addition, these programs have shown that they foster cooperative learning and civic responsibility (SEER, 2005).

In response to a growing need to clarify what is meant by environmental literacy, NAAEE released a comprehensive, research-based description of environmental literacy and applies that work to the creation of a framework for an assessment of environmental literacy in December 2011. This framework has been used to develop a position paper for the Programme for International Student Assessment (PISA) Governing Board by the PISA Environmental Literacy Expert Group, proposing to build a framework to assess environmental literacy for the PISA 2015 assessment and in the development of several state-level and multi-state/regional plans to measure the environmental literacy of graduating seniors as part of state environmental literacy plans (NAAEE, 2012).

Local Context

In 2010, the District of Columbia State Board of Education adopted the Common Core State Standards for English/language arts and mathematics. In December 2013, the District adopted the NGSS. Based on the National Research Council's *Framework for K-12 Science Education,* the NGSS reflects the integration of science and engineering content and application as it is practiced in the real world (OSSE, 2015a).

In 2012, the state assessment system[2] in English/language arts and composition was aligned to the Common Core State Standards. The mathematics assessment was aligned to the common core in the 2012-13 school year. Beginning in the 2013-14 school year, DC began using the PARCC assessment. Consistent with the assessment transition to the common core, the District also transitioned to an NGSS-aligned assessment in spring 2015 and will continue to provide technical assistance to LEAs around this transition (OSSE, 2015b).

Even though environmental literacy is a cross-curricular, interdisciplinary subject, environmental concepts can be assessed within the science standards. The DC Science Assessment uses interrelated questions to adequately assess the new standards. The goal of real-world context or scenarios is to engage students and assess three-dimensional science learning. In spring 2015, OSSE field-tested the new science assessment, which is administered online to students in grades 5, 8, and high school biology in the same platform used for the PARCC assessments. The 2015 assessment integrated technology-enhanced NGSS-based items with science item formats previously used in District-wide assessments, and included new scenario-based items at each grade level (OSSE, 2015a).

The DC Science Assessment consists of two timed test units per grade, approximately one hour duration per unit. More than half of the assessment items are selected response, with the remainder a combination of constructed response and technology enhanced items. Students demonstrate their understanding of NGSS concepts through storylines, some of which may have an environmental literacy context. The spring 2016 Science Assessment Blueprint shows the NGSS topics that are addressed on the assessment, and are described in Table 3 below:

Table 3. DC Science Assessment (2016 Blueprint)

	Grade 5	Grade 8	Biology
Life Science	• Interdependent relationship within ecosystems: environmental impacts on organisms • Inheritance and variation of traits: life cycles and traits • Matter and energy in organisms and ecosystems	• Matter and energy in organisms in ecosystems • Growth development and reproduction of organisms • Natural selection and adaptation	• Structure and function • Interdependent relationships in ecosystems • Matter and energy in organisms and ecosystems • Inheritance and variation of traits • Natural selection and evolution
Physical Science	• Forces and interactions • Energy • Structure and properties of matter	• Chemical reactions • Structure and properties of matter • Forces and interactions • Energy • Waves and electromagnetic radiation	
Earth Science	• Weather and climate • Earth's systems: processes that shape the earth • Earth's systems	• History of the earth • Earth's systems • Human impacts	
Engineering	• Engineering design	• Engineering design	• Engineering design

Source: Office of the State Superintendent of Education (2016d)

[2] DC Comprehensive Assessment System

Scores from the 2015 NGSS field test were disseminated to LEAs but not publicly released. However, figure 1 below depicts past performance data on the DC CAS released in 2014, which shows that percentage of students demonstrating proficiency in science has been increasing steadily since 2008 (OSSE, 2014b).

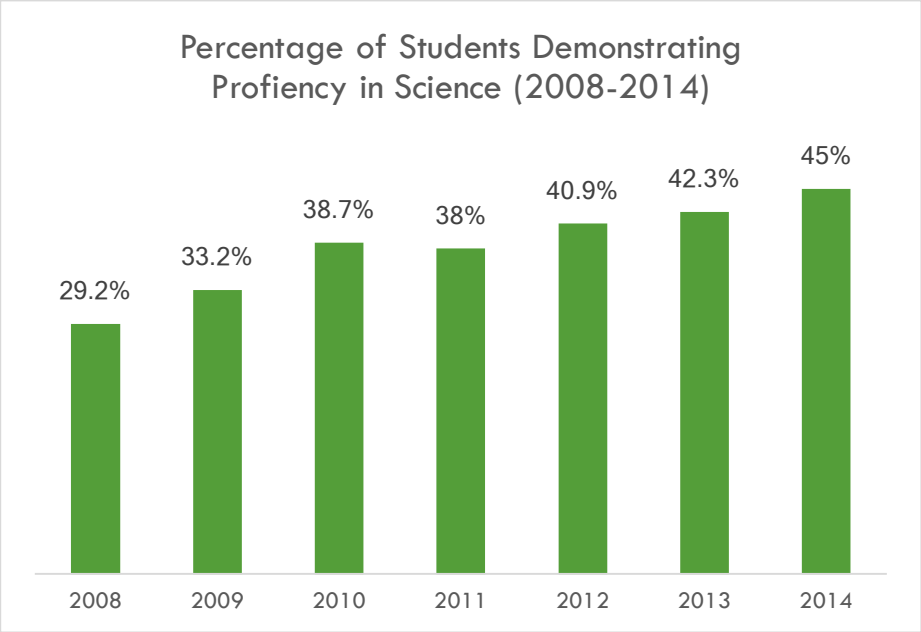


Fig. 1. Past performance on the DC CAS for science (OSSE, 2014b)

With the adoption of the English/language arts and mathematics Common Core State Standards, the District was part of the multi-state initiative to develop common assessment systems, PARCC, and the District is one of nine participating states in PARCC that led the assessment development effort. In 2015, the District was the first state to administer an NGSS-aligned field test that included technology enhanced items. In subsequent years, the District will continue to evolve assessments to reflect the three dimensional design of the NGSS.

The District of Columbia continues to be the only state in the nation that conducts a standardized test for health and physical education. Since 2012, District students are tested annually in grades 5 and 8, and high school (during the year that a health class is taken) on their health and physical education knowledge as it pertains to OSSE's Health and Physical Education Standards. The assessment was put on hold for the 2014-15 school year to accommodate the transition to PARCC. At this time, health scores are not included in the state's accountability system, but they are reported to the U.S. Department of Education for accountability, included in schools' annual report cards, and included in the annual Healthy Schools Act Health and Physical Education (OSSE, 2016e).

Currently, DCPS also administers the following formative assessments two to three times per year in mathematics, science, social studies, and English/language arts:

- Achievement Network for English/language arts (grades 3-10)
- DIBELS/TRC for English/language arts (grades K-5)
- Reading Inventory (grades 4-8)
- i-Ready Math Diagnostic (grades 2-8)

- i-Ready Math Standards Mastery (grades 3-8)
- Northwest Education Association's Measures of Academic Progress in math (HS Algebra I, Geometry, and Algebra II)
- Northwest Education Association's Measures of Academic Progress in science (grade 6)
- Social Studies Assessment of Growth and Excellence (grades 6-8)

The purpose of these assessments are to measure students' knowledge and skills in specific subject areas to inform educators and students on progress, to drive instruction, and provide a measure of teacher and school achievement.

Status

OSSE is required to submit a state education plan for the Every Student Succeeds Act (ESSA) to the U.S. Department of Education in April 2017. Included in this plan will be a new proposal to assess school and student accountability (OSSE, 2017). An updated health and physical education assessment also will be created using a new assessment method modeled after what is used by the state of Washington.

To help guide teacher instruction in middle school science, DCPS implemented Northwest Education Association's Measures of Academic Progress (MAP) into the sixth grade Earth Science course. This formative assessment is administered at the beginning, middle and end of the school year to assist teachers in measuring the growth of their students and provide guidance to tailor science instruction based on students' learning needs.

OBJECTIVE 4: CREATE MEANINGFUL MEASURES OF STUDENT ENVIRONMENTAL LITERACY (ASSESSMENT).

Goal	Action Items	Lead Organizations	Implementation Recommendations	Timeline
A. Collect baseline information of student performance in environmental literacy (EL) concepts within current science, health, and social studies standards.	i. Convene a panel to designate health standards that contain EL concepts and write corresponding justifications (e.g., Category 4: Disease prevention).	OSSE	Work within current structure of item development for DC Health and Physical Education assessment and encourage OSSE to explore the inclusion of environmental themes.	In progress
	ii. Gather baseline data for SY15-16 science test and baseline data for the 2017-18 school year health test.	OSSE DCPS	Gather and analyze Next Generation Science Assessment results to create baseline data points for science standards that contain relevant environmental content. Implement a Life Science assessment in seventh grade from NWEA's MAP in the 2017-18 school year and an interdisciplinary assessment into eighth grade in the 2018-19 school year.	2018 2019
	iii. Conduct analysis to determine correlation between assessment performance and implementation of school-based environmental programming to determine best practices.	OSSE	Conduct impact evaluations based on recipients of the US Green Ribbon Schools recognition and/or school garden grants, or schools implementing the ALT Energy Pathways from the Career and Technical Education programs.	2020
	iv. Identify opportunities to align environmental literacy efforts with science and health assessment item development.	OSSE		Ongoing
B. Create environmental literacy assessment opportunities that are not test-driven.	i. Develop incentives and recognition for student participation and engagement in environmental projects, such as a capstone project, science fair project, portfolio, school environmental competition, and provide a showcase for student presentations.	DOEE DCPS DGS DCEEC	Create a yearly opportunity to showcase student environmental literacy projects, such as a Youth Summit, Environmental Literacy Week, STEM Fair, or designate an environmental literacy challenge as part of Growing Healthy Schools Month.	Ongoing
	ii. Catalogue efforts and create outlet to promote and recognize student achievements.	DCPS charter LEAs	Create a webpage on OSSE's Environmental Literacy Program website to keep a running list of efforts.	2018
C. Continue to incorporate environmental literacy into student assessment tools.	i. Participate in the development of the assessment items for the NGSS and Health and PE Standards and environmental literacy correlations.	OSSE	Include science in state accountability measures in the development of the ESSA state plan, the draft of which will be submitted to the U.S. Department of Education in spring 2017.	Ongoing

SCHOOL FACILITIES

Background and Rationale

According to the U.S. Department of Education, a Green Ribbon School is one that demonstrates progress in the following three pillars: 1) reducing environmental impact and costs, including waste, water, energy use, and alternative transportation; 2) improving the health and wellness of students and staff; and 3) providing effective sustainability education (USED, 2016). Viewed through a broader lens, green schools can include LEED certification, active school gardens, exemplary recycling practices, and an integrated environmental education curriculum.

A report from the U.S. Green Building Council and American Institute of Architects (2011) cites numerous benefits of green schools: improved student health by decreasing asthma triggers, which decreases absenteeism; building improvements to include daylighting, which increases student productivity; increased water and energy efficiency, which decreases operating costs; and greater satisfaction with green school environments, which increases teacher retention. According to studies by Duran-Narucki (2008) and Kumar, O'Malley, & Johnston (2008), substandard physical environments are strongly associated with truancy and other behavior problems, with lower student attendance leading to lower scores on standardized tests in English/language arts and math. More recently, Williams & Dixon (2013) led a review of research conducted between 1990 and 2010 that examined the impact of school gardens on academic performance. The research overwhelmingly showed that garden-based learning has a positive impact on students' grades, knowledge, attitudes, and behavior (Williams & Dixon, 2013). Dhanapal & Lim (2013) compared quiz scores after an outdoor science lesson and an indoor science lesson, and found that quiz scores after an outdoor classroom science lessons were higher. Additionally, students enjoyed and preferred learning science outdoors rather than indoors.

Local Context

Given that student academic achievement is closely tied to student health, it is important that school facilities provide an educational setting conducive to learning, as well as serve as healthy environments. Even though school buildings have moved to the forefront of "green building" design, Moore & Cooper Marcus (2008) find that the thinking about outdoor spaces remains unchanged from the perspective of users (especially children) and their educational potential. Green building design policies need to give equal prominence to both interior spaces and school grounds, and these policies need to give equal weight to the behavioral requirements of users as well as green technology requirements (Moore & Cooper Marcus, 2008).

In the District of Columbia, the Healthy Schools Act of 2010 has numerous provisions that support the relationship between a school's physical environment and the academic success of its students. For example, the Healthy Schools Act amended the Green Building Act of 2006 to encourage school construction to achieve LEED gold certification. The Healthy Schools Act also mandates that there be recycling, energy reduction, integrated pest management, and other environmentally-friendly practices inside all District public school buildings. Additionally, the schools must test

drinking water for lead and ensure compliance with U.S. Environmental Protection Agency standards for indoor air quality and lead removal (OSSE, 2011).

Launched in September 2011, Sustainable DC is a comprehensive, 20-year plan to make the District of Columbia the healthiest, greenest, and most livable city in the nation. While work on this plan began in 2011, the plan was not finalized until 2013. The plan goes beyond an environmental framework, defining sustainability broadly to include jobs and economic growth, equity, diversity, and health. With 31 targets, 32 goals, and 143 specific actions, the plan sets the District on an ambitious track through 2032.

During the development of the Sustainable DC Plan, working groups highlighted the importance of creating and maintaining school facilities with features that support students in environmental learning. Action plans include:

- Install educational gardens at 50 percent of DCPS schools
    - Currently 58 percent of DCPS schools and 45 percent of public charter schools have active school gardens programs.
- Targeting schoolyards for low-impact development projects, rehabilitating school greenhouses to use for education and training, and developing public school buildings as year-round sustainability learning centers.

For more than 15 years, many District teachers and organizations have been working to extend classroom learning opportunities to the outdoor school grounds. To date, these include:

- Active gardens are located in 127 schools. These include spaces for outdoor classrooms that provide designated areas for student learning (OSSE, 2016f).
- Twenty-four schools that are LEED-certified (U.S. Green Building Council, 2016).

Some schools have more than one type of garden and the gardens have varying degrees of use. Of the schools with gardens, figure 2 shows the percentage breakdown (by type) of school gardens.

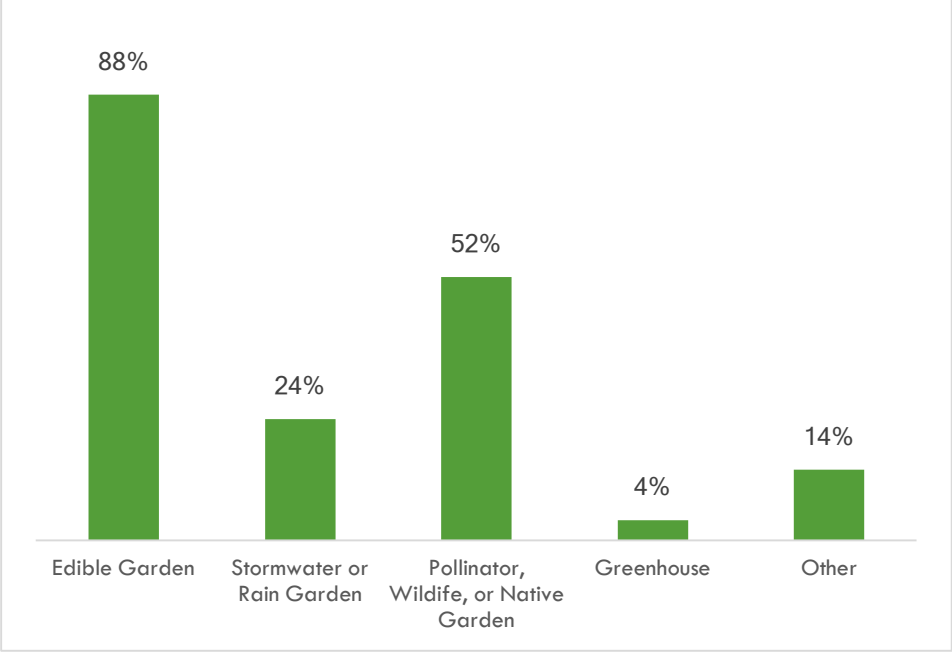


Fig 2. Percent of Gardens by Type, SY 2015-16 (OSSE, 2016f)

Several District agencies support green school buildings and grounds in varying capacities. For example, OSSE has a school garden program that assists schools in building and maintaining school gardens, and provides training and technical assistance to teachers in utilizing school gardens as a teaching tool (OSSE, 2016g). DOEE's RiverSmart Schools program improves school grounds by incorporating landscape design principles that create habitat for wildlife, emphasize the use of native plants, highlight water conservation, and retain and filter stormwater runoff. These sites have the added benefits of an outdoor classroom that supports effective teaching practices and promotes student learning (DOEE, 2016). DGS provides building design and construction in accordance with the LEED rating system and facilities maintenance services (e.g., heating, ventilation and air conditioning [HVAC]); waste hauling; integrated pest management; water quality testing) for DCPS school buildings.

In 2015, DCPS created the position of Energy and Sustainability Liaison as part of its facilities team in the Office of the Chief Operating Officer. The liaison meets regularly with sister agencies, nonprofit partners, central office staff, and school staff to facilitate coordination and expansion of sustainability efforts, including energy efficiency, stormwater retrofits, gardens and outdoor classrooms, internal and external communications, green construction, green cleaning, recycling and composting, sustainable curriculum, tree planting grants, student and staff leadership opportunities, and connecting students with local green businesses.

It is important to note that each charter LEA bears sole responsibility for its school facilities, and there is no centralized contact person to coordinate environmental efforts across all charter schools. Depending on the individual charter LEA, environmental efforts might be coordinated by a facilities administrator, business manager, and/or custodial staff.

Members of the DC Environmental Education Consortium and other organizations also have schoolyard greening programs that assist schools in the creation of educational green spaces, provide professional development for teachers, and conduct in-class presentations that include outdoor components. At least 14 organizations provide in-class presentations regarding indoor air quality, energy efficiency, and/or waste reduction for schools (see Appendix E).

Status

Launched in 2009, the District Sustainability Award (formerly Environmental Excellence Award) recognizes outstanding examples of environmental leadership and contributions to the mayor's vision that the District becomes the greenest, healthiest, and most livable city in the nation. Coordinated by DOEE, the first Outstanding Achievement by an Educational Facility award was given to Thurgood Marshall Academy Public Charter High School in 2011. Mundo Verde Public Charter School won the award in 2013 (DOEE, 2013). Since 2012, the U.S. Department of Education has recognized seven schools in the District as Green Ribbon Schools (OSSE, 2016f). There is great potential to build these efforts into a coordinated green schools recognition program for District schools.

Since 2012, the District has increased capacity for coordination of school facilities with sustainability initiatives. The District's Department of General Services' Sustainability and Energy Management Division has begun to support integration of building performance data with curriculum. For example, the BuildSmartDC website (http://www.buildsmartdc.com/) provides public access to energy and water use data for all municipal buildings, including DCPS school buildings. DGS also has hosted various school-wide competitions: Sprint to Savings, which

focused on promoting energy reduction behaviors; DC Recycle Right, which focuses on improving correctness of classroom recycling; and DC Reduce First, which focuses on reducing food waste (DGS, 2016a). In 2016, DCPS teachers developed lesson plans in partnership with general services to accompany these competitions, which were made available to all participants in the 2016 DC Recycle Right competition (DGS, 2016b).

By creating an Energy and Sustainability Liaison position, DCPS now has a primary point of contact for District agencies and other stakeholders to coordinate projects and programs at schools. The liaison is responsible for the review and approval of site improvement projects and outdoor classroom projects, and the review of modernization projects for compliance with LEED and District sustainability goals.

Additionally, two District agencies continue to have grant programs that provide support for outdoor learning spaces. During fiscal year 2017, DOEE's Natural Resources Administration plans to award approximately $665,000 to projects for the department's RiverSmart Schools program, which includes teacher training and project implementation/installation at five District schools. These innovative schoolyard greening projects focus on incorporating landscape design principles that create habitat for wildlife, emphasize the use of native plants, highlight water conservation, and retain and filter stormwater runoff. With funding from the Healthy Schools Act of 2010, the OSSE started the School Garden Grant program with the goal of supporting on-going school garden programs or providing start-up funding for projects at new sites. In March 2016, OSSE awarded $420,000 to 29 school garden programs throughout the District (OSSE, 2016h). Funding also has been made available through the Sustainable DC Innovation Challenge, in partnership with OSSE, DOEE, and DGS, to create three outdoor classrooms in the existing school gardens at Hardy Middle School, Tubman Elementary School, and Leckie Elementary School.

OBJECTIVE 5: MAXIMIZE SCHOOL FACILITIES AND GROUNDS TO CREATE LEARNING OPPORTUNITIES FOR ALL STUDENTS.

Goal	Action Items	Lead Organizations	Implementation Recommendations	Timeline
A. Utilize school facilities to support environmental concepts and practices.	i. In keeping with LEED (i.e., teaching tool credit IDc3) requirements, establish model schools that show the development of green building curricular integration best practices.	OSSE DCPS	Create resources that integrate sustainable building features for active learning opportunities and tools for teachers, students, and community members. Engage with design professionals and school staff during the design process to create buildings and schoolyards that are conducive to embracing environmental literacy.	Ongoing
	ii. Coordinated integration of HSA requirements as described in Section 501(Environment) at DCPS schools.	DGS	Streamline the process of engagement and communications regarding school grounds as part of DCPS facilities modernization across all participating District agencies and non-profit organizations.	Ongoing
	iii. Publish building performance data for energy, waste, and water and provide educators with easy access to technical specifications and drawings, summaries of green features, and policies, for all District-owned school buildings.	DGS	Streamline informational requests related to green buildings, schoolyard gardens, and environmental practices for District-owned school buildings.	Ongoing
	iv. Identify and provide an entity to provide technical support for charter LEAs related to school facilities.	DOEE PCSB	Develop best practices and guidance for green building practices at public charter schools, with input from DGS. Clarify responsibilities, requirements and resources available to public charter schools.	2019
B. Encourage and support outdoor learning experiences in outdoor schoolyard spaces.	i. 60 percent of schools will have active school gardens by the 2020-21 school year engaging 25 percent of students in the District.	DCEEC OSSE DOEE UDC		2020
	ii. Develop a maintenance plan to ensure school gardens, greenhouses, and outdoor classrooms are cared for in conjunction with school campuses.	DGS		2019

C. Encourage schools to apply to the U.S. Green Ribbon Schools program.	i. Create and implement a DC Green Schools recognition program.	OSSE DCEEC	Create a Green Schools award program for the District in conjunction with existing recognition opportunities, such as the District Sustainability Award.	2018
	ii. Submit qualified applicants to the U.S. Green Ribbon Schools recognition program.	OSSE	Create an organizational support system for schools interested in pursuing the U.S. Green Ribbon Schools recognition program, to include contact information for local resources, webinars, and information sessions.	ongoing
D. Create opportunities for students to utilize school buildings and grounds for learning.	i. Create a pilot school ambassador program at five high schools that give green tours.	UDC DCPS	Work with UDC to give these students a tour of the UDC student center and then tips on how to give green building tours. Also work with USGBC to find out how to translate LEED checklist so that info for school tours can be easily found.	2018
	ii. Establish pilot program with the Department of Employment Services' Summer Youth Employment Program that focuses on environmental initiatives.	DOES	Establish a focus group to identify partners and employment opportunities for environmental initiatives (such as summer garden landscaping/maintenance) for a summer 2018 pilot program.	2018
	iii. Explore opportunities to provide vocational training connected to green jobs.	DOES		2020

IMPLEMENTATION

Background and Rationale

Interdisciplinary, place-based environmental education benefits students' academic, social and emotional growth. A large and growing body of peer-reviewed literature demonstrates these benefits. For example, instruction and independent work in natural settings promotes student engagement in science, math, and language arts (Williams & Dixon, 2013), with some studies suggesting that these settings are especially suitable for increasing engagement and achievement in science among minorities (e.g., Aguilar & Krasney, 2011; Rios & Brewer, 2014; Semken & Freeman, 2008). Nature-based environmental education may promote pro-environmental beliefs, environmental stewardship, and a desire to address environmental problems (Chawla, 2015; Ewert, Place, & Sibthorp, 2005; Giusti, Barthel, & Marcus, 2014).

Such research, along with the experiences of several generations of teachers and nonformal educators, highlight the need to integrate environmental education across all grades and subjects, as well as to assess student environmental literacy. Since about 2006, and inspired by Louv's popular book about nature-deficit disorder (2004), the No Child Left Inside Coalition has advocated for federal environmental education funding, as well as for the development of state environmental literacy plans. The inclusion of environmental education as a core focal area for funding within the 2015 Every Student Succeeds Act was due largely to this coalition and related bi-partisan congressional efforts.

As of May 2014, 46 states plus the District of Columbia were in the process of developing, adopting or implementing state environmental literacy plans; of these states, 13 were in the process of implementing their environmental literacy plans, while an additional four states had adopted their plans and were moving toward implementation (Braus *et al.*, 2014). The District adopted its state environmental literacy plan in July 2014.

Because these plans are still very new, research about them is only beginning to show up in the published literature. So far, these studies are dissertations and theses. For example, Ruggiero (2016) evaluated state environmental literacy plans against the NAAEE guidelines (2016), and Duncan (2016) evaluated a tool for assessing middle school environmental literacy linked to Oregon's plan. In particular, Ruggiero (2016) states that the District's state environmental literacy plan is a strong example of a well-written collaborative plan with strength in curriculum, professional development, and assessment, as well as strong plans for graduation requirements and implementation.

According to information gathered by NAAEE, since beginning the process of developing their environmental literacy plans, many states report an increase in collaboration between state education agencies, local education agencies, natural resource agencies, university researchers, and environmental educators. Environmental educators from many states also report an increase in verbal and in-kind support from state departments of education and other local and state agencies. However, many of these plans were developed in anticipation of federal funding, so funding remains a major constraint for implementation in nearly all states (Braus *et al.*, 2014).

ESSA provides an opportunity for environmental education and environmental literacy programs to be eligible for federal funding. Under Title IV of the bill, environmental education can be considered when developing "well-rounded education" grants and 21st Century Community Learning Centers programs. Additionally, the priority placed on STEM activities that include "hands-on learning" and "field-based or service-learning" to enhance understanding of STEM subjects may provide additional opportunities related to environmental education programs (NAAEE, 2016).

Additionally, the U.S. Department of Education's Green Ribbon Schools recognition program has identified and promoted environmental literacy as one of its three core pillars for demonstrating achievement. This designation has not only increased environmental literacy actions in thousands of schools nationwide, but it has resulted in unprecedented collaboration among state and local health, education, and environmental agencies.

Local Context

Since the first DC Environmental Literacy Plan was drafted 2011, there has been a concerted effort to collaborate with local, regional, and national initiatives to drive the District's Environmental Literacy Plan implementation strategy.

When released in 2013, the District's Sustainable DC Plan included environmental literacy plan implementation as the method to reach the goal of providing all school-age children in the District with an education in sustainability and preparing them for a changing green economy (DOEE, 2013). Aligning the environmental literacy plan with the education goals of the Sustainable DC Plan created the opportunity for funding through the first Sustainable DC Innovation Grant competition. The Sustainable DC Plan also created the opportunity to include legislation in the Sustainable DC Omnibus Amendment Act to formally adopt the environmental literacy plan and also create an environmental literacy program within OSSE.

In 2014, the Chesapeake Bay Watershed Agreement was signed by the governors of the six states and jurisdictions in the Chesapeake Bay Watershed and the mayor of Washington, DC. For the first time, this regional commitment includes an environmental literacy goal, to be measured by outcomes related to student engagement in meaningful watershed educational experiences, movement toward sustainable schools, and state-level environmental literacy planning (CBP, 2014). Action items within the DC Environmental Literacy Plan have been integrated in the District's management strategies work plans, so that both initiatives move forward in tandem (CBP, 2015; 2016a).

Every year, District representatives have presented at the annual conference of the NAAEE. The District's early implementation efforts have informed efforts across the country, notably in Colorado and Oregon. The District also is examining best practices from other states, such as the Environmental Literacy Model used in Maryland and the Rhode Island K-12 Environmental Literacy Assessment Plan, to develop the District's next phase of implementation.

Status

As a result of the improved communication, there has been an increase in environmental literacy activities during the development of the DC Environmental Literacy Plan and now in its implementation. Formal adoption of the plan in 2014 has helped centralize implementation with OSSE and solidify funding for programs. As a result, the District has emerged as a national leader in environmental literacy plan implementation.

By strategically embracing and collaborating with other District initiatives and priorities, the District's investment in environmental literacy programs has grown significantly. Two District agencies have grant programs to assist schools with components of an environmental curriculum. After the first DC Environmental Literacy Plan was submitted to DC Council in 2012, DOEE awarded its largest environmental education grant in 2014: $1.2 million toward overnight meaningful watershed educational experiences for District fifth graders. In the 2016-17 school year, DOEE will award approximately $415,000 to fund three projects that offer meaningful stream or Chesapeake Bay experiences to District students for approximately 2,300 students from more than 60 schools: a trash reduction program in schools, the continuation of the overnight program for fifth graders, and professional development for teachers at schools participating in the RiverSmart Schools program. During the 2017 fiscal year, DOEE funded a grant of nearly $100,000 to conduct a gap analysis of the agency's current educational programming and to develop additional energy and environmental education programming to ensure programs are offered for all grades K-12. The additional programming will be implemented during the 2017-18 school year. Additionally, DOEE administers a grant of more than $175,000 to fund educational trips for the general public on the Anacostia River.

OSSE's investment in environmental literacy has also grown. With the creation of the environmental literacy program in 2015, OSSE has established an Environmental Literacy Leadership Cadre for elementary school teachers. In the 2015-16 school year, OSSE awarded more than $430,000 in grants to nonprofit organizations to support cadre efforts at 16 schools, and awarded more than $385,000 in the 2016-17 school year. These funds are in addition to other programs funded by the Healthy Schools Act: the School Garden Program, which has grown to award approximately $425,000 to 29 schools in 2016; and the Farm Field Trip grant, which provided $19,500 for 12 schools for the 2016-17 school year. Table 4 below shows District agency investment in environmental literacy activities since the environmental literacy plan was submitted to DC Council in 2012.

Table 4. District Agency Investment in Environmental Literacy Activities since July 2012

Agency/Program	FY2011-12	FY2012-13	FY2013-14	FY2014-15	FY2015-16	FY2016-17
DOEE-Meaningful Watershed Educational Experiences: Overnight* Trash+	$100,000*	$400,000* $20,000+	$20,000+	$1.2 M* $20,000+	$20,000+	$300,000* $40,000+
DOEE-RiverSmart Schools	$65,000	$60,000	$300,000	$700,000	$890,000	$665,000
DOEE-GreenZone Environmental Program	$277,698	$215,940	$221,064	$206,165	$259,238	$343,711
DOEE-other		Environmental Ambassadors $116,105				Community Relations $99,962
Sustainable DC Budget Challenge			Env. Lit. Plan Implementation $272,000	Env. Lit. Plan Implementation $103,500	Outdoor Classrooms $880,000	
OSSE-Environmental Literacy Program	n/a	n/a	n/a	n/a	$534,800	$590,154
OSSE-School Garden Program	n/a	$197,236	$200,005	$299,768	$375,594	$423,231
OSSE-Farm Field Trip	n/a	n/a	n/a	$34,000	$31,000	$19,500
Totals	**$442,698**	**$1,009,281**	**$1,013,069**	**$2,563,433**	**$2,616,506**	**$2,481,558**

Additionally, District government agencies have created new staff positions that have helped increase the capacity to coordinate environmental education initiatives:

- Department of General Services: Schools Conservation Coordinator
- DCPS: Energy and Sustainability Liaison, Director of Science, STEM Integration Specialist, Manager of STEM Professional Learning, Elementary Science Specialist
- OSSE: Environmental Literacy Coordinator, Director of STEM

In April 2016, the Chesapeake Bay Education Workgroup convened a Leadership Summit on Environmental Literacy for high-level leadership from state departments of education and state natural resource agencies to communicate how the Chesapeake Bay Agreement can be part of state plans for the Every Student Succeeds Act (CBP, 2016b). Additionally, the formation of the Superintendents' Environmental Education Collaborative appears to be a promising model to share information regarding ESSA grant opportunities, best practices for creating environmental education models, and promoting successful implementation stories (SEEC, 2017).

On the horizon are three opportunities to explore alignment with environmental literacy plan implementation. Within OSSE, the environmental literacy program is housed in the Division of Health and Wellness, which is beginning to view its programs through the lens of the Centers for Disease Control and Prevention's (CDC) Whole School, Whole Community, Whole Child Model (see figure 3 below).

The Whole School, Whole Community, Whole Child (WSCC) model is an expansion and update of CDC's Coordinated School Health (CSH) approach. By focusing on youth, addressing critical education and health outcomes, organizing collaborative actions and initiatives that support students, and strongly engaging community resources, the WSCC approach offers important opportunities that may improve healthy development and educational attainment for students. The physical environment is a new component to the coordinated school health approach, which offers a new opportunity for collaborate. The connection to local wellness policies also can be strengthened, since many LEAs are in the process of updating them for the first time.

Fig. 3. The Whole School, Whole Community, Whole Child (WSCC) Model. (CDC, 2016)

In 2017, the District's Office of Planning will be drafting amendments to the District of Columbia's Comprehensive Plan, a 20-year framework that guides future growth and development in the District. Originally adopted in 2006 and amended in 2011, it addresses a wide range of topics that affect how we experience the city. These topics include land use, economic development, housing, environmental protection, historic preservation, transportation, and more. The Office of Planning has launched an effort to amend the Comprehensive Plan a second time to ensure that it remains responsive to the needs of the community (Office of Planning, 2017).

The plan includes an Environment and Stewardship section with the following sections:

- Environmental Education in District Schools;
- Continuing Education on the Environment;
- Interpretive Centers;
- Demonstration Projects; and
- Partnerships.

OSSE and DOEE have been working together to ensure the plan reflects current environmental education efforts and maintains a place in the planning document.

Lastly, the Sustainable DC Plan must be updated every five years. In 2017, DOEE is engaging the community in a comprehensive amendment process for updating the plan. It may be possible to further strengthen the environmental education initiatives when drafting the update.

By formalizing a commitment for ensuring that District students have access to academic courses, outdoor field experiences, and volunteer opportunities that reflect the diversity of prospective careers within the environmental field, the vision of well-informed District students graduating high school who are prepared to be competitive in the green economy can be realized.

OBJECTIVE 6: ENCOURAGE COLLABORATION AND ENGAGEMENT ACROSS ALL SECTORS INVOLVED IN IMPLEMENTING THE DC ENVIRONMENTAL LITERACY PLAN.

Goal	Action Items	Lead Organizations	Implementation Recommendations	Timeline
A. Cultivate and foster the knowledge and awareness necessary for the development and implementation of ELP at LEAs.	i. Require administrators, instructional superintendents, and guidance counselors to attend environmental literacy meetings or leadership academies and share information about resources.	OSSE	Develop resources that describe how environmental education supports local, regional, and federal initiatives.	2019
	ii. Ensure regular dissemination of information to encourage local, District-specific EE opportunities, such as environmental literacy guides, fact sheets, and teacher's night.	DCEEC	Create a network of individuals from District agencies and non-profit organizations that will be available to assist Local Education Agencies (LEAs) with developing a school-based Environmental Literacy Implementation Program.	Ongoing
B. Individual LEAs develop school-based environmental literacy programs based on the Environmental Literacy Framework.	i. Explore integration of science/environmental literacy into DCPS school-Level scorecards.	DCPS		2020
	ii. Identify how the implementation plans can increase the number of U.S. Green Ribbon Schools applications.	OSSE	Create a recognition program to highlight the successful implementation of environmental literacy best practices.	2020
	iii. Assist LEAs with the development of school-based environmental literacy programs that can be sustained over time.	OSSE		Ongoing
	iv. Create approval process for LEA plans.	OSSE		2020
	v. Next update of Local Wellness Policy to include greater emphasis on environmental sustainability and alignment with the DC Environmental Literacy Plan.	OSSE	Include environmental education updates in at least one School Wellness Committee meeting per year.	2018

C. Each District agency demonstrates commitment and ownership of an Environmental Literacy Scope of Work and Implementation Plan that supports schools.	i. Designate staff within each agency to support ELP efforts and to provide OSSE with yearly updates on progress.	DOEE DCPS DPR DOES DGS DOES UDC	Each agency should begin to implement the collaborative actions agreed upon in this draft document, and develop a five-year action plan and budget based on this document.	2018
	ii. Develop agency guidelines/training and templates for how to effectively partner with schools.	OSSE	Post information on the OSSE website.	2020
D. Create state infrastructure for implementation of the ELP.	i. Regularly convene the Environmental Literacy Advisory Committee to review progress and provide implementation recommendations.	OSSE	Fully develop the purposed and objectives for the Environmental Literacy Advisory Committee. Create an outline of member roles, terms, conditions, and expectations.	Ongoing
	ii. Build capacity within OSSE to grow the program.	OSSE		2018
	iii. Create opportunity for environmental representation on the Healthy Youth and Schools Commission.	OSSE		2020
	iv. Continue to incorporate environmental literacy indicators into School Health Profiles to help measure progress.	OSSE	Include data from the School Health Profile into the yearly Environmental Education Update/Report.	Ongoing

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APPENDIX A.

DC ENVIRONMENTAL LITERACY PLAN WORKGROUP AND REVIEW PROCESS

Under the DC Healthy Schools Act of 2010, the Office of the State Superintendent of Education (OSSE) is designated as the lead agency to triennially develop an environmental literacy plan, in conjunction with the following agencies:

- Department of Energy and the Environment;
- District of Columbia Public Schools;
- District of Columbia Public Charter School Board;
- Office of the State Superintendent of Education;
- District of Columbia State Board of Education;
- University of the District of Columbia;
- Department of Parks and Recreation;
- Department of General Services; and
- Department of Employment Services.

Other collaborators included members of the DC Environmental Education Consortium and community members.

WORKGROUP MEMBERS

In July 2016, OSSE hosted a kick off meeting to begin the process of updating the DC Environmental Literacy Plan. At this meeting, the DC Environmental Literacy Plan Workgroup was formally re-instated, comprised of representatives designated by each required District agency. Additional workgroup members included nonprofit organizations and community members. Below are workgroup members who attended at least two of the five monthly meetings from July 2016–November 2016.

MEMBERS OF THE DC ENVIRONMENTAL LITERACY PLAN WORKGROUP

*Denotes participants who no longer work with the listed organizations.

- Zachary Bergeron, Living Classrooms of the National Capital Region*
- Rebecca Davis, Environmental Education Consultant
- Alexis Dickerson, Chesapeake Bay Foundation
- Beth Gingold, Department of General Services
- Margaret Harrison, District of Columbia Public Schools
- Sarah Holway, DC Greens
- Grace Manubay, Office of the State Superintendent of Education (Project Lead)
- Angelica Melendez, DC Greens*
- Candace Nelson, Department of Employment Services
- Sally Parker, District of Columbia Public Schools

- Kelley Scholl, Office of the State Superintendent of Education
- Rachael Shearouse, Living Classrooms of the National Capital Region*
- Josh Singer, Department of Parks and Recreation
- Sam Ullery, Office of the State Superintendent of Education
- Audrey Williams, District of Columbia Public Charter School Board
- Kamran Zendehdel, University of the District of Columbia

COLLABORATORS

To develop the individual components of the DC Environmental Literacy Plan, the following members of the workgroup and key stakeholders participated in additional meetings to write sections of the plan.

CONTENT STANDARDS:

Rebecca Davis, Environmental Education Consultant
Alexis Dickerson, Chesapeake Bay Foundation
Erin Fenton, Department of Energy and Environment*
Maya Garcia, Office of the State Superintendent of Education
Margaret Harrison, District of Columbia Public Schools
Grace Manubay, Office of the State Superintendent of Education

PROFESSIONAL DEVELOPMENT:

Rebecca Davis, Environmental Education Consultant
Alexis Dickerson, Chesapeake Bay Foundation
Margaret Harrison, District of Columbia Public Schools
Grace Manubay, Office of the State Superintendent of Education
Teresa Rodriguez, Department of Energy and Environment
Kelley Scholl, Office of the State Superintendent of Education
Audrey Williams, District of Columbia Public Charter School Board

HIGH SCHOOL EXPERIENCE:

Maya Garcia, Office of the State Superintendent of Education
Yair Inspektor, Office of the State Superintendent of Education
Erin Krivicky, Office of the State Superintendent of Education*
Grace Manubay, Office of the State Superintendent of Education
Sally Parker, District of Columbia Public Schools
Elizabeth Schiemann, Office of the State Superintendent of Education
Ariel Trahan, Anacostia Watershed Society
Chloe Woodward-Magrane, Office of the State Superintendent of Education
Kamran Zendehdel, University of the District of Columbia

STUDENT ASSESSMENT (EVALUATION):

Maya Garcia, Office of the State Superintendent of Education
Margaret Harrison, District of Columbia Public Schools
Yair Inspektor, Office of the State Superintendent of Education
Grace Manubay, Office of the State Superintendent of Education
Aimee McLaughlin, Office of the State Superintendent of Education
Kelley Scholl, Office of the State Superintendent of Education

SCHOOL FACILITIES:

Alexis Dickerson, Chesapeake Bay Foundation
Trinh Doan, Department of Energy and Environment
Beth Gingold, Department of General Services
Grace Manubay, Office of the State Superintendent of Education
Sally Parker, District of Columbia Public Schools
Ariel Trahan, Anacostia Watershed Society
Sam Ullery, Office of the State Superintendent of Education

IMPLEMENTATION:

Alexis Dickerson, Chesapeake Bay Foundation
Naamal De Silva, George Washington University
Trinh Doan, Department of Energy and Environment
Erin Fenton, Department of Energy and Environment*
Kate Judson, Department of Energy and Environment
Grace Manubay, Office of the State Superintendent of Education
Ariel Trahan, Anacostia Watershed Society
Sam Ullery, Office of the State Superintendent of Education

APPENDIX G – SCHOOL CASE STUDIES:

Kristin Nordeen, Science Curriculum Manager, Chavez Schools
Britni Whitty, STEM Enrichment Resource Teacher, Hardy Middle School
Angela Benjamin, SciMaTech Academy Coordinator, Wilson High School
Elizabeth McNamee, Grade 4 Teacher, Capital City Public Charter School
Lola Bloom, Operations Manager and Wellness Coordinator, DC Bilingual Public Charter School
Sarah McLaughlin, Grades 3-5 Special Education Teacher, Seaton Elementary School
Peter Bailey, Computer Lab Coordinator, Kimball Elementary School
Jennifer Ramsey, Upper School Science Teacher, KIPP DC: Heights Academy

REVIEW PROCESS

The first draft of the 2017 Environmental Literacy Plan was reviewed by the nine members of the Environmental Literacy Advisory Committee.[3] In March 2017, OSSE posted the draft plan on its website and began a month-long public comment period, which included an online form to collect comments. OSSE presented the draft plan at three public comment meetings, hosted by the following groups: the DC Environmental Education Consortium, OSSE's Youth Advisory Committee, and the Department of Energy and Environment. A public comment meeting for teachers was canceled due to inclement weather, however 25 teachers viewed the presentation remotely. Comments and feedback were received from the following:

- 10 individuals representing 10 environmental organizations;
- 12 teachers representing 11 schools in the District;
- 19 individuals from four District agencies; and
- 13 students from four District high schools.

Feedback received during the public comment period was reviewed and addressed by OSSE, and the final draft was reviewed by District agency representatives prior to the OSSE submitting the DC Environmental Literacy Plan to DC Council.

[3] List of members can be found in OSSE's 2016 Environmental Education Update. http://osse.dc.gov/node/1174761

APPENDIX B.

THE DISTRICT OF COLUMBIA'S EDUCATION LANDSCAPE

The District of Columbia has a unique education landscape that allows for school reform, robust charter schools, and universal preschool. Its 69 square miles of land, divided into eight wards, contains 66 local education agencies (LEAs). The diversity among the LEAs is extensive – one large, traditional school district, District of Columbia Pubic Schools (DCPS), that is under mayoral control, and 65 individual, independently administered charter LEAs, which can range from single, small schools to multi-campus charter networks. Together, these 66 school districts educate more than 90,000 students, mostly from low-income families of color.[4]

For decades, DCPS served as both the state education agency and as an LEA. In 2007, after Congress amended the District of Columbia Home Rule specifically to permit mayoral takeover of public education, the Public Education Reform Amendment Act (PERAA) was enacted and created the Office of the State Superintendent of Education (OSSE) to oversee the federally prescribed state-level functions of the jurisdiction, including accountability and support for all LEAs in the District. The same law established an independent State Board of Education (SBOE) with advisory, approval, and public engagement mandates, and the Deputy Mayor for Education. According to a 2015 report brief from the National Academies of Science, Engineering and Medicine, these three agencies are operating, but their missions and lines of authority are not clearly defined, for no agency has the primary responsibility for monitoring and overseeing the quality of public education for all students.[5] The PERAA turned over control of DCPS to the mayor, which set the stage for reinvigorated efforts to improve schools in DCPS by: closing low-performing or under-enrolled schools, a new teacher contract which includes an aggressive teacher evaluation component, the creation of the IMPACT teacher and staff evaluation system, bonuses for highly effective teachers, and new momentum around improvement within DCPS. Additionally, PERAA eliminated DCPS as a charter school authorizer, put its charter schools under the District of Columbia Public Charter School Board.

The District has one of the strongest charter school laws in the country, enacted by Congress in 1995 with the passage of the School Reform Act (SRA). Since then, charter schools have grown to serve 46 percent of students, making the District the state with the largest share of publicly educated pupils enrolled in charter schools. Each year, new charter schools open, increasing the number of LEAs providing service to students in the District. Charter schools also are adding grade levels each year. The overall increase in charter schools has had a significant impact on state-level educational policy.[6]

The Pre-K Enhancement and Expansion Amendment Act of 2008 established universal high-quality pre-K for any District children ages 3-4. According to *Education Week's Quality Counts* report released in December 2016, 80.6

[4] OSSE. (2017). Draft District of Columbia Consolidated State Plan under the Every Student Succeeds Act. http://osse.dc.gov/essa

[5] National Academies. (2015). An Evaluation of the Public Schools of the District of Columbia: Reform in a Changing Landscape. http://sites.nationalacademies.org/DBASSE/BOTA/Evaluation_of_the_Public_Schools_of_the_District_of_Columbia/index.htm

[6] OSSE. (2015). Elementary and Secondary Education Act Flexibility Waiver. http://osse.dc.gov/service/elementary-secondary-education-act

percent of children ages 3-4 in the District are enrolled in academic programs – the highest participation rates for early childhood education in the nation. The District also led the nation in postsecondary participation, with 76.2 percent of residents aged 17-24 either residing in or relocating to the District having a college degree or enrolled in a postsecondary institution.[7] Yet, many are not graduates of the District's elementary and secondary education sector. Furthermore, the District has a stratified education gap among residents wherein income and educational attainment differs between the upper Northwest and most of the city east of Rock Creek Park.[8]

The District adopted the Common Core State Standards in 2010 and began administering the Partnership for Assessment of Readiness for College and Careers (PARCC) assessments in the 2014-15 school year. In addition, the District adopted the Next Generation Science Standards in 2013, and began field testing the DC Science exam aligned to those standards in the 2014-15 school year with all students in fifth grade, eighth grade, and high school biology. The first operational exam was administered to all students in the same grades in the 2015-16 school year.[9]

In recent years, the District has made much progress toward its educational reform agenda, but significant challenges remain. Despite the renewed focus on raising achievement, many schools and students still struggle. Statewide, only 27 percent of District students have met expectations for proficiency in English/language arts and 25 percent in mathematics, with stubbornly persistent performance gaps between subgroups. For students with special needs, only 5 percent are meeting expectations for proficiency in English/language arts and six percent in mathematics. English learners perform slightly better, with 14 percent meeting expectations for proficiency in English/language arts and 19 percent in mathematics.[10] The new state education plan under the Every Student Succeeds Act (ESSA) includes upfront goals for the District to be the fastest improving state and city in the nation in student achievement outcomes, and ensuring greater equity in outcomes for students by accelerating progress for those who are furthest behind. Progress and innovation taking place in both DCPS and public charter schools, combined with a foundation of joint cross-sector efforts, shows a broad commitment among education leaders to a shared citywide vision of improving all public schools.[11]

[7] Education Week. (2016). District of Columbia State Highlights Report. http://www.edweek.org/ew/qc/2017/state-highlights/2017/01/04/district-of-columbia-state-highlights-report-page.html

[8] OSSE 2015 Elementary and Secondary Education Act Flexibility Waiver.

[9] OSSE 2017 Draft District of Columbia Consolidated State Plan under the Every Student Succeeds Act.

[10] Ibid.

[11] Ibid.

APPENDIX C.

CURRENT STATUS OF ENVIRONMENTAL LITERACY IN THE DISTRICT

In Washington, DC, the earliest indication of collaborative environmental education efforts is the establishment of the DC Environmental Education Consortium in 1993. Originally, members were teachers interested in creating a network through which lesson plans, ideas, and environmental education provider contacts could be shared. Through a grant from the U.S. Environmental Protection Agency, an environmental education directory, *DC Naturally,* was published in 1997 and disseminated to teachers and organizations throughout the District.

It was not until 1998 that there was formal implementation of environmental education in the District. Recognizing the value of hands-on environmental education, the governors of the Chesapeake Bay states and the mayor of Washington, DC, signed a commitment in 2000 to provide a meaningful watershed educational experience (MWEE) for every student in the Chesapeake Bay watershed before graduation from high school, beginning with the class of 2005.

The Chesapeake Bay Agreement was renewed in 2005 and again in 2014.[12] The latest commitment emphasizes the importance of environmental literacy with a stand-alone goal: to enable students in the region to graduate with the knowledge and skills to act responsibly to protect and restore their local watershed, as measured through the following three outcomes:

1) Students: Continually increase students' age-appropriate understanding of the watershed through teacher participation in teacher-supported, meaningful watershed educational experiences and rigorous, inquiry-based instruction, with a target of at least one MWEE in elementary, middle, and high school, depending on available resources
2) Sustainable schools: Continually increase the number of schools in the region that reduce the impact of their buildings and grounds in their local watershed, environment, and human health, through best practices, including student-led protection and restoration projects
3) Environmental literacy planning: Each participating Chesapeake Bay jurisdiction should develop a comprehensive and systemic approach to environmental literacy for all students in the region that includes policies, practices, and voluntary metrics that support the environmental literacy goals and outcomes of the agreement

District agencies have formed strong partnerships with public schools in the District to engage students in MWEEs. The Department of Energy and Environment's (DOEE) Watershed Protection Division has led the effort to provide

[12] Chesapeake Bay Program. (2014). Chesapeake Bay Watershed Agreement. http://www.chesapeakebay.net/chesapeakebaywatershedagreement/goal/environmental_literacy

District students with MWEEs since 2003.[13] DOEE provides sub-grant awards to local nonprofit organizations to provide students with classroom presentations, field experiences, and reflection activities as they relate to the Chesapeake Bay, as well as professional development for teachers. OSSE's Division of Health and Wellness[14] hired a school garden specialist in 2011 to support the School Garden Program, as well as the U.S. Green Ribbon Schools Program. In early 2012, OSSE launched its School Garden Grant to provide funding to school garden programs. In 2015, OSSE hired an environmental literacy coordinator to lead OSSE's implementation of the DC Environmental Literacy Plan, and coordinate with other District agencies and stakeholders to report on progress every year. Since then, OSSE's School Garden Grant started to require a minimum of one MWEE to be taught in the garden, and OSSE began partnering with DOEE to provide transportation for DOEE's Overnight Meaningful Watershed Educational Experience program for fifth grade students. OSSE continues to spearhead pilot initiatives to determine how to best support environmental literacy efforts in District schools.

Additional District agencies provide environmental education opportunities to District students and teachers. In the past, the Department of Parks and Recreation has provided youth environmental education opportunities at local parks and recreation sites, as well as summer camp opportunities at Lederer Youth Garden in Ward 7 and Camp Riverview on Maryland's Eastern Shore. For teachers, the University of the District of Columbia has a master gardener program and a sustainability department that provide resources and technical expertise.

Since 1993, the DC Environmental Education Consortium has been the strongest network of organizations that assist schools with environmental education programming. Comprised of members from many nonprofit organizations and local and federal government agencies, this professional network continues to serve teachers and students in the District. Twenty-three members and 22 other organizations provide District schools with curricular materials, professional development opportunities, in-class presentations, field experiences, community service opportunities, funding, and more.[15]

In 2005, the DC Environmental Education Consortium recognized the need to have Environmental Science Standards and convened a group of environmental education providers and science teachers to draft high school environmental science standards. These standards were among the science standards adopted by the District of Columbia State Board of Education in 2006. Members of the environmental consortium developed supporting documents, standards-based worksheets, for the Environmental Science and Earth Science power standards to assist teachers with the creation of standards-based lesson plans. The consortium also formed strategic partnerships to start the annual Teachers Night at the U.S. Botanic Garden and DC School Garden Week (now Growing Healthy Schools Month). Members of the consortium continue to support environmental literacy efforts, such as DCPS Cornerstones training in Engineering is Elementary Curriculum and the Climate Change Short Films project.

[13] The District Department of the Environment was established in 2006 and renamed the Department of Energy and Environment in 2015. In 2003, the Watershed Protection Division was located within the District's Department of Health's Environmental Health Administration.

[14] In 2011, this division was called the Office of Nutrition Services.

[15] Self-reported information collected as part of an on-line survey of environmental literacy organizations. See Appendix E for more information.

APPENDIX D.
GLOSSARY OF TERMS

ACRONYMS

CEU: Continuing Education Units

CAS: Comprehensive Assessment System

CTE: Career Technical Education

DCEEC: District of Columbia Environmental Education Consortium

DCPS: District of Columbia Public Schools

DGS: Department of General Services

DOEE: Department of Energy and Environment

DOES: Department of Employment Services

DPR: Department of Parks and Recreation

ELF: Environmental Literacy Framework

ELP: Environmental Literacy Plan

HSA: Healthy Schools Act

LEA: Local Education Agency

LEED: Leadership in Energy and Environmental Design

LID: Low Impact Development

MWEE: Meaningful Watershed Educational Experience

NAAEE: North American Association for Environmental Education

NGSS: Next Generation Science Standards

OSSE: Office of the State Superintendent of Education

PARCC: Partnership for Assessment of Readiness for College and Careers

PCSB: Public Charter School Board

SBOE: State Board of Education

SEER: State Education and Environment Roundtable

STEM: Science, Technology, Engineering, and Math

UDC: University of the District of Columbia

DC Environmental Education Consortium (DCEEC): A network of environmental and conservation educators that works to increase capacity to provide meaningful environmental education for the residents of the District of Columbia. Members provide environmental expertise, professional development opportunities, curricula and resources, and hands-on classroom and field experiences to District schools. (dceec.org)

District of Columbia Public Charter School Board (PCSB): Organization established to provide quality public school options for DC students, families, and communities through a comprehensive application review process, effective oversight, meaningful support, and active engagement of stakeholders. PCSB was designated to collaborate with OSSE on creating the environmental literacy plan. (dcpcsb.org)

Department of Energy and Environment (DOEE): District government agency that improves the quality of life for the residents and natural inhabitants of the nation's capital by protecting and restoring the environment, conserving our natural resources, mitigating pollution, increasing access to clean and renewable energy, and educating the public on ways to secure a sustainable future. DOEE was designated to collaborate with OSSE on creating the environmental literacy plan. (doee.dc.gov)

Department of Employment Services (DOES): District government agency that provides comprehensive employment services to ensure a competitive workforce, full employment, life-long learning, economic stability, and the highest quality of life for all District residents. DOES was designated to collaborate with OSSE on creating the environmental literacy plan. (ddoe.dc.gov)

Department of General Services (DGS): District government agency that elevates the quality of life for the District through construction, maintenance, and real estate management. DGS is responsible for building and maintaining safe and green state-of-the-art public facilities, such as all DCPS buildings. DGS was designated to collaborate with OSSE on creating the environmental literacy plan. (dgs.dc.gov)

Department of Parks and Recreation (DPR): District government agency that promotes health and wellness, conserves the natural environment, and provides universal access to parks and recreation services. DPR was designated to collaborate with OSSE on creating the environmental literacy plan. (dpr.dc.gov)

District of Columbia Public Schools (DCPS): The District's largest local education agency, the reference of which does not include public charter schools. DCPS was designated to collaborate with OSSE on creating the environmental literacy plan. (dcps.dc.gov)

Environmental Literacy: The development of knowledge, attitudes, and skills necessary to make informed decisions concerning the relationships among natural and urban systems.

Healthy Schools Act: Landmark law designed to improve the health and wellness of students attending public and public charter schools in the District. The act took effect August 2010 and includes a provision that requires the development of an environmental literacy plan. (dchealthyschools.org)

Inquiry-Based Learning: Inquiry is a multifaceted activity that involves making observations; posing questions; examining books and other sources of information to see what is already known; planning investigations; reviewing what is already known in light of experimental evidence; using tools to gather, analyze, and interpret data; proposing answers, explanations, and predictions; and communicating the results. Inquiry requires identification of

assumptions, use of critical and logical thinking, and consideration of alternative explanations. (National Science Education Standards, pg. 23)

Leadership in Energy and Environmental Design (LEED): Suite of rating systems for the design, construction and operation of high-performance green buildings, homes and neighborhoods. (usgbc.org/leed)

Meaningful Watershed Educational Experience: Approach to seamlessly connect standards-based classroom learning with outdoor field investigations to create a deeper understanding of the national environment. Students explore local environmental issues through sustained, teacher-supported programming that includes, but is not limited to, issue definition, outdoor field experiences, action projects, and sharing student-developed syntheses and conclusions with the school and community.

Next Generation Learning: The intelligent use of technology to develop innovative learning models and personalized educational pathways.

No Child Left Inside: The No Child Left Inside Act aims to ensure every student achieves basic environmental literacy. It would amend the Elementary and Secondary Education Act (No Child Left Behind) to include environmental education for the first time. The legislation would provide new funding for environmental education, particularly to develop rigorous standards, train teachers and to develop state environmental literacy plans. It also proposes giving states that develop such environmental literacy plans access to additional funds. The No Child Left Inside Coalition is a national coalition of more than 2,000 business, health, youth, faith, recreational, environmental, and educational groups. The coalition was formed in 2007 to alert Congress and the public to the need for our schools to devote more resources and attention to environmental education.

Office of the State Superintendent of Education (OSSE): The state education agency for the District of Columbia. OSSE's mission is to remove barriers and create pathways for District residents to receive a great education and prepare them for success in college, careers, and life. OSSE was designated to lead the process for updating the DC Environmental Literacy Plan every three years in collaboration with District agencies. (osse.dc.gov)

Partnership for Assessment of Readiness for College and Careers (PARCC): Consortium of states working together to develop a common set of K-12 assessments in English and math anchored in what it takes to be ready for college and careers. DC began administering the PARCC assessments during the 2014-15 school year.

Service-Learning: A teaching strategy that connects community service to the academic objectives in a way that students feel greater meaning and relevance to what they learn and in a way that develops strong citizenship skills. The National Youth Leadership Council identified eight components of high-quality service-learning: (1) youth voice, (2) meaningful, (3) link to curriculum, (4) diversity, (5) progress monitoring, (6) reflection, (7) duration and intensity, and (8) partnerships.

State Board of Education (SBOE): Board established on June 12, 2007, as part of the District of Columbia Public Education Reform Amendment Act of 2007. Responsible for advising the State Superintendent of Education on educational matters, including: state standards; state policies, including those governing special, academic, vocational, charter and other schools; state objectives; and state regulations proposed by the mayor or the State Superintendent of Education. SBOE was designated to collaborate with OSSE on creating the environmental literacy plan. (sboe.dc.gov)

Sustainability: Nexus of the environmental health, economic prosperity, and social vitality. Sustainability meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable DC: A government plan launched in 2011 to address goals and the interconnections between the built environment, climate, energy, food, nature, transportation, waste, water, and the green economy. There are nine working groups focused on each of the major categories and their recommendations will be analyzed from economic, social, and environmental perspectives. (sustainable.dc.gov)

University of the District of Columbia (UDC): Chartered in 1974, UDC is a pacesetter in urban education that offers affordable and effective undergraduate, graduate, professional, and workplace learning opportunities. As a public, historically black, and land-grant institution, the university's responsibility is to build a diverse generation of competitive, civically engaged scholars and leaders. UDC was designated to collaborate with OSSE on creating the environmental literacy plan. (udc.edu)

APPENDIX E.

ENVIRONMETNAL LITERACY ORGANIZATIONS WITH RESOURCES FOR SCHOOLS

To compile these resource lists, OSSE created an online survey for organizations to complete. Responses were collected from September – December 2016, and all the data in these tables is self-reported.

AIR – INCLUDES AIR QUALITY, CLIMATE CHANGE

Organization	Curricular Resources	School-based Presentations	Field Experiences	Professional Development	Funding	Community Service	Other
Alice Ferguson Foundation			X	X		X	
American Society of Landscape Architecture	X	X	X				
Anacostia Riverkeeper			X				
Audubon Naturalist Society		X					
Chesapeake Bay Trust					X		
Clean Air Partners-Metropolitan Washington Council of Governments	X	X		X			X
Dumbarton Oaks Park Conservancy			X			X	
EcoRise Youth Innovations	X			X	X		
Friends of the National Arboretum						X	
Koshland Science Museum	X	X					
Monarch Sister Schools	X			X		X	X
National Geographic Society	X		X	X	X		X
National Oceanic and Atmospheric Administration	X	X	X				
National Park Service – Rock Creek			X			X	X
U.S. Botanic Garden	X			X		X	
U.S. Environmental Protection Agency	X			X	X		

WATER – INCLUDES STORMWATER, RIVERS, AND AQUATIC WILDLIFE

Organization	Curricular Resources	School-based Presentations	Field Experiences	Professional Development	Funding	Community Service	Other
Alice Ferguson Foundation	X	X	X	X		X	
American Society of Landscape Architecture	X	X	X				
Anacostia Riverkeeper			X			X	
Anacostia Watershed Society		X	X	X		X	
Audubon Naturalist Society		X	X	X	X	X	
Chesapeake Bay Foundation	X		X	X		X	
Chesapeake Bay Trust					X		
Department of Energy and Environment	X	X	X	X	X	X	X
Dumbarton Oaks Park Conservancy		X	X	X		X	
Earth Force				X	X	X	
EcoRise Youth Innovations	X			X	X		
Environmental Concern	X	X		X		X	
Friends of the National Arboretum			X			X	
Groundwork Anacostia River DC	X	X	X	X		X	
Koshland Science Museum	X						
Live It Learn It		X	X				
Living Classrooms of the Nat. Capital Region		X	X			X	
National Geographic Society	X		X	X	X		X
National Oceanic and Atmospheric Admin.	X	X		X			
National Park Trust		X	X		X		
NatureBridge		X	X				X
National Park Service – Rock Creek	X		X	X		X	X
Office of the State Superintendent of Ed.		X		X			
STEMhero	X			X			
Student Conservation Association			X			X	
University of the District of Columbia	X	X	X	X		X	
U.S. Botanic Garden	X			X		X	
U.S. Environmental Protection Agency	X			X	X		

LAND – INCLUDES PLANTS, SOIL, URBAN PLANNING, AND TERRESTRIAL WILDLIFE

Organization	Curricular Resources	School-based Presentations	Field Experiences	Professional Development	Funding	Community Service	Other
Alice Ferguson Foundation			X	X			
American Society of Landscape Architecture	X	X	X				
Anacostia Watershed Society	X	X	X	X		X	X
Arcadia Center for Sustainable Food and Ag		X	X	X		X	
Audubon Naturalist Society		X	X	X	X	X	
Casey Trees	X	X		X		X	
Chesapeake Bay Foundation	X		X	X		X	
Cintia Cabib - Docmentary Filmmaker	X	X					
Dumbarton Oaks Park Conservatory		X	X	X		X	
EcoRise Youth Innovations	X			X	X		
Endangered Species Coalition	X						
Environmental Concern	X	X		X		X	
FRESHFARM FoodPrints		X		X			
Friends of the National Arboretum		X	X	X		X	
Groundwork Anacostia River DC	X	X	X	X		X	
Live It Learn It		X	X				
Living Classrooms of the National Capital Region		X	X			X	
Monarch Sister Schools	X			X		X	X
National Geographic Society	X		X	X	X		X
National Oceanic and Atmospheric Admin.	X	X		X			
National Park Service – Rock Creek	X		X	X		X	X
National Park Trust		X	X		X		
NatureBridge		X	X				X
Office of the State Superintendent of Ed.		X	X	X			
Student Conservation Association			X			X	
University of the District of Columbia	X	X	X	X		X	
U.S. Botanic Garden	X			X		X	
U.S. Environmental Protection Agency	X			X	X		

RESOURCE CONSERVATION – INCLUDES ENERGY, WASTE, AND RECYCLING

Organization	Curricular Resources	School-based Presentations	Field Experiences	Professional Development	Funding	Community Service	Other
Alice Ferguson Foundation			X	X			
Anacostia Riverkeeper			X			X	
Arcadia Center for Sustainable Food and Ag		X	X			X	
Audubon Naturalist Society		X	X		X	X	
Casey Trees	X	X		X		X	
Chesapeake Bay Foundation	X		X	X		X	
Chesapeake Bay Trust					X		
Department of Energy and Environment				X			X
Department of General Services	X			X		X	
Dumbarton Oaks Park Conservatory			X				
Earth Force				X		X	X
EcoRise Youth Innovations	X			X	X		
Endangered Species Coalition	X						
Environmental Concern				X		X	
FRESHFARM FoodPrints		X		X			
Friends of the National Arboretum		X	X	X		X	
Groundwork Anacostia River DC	X	X	X	X		X	
Koshland Science Museum	X						
Living Classrooms of the National Capital Region		X					
National Geographic Society	X		X		X		X
National Oceanic and Atmospheric Admin.	X	X		X			
National Park Service – Rock Creek	X	X	X	X		X	X
National Park Trust		X	X		X		X
NatureBridge			X				
STEMhero	X			X			
Student Conservation Association			X			X	
University of the District of Columbia	X	X	X	X		X	
U.S. Botanic Garden	X			X		X	X
U.S. Environmental Protection Agency	X			X	X		

HEALTH – INCLUDES OUTDOOR PHYSICAL ACTIVITY, GARDENS, AND FOOD

Organization	Curricular Resources	School-based Presentations	Field Experiences	Professional Development	Funding	Community Service	Other
Alice Ferguson Foundation	X	X	X	X		X	
American Society of Landscape Architecture	X	X	X				
Arcadia Center for Sustainable Food and Ag		X	X	X		X	
Audubon Naturalist Society		X		X			
Cintia Cabib - Documentary Filmmaker	X	X					
Clean Air Partners-Metropolitan Washington Council of Governments	X	X		X			X
Department of Energy and Environment							X
DC Greens				X			
EcoRise Youth Innovations	X	X		X	X		
Environmental Concern		X		X		X	
FRESHFARM FoodPrints		X		X			
Friends of the National Arboretum		X	X	X		X	
Green Bronx Machine	X	X	X	X		X	
Groundwork Anacostia River DC	X	X	X	X		X	
Koshland Science Museum	X						
Live It Learn It		X	X				
Monarch Sister Schools	X			X		X	X
National Park Trust		X	X		X		
National Park Service – Rock Creek		X	X			X	X
Office of the State Superintendent of Ed.		X		X	X		
University of the District of Columbia	X	X	X	X		X	
U.S. Botanic Garden	X			X		X	
U.S. Environmental Protection Agency	X	X		X	X	X	X

APPENDIX F.

Environmental Literacy Framework

for the District of Columbia

Environmental literacy is the development of knowledge, attitudes, and skills necessary to make informed decisions concerning the relationships between natural and urban systems.

An environmentally literate* person:

- can discuss and describe ecological and environmental systems and human impacts on these systems;
- engages in hands-on, outdoor learning experiences that involve discovery, inquiry, and problem solving;
- is able to question and analyze information pertaining to his or her surrounding environment; and
- has the capacity to take actions that respect, restore, protect, and sustain the health and well-being of human communities and environmental systems.

*as defined in the DC Environmental Literacy Plan adopted 2014

The Environmental Literacy Framework is a guide for schools that identifies the knowledge and skills District students need to become environmentally literate. The framework is outlined by **grade level** (Pre-K–Grade 8) or **science subject area** (high school) and aligned with the **Next Generation Science Standards (NGSS) Performance Expectations**. Included are **environmental contexts for learning** and **guiding questions** designed to scaffold content appropriate to each grade level. Based on themes taken from the Sustainable DC Plan, **sustainability initiatives** provide starting points for in-depth investigations and suggestions for extending learning beyond the classroom.

Grade Level	NGSS Performance Expectations	Environmental Contexts for Learning: Guiding Questions	Sustainability Initiatives
Pre-K	See the District of Columbia's Early Learning Standard 5.0: Scientific Inquiry*	**The World Around Us:** How can we use our five senses to learn about the environment?	**Nature:** Extend your classroom into the schoolyard.
K	K-PS3-1, K-PS3-2. K-LS1-1. K-ESS2-2, K-ESS3-1, K-ESS2-1, K-ESS3-2.	**Living Things:** What do plants and animals need to survive?	**Nature/Food:** Visit an urban garden or farm.
1	K-2-ETS-1-1. 1-LS1-2, 1-LS3-1. 1-ESS1-1, 1-ESS1-2.	**Patterns and Growth:** How do natural patterns affect living things? How do plants and animals change over the course of their lives?	**Nature:** Visit a zoo/aquarium.
2	2-PS2-1, 2-PS2-2. 2-LS2-1, 2-LS2-2, 2-LS4-1. 2-ESS2-1, 2-ESS2-2, 2-ESS2-3.	**Changing Landscapes:** How do plants and animals support each other in our community? What forces change our local landscape?	**Water:** Explore a local waterway. **Built Environment:** Survey your neighborhood.
3	3-LS2-1, 3-LS3-2. 3-LS-4. 3-ESS2-1, 3-ESS2-2, 3-ESS3-1.	**Environmental Changes and Adaptations:** How have local changes in climate affected the environment? How do living things adapt to changes in the environment?	**Nature:** Travel to a rural farm. **Waste**: Tour a recycling center or landfill.
4	4-PS3-2, 4-PS3-4. 4-ESS3-1, 4-ESS3-2. 4-LS1-1, 4-LS1-2. 4-ESS1-1, 4-ESS2-1.	**Earth's Resources:** How do humans use natural resources? What processes influence the Earth's physical features?	**Waste:** Conduct a cafeteria waste audit. **Transportation:** Organize a walk/bike to school day.
5	5-PS3-1. 5-LS1-1, 5-LS2-1. 5-ESS2-1.	**Web of Life:** We are what we eat; how does energy cycle through the food web? How do the four spheres of the Earth's systems interact?	**Food/Water/Nature:** Engage in an overnight Meaningful Watershed Educational Experience.

*NGSS does not include standards for Pre-K.

Grade Level	NGSS Performance Expectations	Environmental Contexts for Learning: Guiding Questions	Sustainability Initiatives
6	MS-ESS3-1, MS-ESS3-2, MS-ESS3-3, MS-ESS3-4, MS- ESS3-5.	**Earth and Human Activity:** What are the consequences of human activity on air, land, and water over time?	**Built Environment:** Tour a green infrastructure site.
7	MS-LS2-1, MS-LS2-2, MS-LS2-3, MS-LS2-4, MS-LS2-5.	**Exploring Solutions:** How can we creatively address the environmental consequences of human activity?	**Nature/Water:** Improve local watershed health by reducing stormwater runoff at your school. **Food**: Define healthy-healthy eating and design a personal healthy-eating goal.
8	M5-PS3-1, M5-PS3-2, M5-PS3-3, M5-PS3-4, M5-PS3-5.	**Earth Works:** How do the choices you make affect the environment?	**Waste:** Analyze your carbon footprint and create a personal action plan to reduce it. **Energy:** Conduct a school-wide energy audit.

High School Subject Area	NGSS Performance Expectations	Environmental Contexts for Learning: Guiding Questions	Sustainability Initiatives
Earth Science	HS-ESS2-2, HS-ESS2-4. HS-ETS1-1. HS-ESS3-1, HS-ESS3-5. HS-ETS1-1.	**Our Changing Planet**: How do changes in climate occur, and how do they impact Earth's systems and human activity?	**Waste/Transportation:** Research the ways current transportation and waste systems impact climate.
Biology	HS-LS1-5, HS-LS1-6, HS-LS1-7. HS-LS2-1, HS-LS2-2, HS-LS2-7. HS-ETS1-2.	**Designing and Evaluating Solutions**: What are the ecological impacts of our food choices? How can humans reduce their environmental footprint?	**Food:** Design and evaluate a nutrition plan for a healthy adult that supports a sustainable local food system. **Nature:** Conduct a biodiversity transect.
Chemistry	HS-PS1-2, HS-PS1-3, HS-PS1-6. HS-ESS2-2, HS-ESS2-5, HS-ESS2-6. HS-ETS1-3.	**Collect and Analyze Data:** What evaluation can be made about the health of the District and it's residents based on a cross-section of data?	**Nature/Water:** Conduct water-, soil-, and air-quality tests in the District and analyze the results.
Physics	HS-PS3-3, HS-PS3-4. HS-ETS1-4.	**Alternative Energy:** What innovations will help meet future energy needs?	**Energy/Built Environment:** Compare the efficiency of existing power systems and design a carbon-neutral energy generation system.

APPENDIX G.

CASE STUDIES OF ENVIRONMENTAL LITERACY IN SCHOOLS

There are many schools in the District of Columbia that already engage their students in activities and lessons that foster environmental literacy. Below are examples of DCPS and public charter schools across the District's eight wards that have varying degrees of engagement and integration of environmental literacy. Many partner with organizations listed in Appendix E.

WARD 1 – CESAR CHAVEZ PUBLIC CHARTER SCHOOL FOR PUBLIC POLICY – BRUCE PREP (GRADES 6 THROUGH 9)

Chavez Schools have several initiatives that represent a commitment to learning science by doing science and to carrying out the schools' public policy mission through environmental literacy, community education, and advocacy. All grade 6 students at the Bruce Prep and Parkside Middle School (Ward 7) campuses develop a proposal and accompanying visual aid that describes how the public can reduce the negative effects of climate change in a particular region, focusing on designing and engineering solutions that lead to more sustainable communities. Students present their projects in a year-end symposium for members of the Chavez community. In grade 7, all students at the Bruce Prep and Parkside campuses investigate the life cycle and habitat of shad fish, applying their knowledge of species interactions within an ecosystem, to learn about the importance of biodiversity, conservation, and sustainability to the health of an aquatic ecosystem. Students raise shad eggs in the classroom and release hatched larvae into the Anacostia River.

Across all Chavez Schools that have grade 9 (Bruce Prep, Parkside High School in Ward 7, and the Capitol Hill Campus in Ward 6), students research impacts of a local water quality issue. Specific topics range from aquatic biodiversity, microbeads, and litter and trash reduction to aquatic littering and alternative energy sources. To better understand their understanding of the topics, students participate in a field experiences that connect them to the Anacostia, Potomac, and Chesapeake Bay watersheds, such as visiting the Aquatic Resources Education Center, canoeing on the Anacostia River and conducting water quality testing, and hiking along the river. Students use the field experiences to create a public service announcement in the form of a poster, brochure, short video, and/or webpage. All students participate in an end-of-year symposium for the Chavez community, with top presentations shared at the Anacostia Environmental Youth Summit.

WARD 2 – HARDY MIDDLE SCHOOL

Hardy Middle School sits on the outer edges of Georgetown, near Glover Park. The school building was built in 1933 and was recently renovated and reopened in 2007. Beginning in 2008, the science department envisioned the creation of an outdoor classroom for students, with the goal of developing an exciting space that encourages lessons that allow students to investigate problems and determining solutions, and also serving as a connection between the school and community. With funds from a Sustainable DC Innovation Grant, OSSE is creating an outdoor classroom to provide a shaded gathering space for learning about environmental issues and Science, Technology, Engineering and Math (STEM). The classroom's design and construction is meant to be a demonstrative exhibit of sustainable design and green technology, and will also include a rain garden, raised vegetable gardens, and a native species and pollinator garden. The space will include a small teaching area for students near the vegetable gardens, an amphitheater, and tension shade sail canopy, and a solar sunflower display.

To complement the environmental standards emphasized in the Next Generation Science Standards implemented in DCPS, Hardy students have grown aquatic vegetation in the classroom to transplant into the Chesapeake Bay and participation in the Future City competition, where students design a city of the future with environmental issues in mind, create their city virtually in Sim City, then build a model out of recycled materials. For the Grade 7 Utopia project, students work in groups to design a utopia and sustainable solution to one environmental threat. The project builds upon concepts and skills targeted in the English, science, and social studies curriculum, requiring groups to apply cross-curricular knowledge in a thoughtful and creative way. The project culminates in an Environmental Showcase, where students present to their peers. Hardy MS also partners with Dumbarton Oaks Park Conservancy to educate students about stormwater runoff and invasive species. Each year students learn about the park, conservation efforts, and participate in a hands-on service project in the park.

WARD 3 – WILSON SENIOR HIGH SCHOOL (GRADES 9 THROUGH 12)[16, 17]

In 2011, Wilson Senior High School completed a significant building renovation. Recognized as a U.S. Green Ribbon School in 2013, the LEED Gold-certified building includes several environmental improvements: a 74 percent reduction in water use from two green roofs, a 15,000 gallon cistern and 38,000-gallon underground stormwater tank that holds rain water for use to flush 74 toilets and urinals; conversation from a 75-year-old coal- and oil-burning three-story power plant to a highly efficient smaller-scale natural-gas power system; and the creation of a central atrium that increases natural light.

In addition to these building and grounds sustainability features, Wilson HS has a Career Technical Education (CTE) Environmental Pathway, one of four pathways offered by the SciMaTech (STEM) Academy. The pathway offers an interdisciplinary approach to understanding the planet through the required sciences while focusing on environmental stewardship and meeting the challenges of our future. This four-year long pathway starts with

[16] http://www.wilsonhs.org/apps/pages/index.jsp?uREC_ID=204636&type=d
[17] http://www.wilsonhs.org/apps/pages/?uREC_ID=127895&type=d

mandatory Biology for all grade 9 students, followed by Environmental Science: Sustainable Earth, Chemistry, Marine Sciences: Sustainable Oceans, Advanced Placement Environmental Science, and a capstone project or internship. This project started in the 2011-12 school year, and 300 students are enrolled in this track. There are 10 sections of the Sustainable Earth and Sustainable Oceans classes with students from Grades 10-12 enrolled. The newest course coming soon is Project Lead the Way: Environmental Sustainability, a national program that combines environmental stewardship with engineering in support of that goal. Courses are supplemented by after school clubs like the Greenhouse Club which maintains the Wilson greenhouse and has grant initiatives throughout the local region and offers a summer internship supporting Soapstone Creek. Students also participate on the Wilson Science Olympiad team and organize the Wilson Earth Day Festival.

WARD 4 – CAPITAL CITY PUBLIC CHARTER SCHOOL (PRE-K THROUGH GRADE 12)[18, 19]

Capital City Public Charter School (CCPCS) is located in the Manor Park neighborhood of Ward 4. It is in a large open building, surrounded by gardens, that became LEED Gold certified in October 2015, and was named a U.S. Green Ribbon School in 2016. CCPCS is an Expeditionary Learning school, and students in grades pre-K 3 through 12 participate in two semester-long expeditions in which students participate in fieldwork, meet with experts, and create authentic high-quality products. Topics range from gardening to birds, from markets to geology. Students may produce products such as books, art installations and short films, sharing these products with a larger audience through in-person and technological outreach. Students have been leaders in the school's sustainable practices. In 2012, 7th and 8th grade students, as part of their Green Building Expedition, worked with experts from Alliance to Save Energy and the U.S. Green Building Council to investigate green building practices. They provided recommendations to the Board of Directors on green building designs that were incorporated into the school's building renovation, such as slanted classroom ceilings that draw in more natural light. High School Urban Ecology and Honors Environmental Science students themselves were instrumental in completing the U.S. Green Ribbon Schools application. During the 2015-16 school year, CCPCS expeditions in the Lower School began to be guided by NGSS that focus on the environment. For example, grade 1 students investigate bees and create beeswax candles to sell at local farmer's markets, while grade 2 students conduct an investigation in Rock Creek Park to conduct experiments around the properties of water, study water pollution, and create large-scale installations about water made from waste materials. One of the high school expeditions, Food Justice for All in 11th grade, where students learn about obesity and food deserts, and culminates in youth summit for students from other District schools and community members.

[18] http://osse.dc.gov/sites/default/files/dc/sites/osse/publication/attachments/Capital%20City%20PCS.pdf
[19] http://www.ccpcs.org/post/green-ribbon-school/

WARD 5 – DC BILINGUAL PCS (PRE-K THROUGH GRADE 5)

Founded in 2004, DC Bilingual Public Charter School serves more than 400 students in grades pre-K 3 through grade 5. DC Bilingual implements an innovative dual immersion Spanish and English learning program for all students, and promotes global leadership through a rigorous academic and multidisciplinary curriculum. Science is taught for over four hours a week in Spanish for all grade levels, and is organized around STEM principles and NGSS standards. Teachers take students on environmental science-based field experiences, such as local farm visits, boat trips on the Anacostia River, and tours of recycling facilities.

DC Bilingual promotes environmental literacy within its community primarily through the school garden, an approximately 8,000 sq. ft space that includes raised beds for edibles, a koi pond, a pollinator habitat, a decomposition zone, and a community composting area. All grades utilize the garden year-round to reinforce science, literacy, and math standards through hands-on experiences such as pollinator surveys, writing poetry about the elements, and using tools to measure and plant the garden. Students participate in an annual science fair, and the garden was featured in projects about erosion, decomposition, hydroponics, and solar energy. The school partners with City Blossoms for weekly pre-K 3 and 4 workshops that highlight sensory learning, and with Food Corps to support outdoor educational opportunities for the entire community, including staff and families. The U.S. Forest Service visits DC Bilingual regularly to introduce students to insects and local wildlife, and presents at STEM fair in the spring. As the population of the school expands, the food service continues to take the environment into consideration through conducting waste audits, composting fruit and vegetable waste, and promoting "share tables." The school also plans to renovate in upcoming years, and will incorporate elements into its design that reinforce scientific exploration, such as a water catchment system to prevent run-off and irrigate the garden, and a learning lab designated for experiments and modeling.

WARD 6 – SEATON ELEMENTARY SCHOOL (PRE-K THROUGH GRADE 5)[20]

Seaton Elementary School is a pre-K through grade 5 school with slightly more than 300 students in the Shaw neighborhood of Washington, DC. Seaton has a very diverse school community with students and teachers representing more than 30 countries. Many Seaton students speak English as a second language and the school has a large English as a Second Language program that particularly serves students speaking Spanish, Mandarin, and Amharic. Seaton has many interesting partnerships that focus on health, wellness, and the environment, including DOEE's RiverSmart Schools program, SweetGreen in Schools, YMCA Before Care, DC Scores, Girls on the Run, CanoeMobile, Old City Farm, and more. Seaton has a large outdoor space with a big garden, soccer field, two playgrounds, and a large asphalt area with basketball hoops and running space. The school is working with the RiverSmart Schools program to make the school more "green" with permeable pavement, water catchment, and more garden space.

[20] http://osse.dc.gov/sites/default/files/dc/sites/osse/publication/attachments/Seaton%20ES.pdf

Seaton Elementary has implemented environmental literacy largely through its many partners and programs. Seaton used the Common Core State Standards along with the DC Environmental Literacy Framework to come up with a plan that works best for its school. Each year, students focus on specific themes such as sun's energy, wildlife habitats, or the water cycle. Along with those themes, students complete projects in the garden and participate in a field trip that brings to life what they are learning in the classroom. Each grade is responsible for caring for a different aspect of the garden, such as the compost pile, the pollinator garden, and the wetland area. Individual grade activities are complemented by school-wide events such as Earth Day, Growing Healthy Schools Month, and our Wellness Fair. The idea is that by graduation, students have a holistic view of how humans are connected to and responsible for being ecologically responsible citizens.

WARD 7 – KIMBALL ELEMENTARY SCHOOL (PRE-K THROUGH GRADE 5)[21]

Kimball Elementary School is a strong community of passionate teachers and curious students. Kimball is a 40/40 Focus School[22] on the rise. While there is not always time for sciences at Kimball, teachers have found ways to include science lessons throughout the year. Kimball's students from pre-K through grade 5 consistently demonstrate their curiosity and eagerness to learn about the world around them. Kimball is located on Minnesota Avenue in Southeast DC and abuts Fort Dupont, a national park. Kimball students love to take advantage of these grassy and wooded spaces in the middle of a busy city. In addition to the outdoors, students have grown increasingly interested in harvesting and cooking with nutritious foods straight from the school garden. Once a month, Kimball families and staff have the opportunity to "shop" together at the school's Joyful Market through Martha's Table. These markets bring the school community together while students show off their cooking skills and serve healthy free samples to classmates, families, and staff.

Kimball is at the beginning of its environmental literacy efforts. Through the FoodPrints program, Kimball students begin learning about plants and the health benefits of eating nutritious snacks and meals. Students of all ages are able to shop at the school's monthly Joyful Markets, facilitated in part by the older students. Occasional trips to visit the nearby police horses capture the minds of preschool students as they learn how people and animals work together. Students in grades K-2 explore the world of insects through stories and lessons in pollination. Grade 3 students have the opportunity to learn about the habitats of different woodland creatures, and experience these places when they visit Woodend Nature Sanctuary. Grade 4 students discover watersheds and the importance of keeping these vital environments clean and sustainable for both humans and animals. Finally, grade 5 students spend three days at Hard Bargain Farm Environmental Center, experiencing all different components of natural life and what it means to live symbiotically with the environment. Students in grades 3-5 also learn natural science through an environmental lens during their science, technology, engineering, arts and math (STEAM) specials course.

[21] http://osse.dc.gov/sites/default/files/dc/sites/osse/publication/attachments/Kimball%20ES.pdf

[22] DCPS commitment that its 40 lowest-performing schools will increase proficiency rates by 40 percentage points by the 2016-17 school year. https://dcps.dc.gov/publication/40-lowest-performing-dcps-schools

WARD 8 – KIPP DC: HEIGHTS ACADEMY (GRADES 1 THROUGH 4)[23]

Heights Academy is one of six elementary schools within the KIPP DC network of charter schools. Located in the historic southeast neighborhood of Anacostia, Heights Academy shares the Douglass Campus with three other KIPP schools. At Heights Academy, students in grades 1-4 focus on building community, achievement, and persistence in addition to their academic growth. Standing behind the belief that science education is an integral part of a rigorous elementary school education, Heights Academy offers a daily, 45-minute Next Generation Science Standards-aligned science program for all students. All students in grades 2-4 have a Chromebook laptop where they engage in personalized learning programs such as SpatialTemporal (ST) Math, iReady, Kahn Academy, and Accelerated Reader. Students also take specials classes in art, technology, physical education, and music. The school and network belief is that all students will rise to and through college.

Heights Academy's environmental programming occurs primarily within its daily grade-level science coursework. In addition to using Full Option Science System (FOSS) curriculum and the Next Generation Science Standards to explore science topics, students engage in grade-level environmental program projects. The grade 1 environmental project centers around the school's new classroom paper recycling program. Grade 1 students measure and compare recycled paper from each classroom, creating a bar graph on the lower school science bulletin board so the school also can analyze the data. In grade 2, students create "insect hotels" to learn about the needs and structures required to help insects reproduce and thrive, and observe insects in their natural habitats. Grade 3 students plant sunflowers and track their growth and study the role they play with pollinators, while also learning about plant life cycles, ecosystems and food webs, and how energy is created and transferred. In grade 4, students use principles of engineering design to create structures to attract pollinators using upcycled materials found on campus, then plant pollinating plants in the school garden. Students in grades 1-3 attend the Washington Youth Garden as their off-campus field experience, while grade 4 students go on a Potomac River boat trip with the Chesapeake Bay Foundation.

[23] http://osse.dc.gov/sites/default/files/dc/sites/osse/publication/attachments/KIPP%20DC_Heights%20Academy.pdf

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