

EDUCATING STUDENTS FOR SUSTAINABILITY & ENVIRONMENTAL LITERACY

SUPPLEMENTAL RESOURCE

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Beyond improving the physical learning environment of students, a strategic sustainability focus area for school districts to devote time and resources is in the development of a curriculum or lessons that teach students about sustainability or the environment.

As described in *Environmental Equity: Closing the Opportunity Gap in Urban Schools*, students benefit in many ways from increasing their environmental literacy. In addition to becoming environmentally aware, data shows that

- students experience improved academic performance across all subject areas;
- enhanced critical thinking skills; and
- improvement in their personal growth and life-building skills.

The additional benefits stem from the reality that educating for sustainability encourages project-based, applied learning with real world applications that allow students to deeply experience and retain information. The seemingly limitless ideas about what environmental literacy and sustainability education can look like make for multiple opportunities for schools to provide learning opportunities.



Educating for Sustainability (Efs) encourages project-based, applied learning with real world applications that allow students to deeply experience and retain information.

STANDARDS

FOR SUSTAINABILITY & ENVIRONMENTAL EDUCATION



“Robust environmental education is the best way to grow the next generation of scientists, promote environmental stewardship, and encourage Americans to live healthier lifestyles.”¹



Before understanding the variety of ways that a school can provide environmental or sustainability education, it is important to understand the roles that standards and skills assessments play in education from a general academic perspective. Since the 2001 federal No Child Left Behind Act (NCLB), codifying accountability standards has been a requirement for all U.S. public schools.²

Math and English standards were the primary focus and, in 2010, the Common Core State Standards (CCSS) were released by a multi-state working group and adopted by most states. Since the 2015 Every Student Succeeds Act (ESSA), states have more of a say in how their schools measure student achievement, yet all are required to have expectations and measures of school success in disciplines like math, English, and science.

Science education already includes standards for environmental education (EE), including

- teachings on **ecological systems** and **true science literacy**;
- **educating for sustainability**;
- teaching in ways that link **knowledge, inquiry, and action** to help build a healthy future; and
- a **combination** of all of these.

The Next Generation Science Standards (NGSS), launched in 2013, were the first national changes to science learning expectations since 1996, including additional guidelines for teaching evolution and climate change; a focus on applying knowledge in context; and more systems-based thinking.³ Today, 44 states (encompassing 71% of students) operate with science education standards that are based on the NGSS or the Framework of K-12 Science Education.⁴

Standards for environmental education are becoming more common across the nation. In 2011, Maryland was the first state to make environmental literacy a graduation requirement, a change made possible through support from the Chesapeake Bay Foundation and its sponsored [No Child Left Inside \(NCLI\) Coalition](#), which encourages such efforts across all states.⁵

In 2013, the NCLI Act was introduced in Congress. Although NCLI was not enacted, the 2015 reauthorization of the Elementary and Secondary Education Act subsequently incorporated environmental education and literacy topics.

As part of legislation known as the [Every Student Succeeds Act \(ESSA\)](#), districts were awarded federal funding to support EE programs.⁶ The NCLI Coalition partnered with the North American Association for Environmental Education (NAAEE), creating the “Excellence in Environmental Education – Guidelines for Learning (K-12)” as a model framework for environmental literacy. As part of the NCLI Coalition’s work, federal legislation for EE standards have been proposed. Resources are in place for states to develop environmental literacy plans along with a listing of [current EE requirements by state](#).

7

By 2014, all but four states were working toward implementing plans to enrich curriculum with EE, including 13 states already implementing.⁸ In 2014, the Center for Green Schools (at the U.S. Green Building Council) and Houghton Mifflin Harcourt created the [National Action Plan for Educating for Sustainability](#), bringing together many of the previous key players in environmental education and literacy.

The plan outlines actions for incorporating standards for “Education for Sustainability,” with the vision that “all students graduate educated for a sustainable future through the integration of the environment, economy, and equity, with the ability to apply systems thinking to problem solving and decision making by 2040.”⁹



In this era following No Child Left Behind, even environmental and sustainability education have become standards-aligned.

ⁱ As a useful tool, this [resource](#) outlines the linkages between science education/NGSS and environmental literacy.

This plan outlines that a 21st-Century school should not only operate as a healthy ecosystem, but should educate on the environment – include place-based learning, and attributes like systems thinking, lateral thinking, metacognition, and creativity; all at the core of EfS.⁹

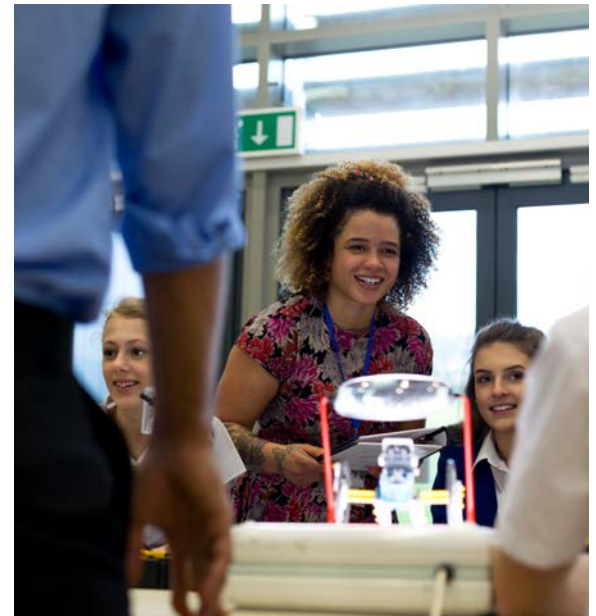
For context, in 1995 the Cloud Institute for Sustainability Education developed “Education for Sustainability” (EfS), as an academic approach to ensure students are taught in a way that generates a future world toward sustainability. EfS includes [nine sustainability learning standards](#), with performance indicators that can be layered into existing content.

All content of EfS aligns to the Common Core and Next Generation Science Standards:

- Cultural preservation and transformation
- Responsible local/global citizenship
- Dynamics of systems & change
- Sustainable economics
- Healthy commons
- Natural laws and ecological principles
- Inventing and affecting the future
- Multiple perspectives
- Strong sense of place

The EfS framework provides a means for teaching existing standards through sustainability topics, including how the skills for sustainable literacy can be assessed. The EfS standards make clear the types of higher-order thinking skills that a student might develop when taught to these standards. In connecting to existing learning standards, a school can meet learning standards in the core curriculum while introducing these topics as the vehicle and content.

Many strategies exist to navigate the immense number of the resources, standards and strategies for providing environmental and sustainability education in schools.



The intent of EfS is to “introduce a sustainability lens and global issues into required curricula and to institute best teaching practices in order to increase our students’ affinities for learning and their ability to excel academically.”

IMPLEMENTING SUSTAINABILITY & ENVIRONMENTAL EDUCATION

There are multiple ways to include environmental and sustainability education into the learning experiences of students:



MULTIDISCIPLINARY

- Embed environmental and sustainability topics and standards into the existing curriculum so that every teacher and every class incorporates it into their classroom

INTERDISCIPLINARY

- Offer environmental education via stand-alone courses or subjects
- Offer environmental education as a unit within an existing course

SPECIAL EVENTS

- Offer special events or stand-alone activities that expose students to environmental education

These options, with varying degrees of intensity, give schools opportunities to start where they are - building toward deeper integration of environmental and sustainability education over time.



MULTIDISCIPLINARY

Embedding environmental and sustainability topics into the existing curriculum or classes, results in **multidisciplinary environmental education**.



“In a multidisciplinary approach, the distinct perspectives and concepts of each contributing discipline are used to tackle particular portions of a complex problem.”¹²

Through this approach, EE or EfS standards are taught by naturally incorporating the subject matter into all courses without a separate class dedicated only to environmental education. This approach is certainly the most thorough exposure for students, but requires additional commitment for the teachers and district.

A multidisciplinary approach to EfS requires out-of-the-box thinking, literally and figuratively. The approach can and should provoke questions and conversations, and it may require significant effort from a school or district. Connections to existing curriculum is not always included or intuitive, and staff training may be required.

However, without realizing its direct connection to sustainability standards, teachers in urban districts already are spending more time in recent years developing critical thinking, problem solving, or other social and emotional skills in their students.

LESSON IDEAS

- The **literacy teacher** identifies local and global citizenship-themed readings or writing topics to meet grade level writing and reading standards.
- The **math teacher** identifies opportunities for students to analyze costs associated with utilities and use evidence to articulate the impact and opportunities for the school.
- The **history teacher** helps students understand the history of resource management, and how it could look different in the future.
- The **social studies teacher** has students compare and analyze global cultures over time relative to human use of natural resources.
- The **biology teacher** focuses on creating an understanding of animal habitats and the human impact on them; or uses the science of composting/decomposition to teach about ecosystems.
- An **art teacher** has students use art as an expression of the linkages between past, present, and future; or helps students turn otherwise might become “junk” into expressive art.

STRATEGIES

for adopting multidisciplinary environmental education

The most straightforward approach to EfS integration would feature a curriculum package with units and lesson plans that aligns state and EfS standards.

Fortunately, multidisciplinary teaching methodologies already exist; all that's needed is to tie these strategies to sustainability. Several states have adopted 21st Century learning standards with similar, higher-order thinking skills as those of the EfS standards.

Those standards include:

- collaboration,
- critical thinking,
- problem solving, communication, creativity, and
- innovation.

Some of these skills are taught in standalone courses; more often the standards are integrated into existing content areas to ensure students are prepared for 21st Century careers.

In lieu of adopting a curriculum that already incorporates environmental or sustainability education into all content areas, teachers can co-plan to reach the same desired effect.

One option might be to **start with curriculum mapping to the standards** - then identifying gaps or opportunities for including EfS or EE.

Several organizations provide professional development for leaders or teachers on this curriculum design opportunity.

The work of integrating disciplines is worth the effort, not only for students but for teachers and entire school communities.



When teachers learn new skills – or improve on their existing teaching methodologies to develop their instructional practice and have them be more invested in EfS – everyone benefits.

Several organizations have taken environmental or sustainability standards, and aligned them to Common Core or NGSS:

- [EfS standards alignment with Common Core](#)
- [EfS scope and sequence](#)
- connection between [environmental literacy standards and NGSS](#)

Teachers and staff are part of the learning and decision-making processes surrounding the importance of sustainability education, what it looks like, and how to teach it. The approach reinforces backwards design – or goal-oriented teaching – which helps teachers share and understand how each other’s goals are connected, allows for collaboration across classes, and encourages creativity. These skills are transferable and relevant beyond sustainability.

Shelburne Farms runs a Sustainable Schools Project with a staff development series, [Education for Sustainability Starter Kit](#), offers schools 3 modules to train and provide staff:

- a foundational understanding of EfS;
- an introduction to strategies; &
- the tools needed to plan and implement at their school (including activities that walk teachers through modifying their curriculum and lessons).

Sustainable Jersey for Schools provides a [step-by-step process](#) for which teachers could create EfS integrated units.

The Cloud Institute offers [coaching and mapping support](#).

These resources (and more) can be found [here](#).



OAKLAND UNIFIED SCHOOL DISTRICT

Community Schools, Thriving Students

Oakland Unified School District (OUSD), a large urban school district in California serving more than 37,000 students, created policies to ensure daily time was spent on science instruction in the elementary grades. To do so, they made sure that all staff embraced the understanding that everyone is responsible for environmental or sustainability standards.

They needed to create a space for staff to be able to come together and dig into the standards across content areas.

The focus areas were:

- 1) close reading of complex texts,
- 2) academic discussion, and
- 3) evidence-based writing.

OUSD was able to connect these academic priorities with their social and emotional support programs, including a focus on creating a safe academic environment where students can collaborate, take risks, and work on effective listening and speaking skills.

Together, teachers created opportunities for discourse, including elaborate on and clarify ideas, strengthen arguments with examples, and build on and challenge ideas respectfully. To help support teachers with this shift, principals had to be included in the learning and inclusive with planning. One successful strategy included gathering feedback on sustainability education – and related student actions and outcomes – following classroom observations.

Through examples and strategies like these, multidisciplinary sustainability education is possible. However, a district just beginning may find it easier to begin such exposure for students through a less intensive manner.

INTERDISCIPLINARY

Environmental and sustainability issues are inherently interdisciplinary, in that they pull ideas, information, learnings, and techniques from various fields, including physical sciences, social sciences, literacy, and math. Imagine, for instance, an interdisciplinary approach to environmental literacy that looks like an environmental science course and integrates other content areas. Alternatively, learning could take place as a standalone unit within an existing course.



STRATEGIES

for implementing interdisciplinary environmental education

In many cases, especially at the elementary level in an urban district, schools purposefully integrate literacy skills into science. This is partly by necessity. Due to struggling reading proficiency in lower grades and/or a prioritized focus on preparing for standardized testing, some districts do not have time or resources in the elementary schedule for a standalone science block. The recent adoption of science standards are beginning to shift teaching practices toward the importance of preparing students for science; schools are starting to adopt K-5 science curriculums and develop teaching skills around them.¹⁴

For K-5 students who are with the same teacher for most periods of the day, the teacher has more opportunities to offer such interdisciplinary activities. For example, teachers might use a portion of the literacy time to introduce science-themed reading material. The same is sometimes true for integration between math and science standards.

Even if time is not dedicated to science each day, many [resources](#) provide units or lessons to help elementary teachers bring science and sustainability into the classroom.

For middle school, most districts provide standalone class periods and teachers dedicated to science. As such, combined with the common adoption of new science standards, aligned science classes will provide students with exposure to foundational information on environmental topics like energy, ecosystems, biological evolution, and Earth's systems.¹⁵ As with elementary school, students will practice leverage reading, writing, math, and history skills, not to mention higher-order thinking skills for these science classes.

Find several resources [here](#) for blending sustainability standards into middle school science courses.

At the **high school level** in many districts, trends are evolving to developing environmental or sustainability literacy for students. The ability to offer more options, however, is dependent upon elective course offerings that in most cases are outside of state mandated instruction. One straightforward approach is to offer a standalone elective course on environmental science as an Advanced Placement, International Baccalaureate or extra-curricular clubs.

As another option, many states are adopting 21st Century learning standards that use similar, higher-order thinking skills sets as those of the EfS standards. There are situations, such as in New Jersey, where these skills are taught as a standalone class in order to fully prepare students for modern day careers and context.

Another high school trend relies on Career and Technical Education (CTE) programs to reorient toward sustainability.¹⁷ Integrating sustainability is a natural fit for several CTE pathways, which are career-themed classes that expand student opportunities to explore, choose, and follow career and technical education programs of study. With a growing need for a workforce prepared for sustainability and green fields, industries have seen CTE programs as an opportunity to develop such a workforce trained in cutting edge programs.¹⁸

For example, for the Construction career pathway, incorporating LEED preparation for certification would be an easy opportunity to integrate sustainability into the curriculum as well as to ensure students are more 21st century career ready.

“Project-based learning is a common instructional strategy in CTE courses and programs.

Often, the projects are *multidisciplinary*, integrating **multiple core academic areas.**

Classes that use project-based learning incorporate ‘rigorous projects [that] are carefully planned, managed, and assessed to help students learn key **academic content**, practice **21st Century Skills** (such as *collaboration, communication, & critical thinking*), and create **high-quality authentic products and presentations.**”





EL PASO INDEPENDENT SCHOOL DISTRICT

El Paso Independent School District, (EPISD)

serves residents of El Paso, Texas, and includes more than 63,000 students at 92 schools. The majority of schools are in areas close to significant sources of air pollution (highways, international bridges, oil refinery, military base). The area experiences ozone-alerts for several months of the year, along with summer, dust storms, and brown inversion layers. In 2013-2014, EPISD partnered with the University of Texas at El Paso to create an annual, themed curriculum for 3rd through 12th graders using a problem-solving approach to teaching students about local air quality issues.

As a step toward multidisciplinary instruction, teachers discuss how they can develop environmental literacy across grades, including how personal and civic responsibilities are introduced.¹⁹

Older students investigated ways to avoid playing outside when the air was unhealthy. And students in higher grade levels examined the larger community's relationship with Mexico to find opportunities for collaboration on air quality issues.

Across grades, teachers rallied behind a common theme each year to develop a deeper understanding of air quality challenges for their community. Younger students began reading a children's story that introduced them to the concepts of particulate matter, ozone, and air quality index.

Other popular pathways for easy integration with sustainability content include Agriculture, Food & Natural Resources; Science, Technology, Engineering, & Math; Business Management & Administration; Manufacturing; Government & Public Administration; and Transportation, Distribution & Logistics, to name a few.

[EcoRise](#) has developed additional CTE themed courses, like sustainable intelligence, biomimicry & science, and design studio that offer interactive opportunities to solve real world problems.

Adding environmental and sustainability units into existing classes, or offering lessons through stand-alone courses, can be easier for districts or schools to implement than entirely adapting existing curriculum; in most cases, a district may already be taking this approach in its adoption of new science standards.



SPECIAL EVENTS

Given the outstanding benefits of environmental and sustainability education, offering this exposure at any level is critical. Another way that a school might offer environmental education is through special events or informal programming, as in leading up to or surrounding an important environmental theme or event in the local community. There are many creative ways this could transpire in a school.

Many schools capitalize on nationalized [holidays](#), such as Earth Day or Arbor Day to introduce environmental education. Celebrations around these holidays may include educational events, themed units, or lessons leading up to the special event.

For example, before **Earth Day** and **Arbor Day**, the school might dedicate a few days or one week in April as Environmental Science Week.

- Teachers could plan units, lessons, or even games for those days, incorporating teaching on a specific set of environmental standards in each class.
- The school could identify a particular topic for each class to teach within their content area. Classrooms could present what they learned to each other.

Field trips to outdoor programs, science museums, or special events – such as a Green Fair or tree planting– could serve as a culminating activities.

The same types of programming could be coordinated around sustainability initiatives within the school, such as rolling out a new recycling plan or opening a school garden.



Camden City School District is a small, urban district in Camden, New Jersey, outside Philadelphia, PA, and educates roughly 7,500 students in 20 traditional public schools.

For two years, the district has organized a STEAM Fair, stemming from the concept of an art show meets science fair. Each year's fair has a specific theme, like "[STEAM in My Life](#)" and each school organizes small groups of students to create projects aligned to the theme.

The student projects connect to and are judged based on the integration of science, technology, engineering, art, and math.

Schools identify finalists who then represent the school at the district-wide fair. At the fair, district instructional staff and local industry experts act as judges, providing scores for the many projects. Winning projects are selected from each grade band.²⁰





Denver Green School

Denver Public Schools

Denver Green School (DGS) is a neighborhood innovation school in Denver, Colorado, and one of few schools in the district schools dedicated to sustainability. The school has earned recognition as a “high-achieving” and “high-growth” school for several years, and the school community is proud of its “hands-on, brains-on” curriculum, which includes a multidisciplinary approach, weaving sustainability into the classrooms and culture of the school. In addition to their integrated curriculum across all content areas, DGS uses its [school garden](#) as a theme for environmental education

Through a partnership with Denver Urban Gardens, the school creates vegetable and flower gardens at school, using standards-aligned lessons for the teachers that incorporate literacy, math, and science. For example, students learned about how carbon dioxide in car exhaust is captured in the leaves of plants and how this natural process reduces greenhouse gases in the air. They learned about how growing food in the garden and eating it in the school lunch reduces expenses, and that healthy, inexpensive food can be available.²¹

The many, varying approaches to environmental and sustainability education provide schools with opportunities to start where they are able to start and build toward deeper integration over time.

With the integration of 21st Century skills into Common Core and the new science standards, many schools now offer exposure to environmental and sustainability education. As schools increase that exposure, the ultimate goal is to move toward assessing student skills to demonstrate that students are educated for sustainability.

“There needs to be a stronger connection between informal environmental organizations and schools to benefit students and to provide faculty opportunities for professional growth and EE curriculum development.”



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