The Guide to Education for Sustainability

Published by Shelburne Farms’ Sustainable Schools Project
Vermont, USA
2015

Revised Edition funded through the generous support of The Bay & Paul Foundations
Revised in 2015 by Shelburne Farms.

Copyright ©2015
This publication may be reproduced without permission for not-for-profit educational purposes, provided
its original form is maintained and proper credit given.

Revised and edited by Jennifer Cirillo and Emily Hoyler. Contributions from Anne Tewksbury-Frye.
Many thanks to the Shelburne Farms’ staff who worked on this edition, and to our collaborative partners,
especially Joe Brooks of Community Works Institute.
A special thanks to the teachers at our two pilot schools: the Sustainability Academy at Lawrence Barnes
and Champlain Elementary School.

Graphics by Tamarack Media and Shelburne Farms.
Design by Holly Brough, Shelburne Farms.

2004 & 2011 Editions

- Developed and published by Vermont Education for Sustainability (VT EFS), in partnership with Shelburne Farms and Vermont
  Community Works.
- Funded through the generous support of The Bay & Paul Foundations, with additional support from the U.S. Environmental
  Protection Agency.
- Editors: Anne Bijur, Jennifer Cirillo, and Erica Zimmerman, Vermont Education for Sustainability Susan Bonthron and Joe Brooks,
  Vermont Community Works, Holly Brough and Megan Camp, Shelburne Farms.
- VT EFS Resource Guide Advisory Guide Committee: Kate Baldwin, James Bressor, Megan Camp, Tim Flynn, Joseph Kiefer, Tom
  Franks, Lindsey Ketchel, Jill Peck, Amy Picotte.
- Publication Design and Production by Vermont Community Works.
- Contributing Writers: Staff: Anne Bijur, Jennifer Cirillo, Erica Zimmerman, Susan Bonthron, Joe Brooks, Martha Beede.
- VT EFS Teacher-Leaders: Jean Berthiaume, Irene Canaris, Janice Case, Suzanne Clark, Amy Demarest, Mary Fiedler, Diane Fuleihan,
  Mary-Ellen Lovinsky, Amy Powers, Brent Sclafani, Mark Skelding, along with: Anne Bahlenhorst, Cindy Siegler, Colleen Cowell,
  Pat FitzGerald, Anne Felber, Dennis Ferrari, Meg Flaherty, Lorraine Gelinas, Andrew Hirsch, Tim Kahn, Bess Klassen-Landis, Wendy
  Moore, Jay Mumford, Colleen Pecor, Ann Sorrell, John Souter, Kathy Rossman, Barbara Messner, Alicia Rominger, Tom Sabo, Rose-
  mary Sadler, Meghan Smith.
- Contributing Organizations and Projects: Antioch New England Institute, Association of Vermont Recyclers, Burlington Legacy
  Project, Cape Eleuthera Island School, Center for a Sustainable Future, Chittenden Solid Waste District, Conservation Study Insti-
  tute, VT FEED: Food Education Every Day, Food Works of Montpelier, Forest for Every Classroom, Green Teacher, Green Mountain
  National Forest Service, Hiraki Elementary School, Institute for Sustainable Communities, Intervale Foundation, Keeping Track,
  The Last Link/Next Link, LEAF, Linking Learning to Life, Marsh Billings-Rockefeller National Historic Park, National Wildlife Federa-
  tion, Northern Forest Center, Ocean Arks International, The Orton Family Foundation, PLACE: Place-based Landscape Analysis
  and Community Education, Shelburne Farms, Sustainable Schools Project, Synergy Learning, University of Vermont, Vermont Agri-
  culture in the Classroom, Vermont Community Works, Vermont Department of Education, Vermont Energy Education Program,
  Vermont Envirothon, Vermont Institute for Natural Science.
# Table of Contents

## I Getting Started: What Is Education for Sustainability (EFS) and Why Is It Important? . . . 1
- Why This Guide Was Developed .................................................................................. 1
- What Do We Mean by Sustainability? .......................................................................... 1
- The Big Ideas of Sustainability ................................................................................... 2
- History of Sustainability, Sustainable Development, and Education for Sustainability ........................................................................................................... 4
- How EFS Can Enhance a Curriculum, School, or Program ........................................... 5

## II Strategies for Education for Sustainability ............................................................. 7
- Promising Practices for Education for Sustainability ................................................ 8
- Place, Experience, and Civic Engagement ................................................................... 11
- The Benefits of Taking a School-Wide Approach ...................................................... 15
- The 4 C’s Model of EFS .............................................................................................. 16

## III Designing Curriculum and Assessments with the Lens of Sustainability ............ 19
- Standards-Based Curriculum Design .......................................................................... 19
- EFS and Assessment ..................................................................................................... 23
- Curriculum Design Steps for EFS ................................................................................ 24

## IV Vermont as a Case Study in Education for Sustainability ................................... 33
- Developing Standards for Sustainability and Place ................................................... 33
- Shelburne Farms’ Sustainable Schools Project .......................................................... 34

## APPENDIX ..................................................................................................................... 39
- Linking the Big Ideas of Sustainability with Essential Questions ............................... 40
- What does Education for Sustainability Look Like in Grade... .................................. 44
- What does Education for Sustainability Look Like in Content Area... ..................... 45
- K-4 EFS Rubric ........................................................................................................... 47

- **EFS Curriculum Tools** ............................................................................................ 49
  - Education for Sustainability Understanding by Design Unit Snapshot .................. 50
  - Education for Sustainability Understanding by Design Unit Snapshot *Example* ........ 51
  - Education for Sustainability Understanding by Design Unit Template v2.1 ........... 52
  - Education for Sustainability Understanding by Design Unit v2.1 *Example* ........... 55
As educators, we all want to know that we are making a difference, that what we are teaching will eventually benefit not only our students but the world outside our classrooms. Education for Sustainability offers a powerful opportunity to achieve that end.

The Shelburne Farms' Sustainable Schools Project developed *The Guide to Education for Sustainability* (*Guide to EFS*) in order to introduce Education for Sustainability (EFS) to educators and administrators and to provide additional information to enhance the work of those already engaged in EFS.

The goals of the *Guide to EFS* are to
- Define sustainability and the framework of EFS;
- Introduce educators to the importance and promise of EFS;
- Describe strategies for integrating sustainability into schools;
- Provide a step by step guide for curriculum development in EFS;
- Showcase Vermont as a case study in EFS.

**Why Do We Mean by Sustainability?**

ANNA: “There’s a little area that has a stream running through it that’s woody. And we found lots of trash in there and we’re going to clean it up. So our project would be making one area more fun to be in. If it is prettier and nicer, maybe more kids and adults would like to go in there and take walks.”

BRIANA: “I think this is important work to do. Because if we didn’t do it, it would be all dirty, no one could play in it, no one could use it, and people would be stepping on things, and it would be smelly. It would be safer and nicer if we do this project. We’re learning that when things are not doing well we should fix them. Even if we’re not in our groups, we can still help our neighborhood. If we see something bad in our neighborhood, we can come to school and tell them. We know how to fix things when they go wrong.”

ANNA: “Yes, it’s important because even though it’s not near my house, there are kids and families that are there, and if we do this work we’d want to go there and use this place. As another part of our project we’re going to contact some of the people who run the streams, because it is really polluted, and we’re going to try to do something about the pollution. Some of the girls and boys live right near it, and they tested the water for a wetlands study...”
Imagine overhearing a conversation like the one above. These children are thinking about the connections between the environment, human behavior, and social responsibility. They are beginning to understand issues of social equity and how the human world and environment are connected. Most important of all, they are beginning to understand that they can do something about improving the quality of life in their community and that it’s not someone else’s job.

When we say sustainability, we’re simply using a term that embodies these notions and that for many cultures represents an age old tradition: Improving the quality of life for all—economically, socially, environmentally—now and for future generations.

Another definition is: Working to meet the needs of the present without compromising the ability of future generations to meet their own needs. This is the most commonly used definition of sustainability, coined in 1987 by the World Commission on Environment and Development, also known as the Brundtland Commission.

The broad nature of these definitions has allowed groups and individuals to define sustainability on their own terms, to meet their own needs and those of their places. In one way, this is the promise of sustainability: it is not a prescribed endpoint, but a goal or vision that individuals or communities must design themselves and then plan and take actions to realize. Ultimately, the goal of sustainability increases the investment of citizens—including students—in their communities as they work towards creating their desired future.

Sustainable development has been a characteristic of many communities around the world and across history. But in many places we have also seen the adoption or development of increasingly wasteful habits of consumption, unjust social and political situations, and economic systems that do not adequately account for social well-being or the earth on which we all depend. The challenge of society, and particularly for us as educators, is to help individuals and groups learn to make decisions based on understanding:

- the natural and human communities in which we live;
- that we are all interconnected and depend on each other; and
- that we have the ability to make meaningful contributions and change.

The Big Ideas of Sustainability

In general we think of sustainability as having the following intertwined goals:

- economic prosperity
- environmental integrity
- social equity

Locally and around the globe, government, nonprofits, schools, and businesses are striving to meet these goals of sustainability. The facing page presents some...
THE BIG IDEAS of SUSTAINABILITY

**Community**
A group of living and non-living things sharing a common purpose or space.

**Systems**
Parts are connected through larger patterns.

**Diversity**
All systems and places function because of variety.

**Interdependence**
All living things are connected. Every organism, system, and place depends on others.

**Cycles**
Every organism and every system goes through different stages.

**Change over Time**
All organisms, places, and systems are constantly changing.

**Limits**
Every system has a carrying capacity.

**Equilibrium**
A state of balance.

**Fairness/Equity**
Resources are shared to meet the needs of living things—across places and generations.

**Ability to Make a Difference**
Everyone has the ability to change or impact a system, community, and themselves.

**Long-Term Effects**
Actions have effects beyond immediate reactions.

**Place**
Natural and human communities together make up one's place.

**SUSTAINABILITY**
When the environmental, economic and social needs of a society are met in the present without compromising the ability of future generations to meet their needs.

“Sustainability means doing more good than harm with the people around us and the stuff we have.”
— STUDENT, SUSTAINABILITY ACADEMY, BURLINGTON, VT

---

Children's Environmental Literacy Foundation
celfoundation.org

Sustainable Schools Project of Shelburne Farms
sustainableschoolsproject.org

---

Download this poster at: www.sustainableschoolsproject.org
key concepts that help to further define sustainability. These Big Ideas make the complexity of sustainability accessible to even the youngest learners.

Essential questions, projects, year-long units, courses, lessons, and entire programs can be built from these concepts—any topic can be looked at through the lens of sustainability.

**History of Sustainability, Sustainable Development, and Education for Sustainability**

Native or indigenous peoples have lived sustainably in many places around the United States and the world. Unfortunately, as our world has modernized, many societies have adopted increasingly wasteful habits of consumption and moved away from living sustainably. The challenge of sustainability is to help modern societies reconnect with the seasoned tradition of taking care of all living things within the means of nature.

To meet this challenge, the international community developed an agenda for the 21st century at the 1992 United Nations Earth Summit in Rio de Janeiro. Agenda 21 was endorsed by 179 different nations and outlines a plan for reaching global sustainability. Chapter 36, “Promoting Education, Public Awareness, and Training,” emphasizes the importance of education in the quest for sustainability. The Shelburne Farms’ Sustainable Schools Project is one of the many initiatives worldwide working to make sustainability a reality.

Education for Sustainability (EFS) is about integrating the Big Ideas and principles of sustainability into our work as educators—into the heart of the curriculum itself—as well as into our institutional practices, culture, and community partnerships. EFS offers a practical connection between the larger goal of improving the quality of life for all and the formal learning experiences that we provide our young people. When we design curricula that emphasizes understanding and contributing to economic, social, and environmental well-being, we work to ensure a better life now and for future generations. And in an age of increasing accountability and measurement-driven education, EFS and service-learning offer tangible results and visible student achievement that parents and the wider community can understand and actually feel quite excited about.

Education for Sustainability is not something new. Aspects of sustainability have been a part of formal education for the past century. Many teachers have been, and continue to be, engaged in EFS or similarly named efforts in the United States and around the world. Schools and programs can relate sustainability to the curriculum through multiple pathways: a school- or program-wide approach; service-learning projects; curricular units; and courses. Just as service-learning can provide a needed connection between different subjects and skills, Education for Sustainability creates intrinsic opportunities for students to apply their learning through real work in the school and community.
As educators we all hope to build on students’ innate curiosity. We want to build knowledge and skills, motivate, encourage a sense of responsibility, and nurture an ethic of caring so that our young people become engaged and thoughtful citizens. But, realistically, how can we expect students to arrive at this point if we do not offer them opportunities to actually practice the skills and responsibilities involved?

As we have worked with students, programs, schools, and individual teachers, we have found that using sustainability as a lens for education significantly helps students discover their potential as citizens and learners. When the Big Ideas of Sustainability are put into play—through investigations of local issues and needs—we engage students in both academics and the world around them. Schools and programs that use sustainability effectively are able to tap into students’ energy and creativity to address complex issues while giving a deeper meaning and imperative to the demands of curriculum and assessments.

EFS helps break down walls between schools and community, and creates an important space and value for student voice in community decisions. EFS projects, programs, and curriculum also offer a pathway for the community to engage with the life of the school, whether as supporting adults or as part of a needed knowledge base. Teacher practitioners of EFS report that their curriculum is better integrated across disciplines and grade levels and that they often feel a sense of renewed passion for teaching. These practitioners also find a supportive community ready to work with them to support the work of their students. EFS can help create an increased quality of life within the school and the community.

Students who are educated to think across subject areas, connecting their learning to real world problems and solutions, will understand and care for the complex web of life that supports them and sustains their communities and the planet. Sustainability is a vital local and global issue, and therefore is a powerful integrating concept to use in education at all grade levels. It provides a compelling reason for students to learn, because what they are learning will help them design both their own futures and that of their communities.

In brief, Education for Sustainability fosters
• the ability to integrate scientific, social, and economic thinking and knowledge;
• real-world skills (ie, teamwork, communication) applied toward responsible ends;
• appropriate applications of technology that help solve, not create, problems;
• equity, justice, inclusivity, and respect for all people;
• a pedagogy that encourages creativity, vision, compassion, cooperation, and collaboration in every student and teacher.

By comprehensively integrating the Big Ideas of Sustainability into their curriculum, teachers can help students reach a deeper understanding of the knowledge and skills necessary to be of real service to their
communities. Educators and their students can then engage in curriculum-based projects and activities that contribute to the community’s well-being.

For example, a middle/high school water quality unit could be reframed to include
- calculating the economic and social costs of cleaning polluted sites in their neighborhood;
- student projects on informing the public about the impact of contaminated water on human and natural communities;
- reviewing how historic settlement patterns relate to a watershed and predicting how climate change might impact those settlements;
- researching the connection between politics and water rights.

An elementary unit on food and nutrition could be expanded to include
- visiting local farms, food banks, and food processing sites to study the logistics and cost of transporting food;
- experiencing cuisines of other countries through cooking classes that explore ethnic specialties;
- working with school food service to develop healthy menus for school lunch.

EFS helps students make sense of the many different concepts and skills that they must master in a unit of study, or school year, or over the course of their educational life. Sustainability is not something new to add to your already crowded curriculum or busy program. Using sustainability as an integrative theme can actually help you address multiple topics and concepts at one time, while improving your students’ comprehension, interest, and overall engagement.

EFS, coupled with rigorous service-learning, helps students to see their role in the local community along with ways to make positive change. It helps students make connections between what they are learning, what is happening in their community, and how their own lives will be impacted.
Education for Sustainability is not a new program, theory, or pedagogy. Rather it is a perspective that we as teachers can use to design learning opportunities. This perspective recognizes that every student must be prepared to shape a better world—one with stronger communities, more efficient use of our natural resources, and a higher quality of life for all. In our complex and fast-changing world, we cannot know exactly what the future will require, but we are becoming aware of the interconnectedness of our world—both locally and globally. We know that all citizens should have (and teach) respect for the value and limits of our natural, economic, and human resources. We must also practice and teach the social skills of our communities, so we are better able to work together to meet the needs of all the planets’ members.

EFS is an opportunity to build on successful teaching strategies, an understanding of the importance of community connections for students, and a growing awareness that as citizens, we need to think about the world in an integrated way. Learning from models in the natural world is central to this approach. According to David Orr, sustainability depends upon replicating the structure and function of natural ecosystems.

“Ecological sustainability”... recognizes humankind as part of nature, that there are limits to growth and carrying capacity and that nature should be regarded as a model for the design of housing, cities, neighborhoods, technologies and regional economies.

— DAVID ORR, ECOLOGICAL LITERACY, 1992
Students are the future and as such have an inherent interest in being involved in the decision making, planning, and sustainability of their communities. The pedagogical foundation of EFS is built upon interdisciplinary curriculum, hands-on activities, and both place-based and service learning. These educational methods alone have merit whether the focus is social studies, math, or art; but there’s a synergy when these approaches are combined. Where disciplines once were taught in discrete units or blocks, they can now be interwoven through the theme of sustainability and community. Educators who facilitate these meaningful and relevant educational opportunities for their students are likely to see an increase in student attention and learning.

**Promising Practices for Education for Sustainability**

Through our work with educators, programs, and schools, ten promising practices have emerged as the most effective strategies to make Education for Sustainability a meaningful part of curriculum and programs.

**Sustainability is a lens.**

Sustainability is a lens through which educators, administrators, and students examine real-world questions on any topic, in any discipline. This lens looks for the connections between environmental integrity, social equity, and economic prosperity. By framing essential questions around the Big Ideas of Sustainability and connecting students to community, we can help them better understand the real interdependence and interconnections of our world. Sustainability can tie together an entire unit or program, a school year, or the K–12 experience into a cohesive curriculum. It provides a larger reason to be doing service-learning.

**EXAMPLE:** A 4/5th grade team of teachers develop a Land and Community unit integrating language arts, science and social studies. The teachers adapt two district science kits on soils and geology, and set the context for the exploration in a local community gardening center. In language arts student read fictional narratives about community gardening, as well as informational texts about the local gardening center from a series in the local newspaper. The unit comes together in a student-directed service-learning project that addresses food justice in their community.

**Students gain an understanding of the Big Ideas of Sustainability.**

From this integrative perspective, we also can recognize and build on the specific concepts and skills of...
sustainability. These include what are often referred to as the Big Ideas of Sustainability (see p. 3), as well as academic standards important to many schools’ curricula. As they learn to apply the Big Ideas on a local level, through a hands-on curriculum, students become able to solve the complex problems of the future.

**EXAMPLE:** Students develop their understanding of diversity by studying a local waterway and a neighborhood. They find comparisons between the two “communities” and understand the need for diversity in both human and natural communities for survival.

**PROMISING PRACTICE 3** Students actively think about creating a sustainable future.

The concept of sustainability is inherently forward thinking. It leads all of us—and especially young people—to not just understand issues, but to inquire about and act towards creating a healthy future for all. Many communities working on sustainable development include a public priority-setting component to these efforts, in an attempt to move away from top-down decision-making. It’s important to include all voices in this process, including students. Incorporating visioning into our curriculum can help students develop problem-solving, communication, and critical thinking skills, especially when the future-thinking is about real communities and issues, not just simulations or futuristic creations.

**EXAMPLE:** Students create drawings and models of ideal neighborhoods, look for the gaps between the current status and future vision, and then present recommendations to city council for neighborhood improvements.

**PROMISING PRACTICE 4** Past, present and future contexts and impacts are connected.

Frequently students see the past as just that—something that happened before their lifetime, with no significance or relevance to the present or the future. However, understanding the past provides clues to how we arrived at our current situation. It also suggests how we may maintain or alter our actions, decision-making processes, beliefs, and theories to create our vision for the future.

**EXAMPLE:** Students and families learn from community members about their city’s history and how the messages in these events or stories relate to current issues impacting their neighborhood’s quality of life.

**PROMISING PRACTICE 5** Students consider impacts of personal and community decisions.

As students build an understanding of the Big Ideas of Sustainability, they begin to consider their role in affecting change and making decisions for the community’s, the planet’s, and their own personal quality of life. A unit or program that includes this promising practice will not only outline information about an issue, but also offer students the chance to be part of assessing and deciding on a response to the issue.

**EXAMPLE:** Students do a “waste audit” of their school or community, studying how individual and collective actions can either help or hinder the local ecosystem.

**PROMISING PRACTICE 6** Local and global perspectives, contexts, and needs are considered.

Investigating the local community from all angles is a fundamental element of Education for Sustainability. It is crucial that students be connected with their local natural and human communities to develop their understanding of cycles, diversity, and relationships. This prepares them to understand the interdependence of systems, and to take an active role in service. As their worldview expands, students use global issues for comparison and communication, but their local community remains the context for learning that is most accessible and immediate.
EXAMPLE: Teachers design a year-long theme focusing on cycles to build students’ understanding of agricultural and natural systems and culture. Through video conferencing, students work with educators to learn about agricultural practices in Central America, and design collaborative project with students in Ecuador. Literacy connections are incorporated through related readings from local folktales, historical pieces, and storytelling. Science and math skills are applied in studying the local habitat.

Academic learning is connected to a real issue or situation.
When students apply their learning to issues that are relevant and meaningful to their daily lives, education comes to life. It is no longer confined to a textbook or school walls. Action in response to an issue can take many forms. It can be physical or kinesthetic (habitat study, river bank clean up, historic preservation work, etc.); or it can be analytical (creating a public service announcement for a local fundraiser, writing letters to governmental representatives, or meeting with local officials). Through EFS, students have the opportunity to actually address issues with the goal of creating more vibrant, just, safe and healthy communities.

EXAMPLE: Students host a Community Forum at City Hall where they invite local and state government representatives to respond to questions they have developed. The questions, generated by the students, are related to their study of community health and well-being. The students take the role of event conveners and organizers, interviewers, reporters, and videographers during the forum. In the weeks that follow the students work to share the results of the forum with the local community through a newspaper article, a blog with photos, and a YouTube video. Students facilitate community response and dialogue through the blog and video posting.

Students practice inquiry and an open-ended questioning process.
Inquiry-based learning involves more than merely asking simplistic questions. It requires the learner or learning community to apply critical thinking skills, find and process information, and utilize that knowledge in actual situations. This process can help to build a foundation for life-long learning.

EXAMPLE: An elementary grade unit uses sustainability to meet three different goals: local requirements to teach topics in Earth Science; state requirements to create standards-based units; and an educator’s interests in encouraging students to think and care more about their school community. Students apply these goals to their overarching question of, “How can we care for, protect, and improve our community?”

Students participate in problem solving, community building, and service-learning.
Helping students see the real-world connections between their education and their community enriches their learning in several ways. It increases students’ awareness of how their community contributes to social, economic, and environmental sustainability through its decisions and practices. It also creates meaningful opportunities for students to contribute to their community. Through service-learning, students develop as active citizens, learn problem-solving skills, and experience a sense of social responsibility and personal efficacy by engaging in thoughtful action to help their communities.

EXAMPLE: Students realize that many buildings in their community are still not handicapped accessible. They research the issue, develop a plan to install ramps, propose it to local government who then pass a resolution to build it. Students participate in crafting a PR plan that included fundraising to offset costs.
**A program or curriculum demonstrates interdependence of economic, environmental, and social systems.**

When an educational curriculum or program demonstrates the interdependence of the economy, environment, and society, it is reaching into the depths of sustainability. Using an integrated, interdisciplinary curriculum to show how individual systems are interwoven helps students study, experience, and understand the connections between all of the elements of their own lives. This in turn encourages them to expand that knowledge to the workings of their community, helping them become thoughtful and engaged citizens in the process.

**EXAMPLE: Students are involved in helping their school use the lens of sustainability for all of its operations, curriculum, and decision-making. The institution actively uses sustainability thinking, integrating it into everything, from parent engagement to wages for food service employees to choosing cleaning products and classroom materials.**

**Place, Experience, and Civic Engagement**

Education for Sustainability brings together knowledge of place with the skills and strategies of experiential education to focus on improving our communities and our future. Service-learning combines the principles of experiential learning with service to the community to support students’ personal, academic, and social development. Civic engagement is the keystone of all EFS work, helping young people become aware, motivated, capable, and active contributors to improving their communities. Sustainability is the overarching goal, embedded in the context of place, and the strategy of service-learning offers a framework for learning and action. With sustainability integrated in their curriculum and paired with the strategy of service-learning, students learn and apply their understanding in ways that build a sense that they themselves can make a difference. Thus, we help our students learn to be citizens in the here and now, as they work to build a community that is sustainable economically, environmentally, and socially.

**“Before you eat breakfast this morning, you’ve depended on more than half the world. This is the way our universe is structured…We aren’t going to have peace on earth until we recognize this basic fact of the interrelated structure of all reality.”**

— DR. MARTIN LUTHER KING, JR.

**Understanding connections**

Students first need to understand that the world is built of connections. By seeing all the interconnections within their community, students better understand the complexity of the human and natural systems around them, and their learning gains meaning and depth. For example, when students of any age learn about where their food comes from—the economic, social, and ecological forces at play in their own communities—they can better consider multiple variables when deciding what food to eat. Connections are the foundation of the systems thinking that our young citizens and our communities need.

**Connecting to place**

Side by side with the EFS goal of understanding interconnectedness is the goal of understanding place, the natural and human systems that make up our local communities, both urban or rural. Place-based learning is therefore a crucial pedagogy for practicing EFS. Both place-based learning and EFS begin with the goal of understanding one’s own place so that we can better understand the world. Beginning in the elementary grades, we need to cultivate student aware-
ness and understanding of our natural and human communities. From that understanding or “sense of place,” they can begin to comprehend the complex interactions of local (and later global) environmental, economic, and social needs, and learn to address them in ways that last into the future.

Research on place-based education, whether environmental or civic in focus, shows that students most effectively gain a positive affinity with their local place when they take an active role in its stewardship, when they have the opportunity to act on their own initiative, and when given opportunities to express their learning to an outside audience.

When we bring our students into the context of their community, we find that motivation soars and opportunities abound for meaningful projects where students can develop and apply their academic skills. At the same time, students become literate in their local place. They gain names and stories for the world around them: the source of their water and food; the long-ago business owner who built the big brick building on the corner; the name of the bird that sounds their wake-up call. With such knowledge, they have more reason to care for this world of theirs and an interest in becoming its stewards. Students can also then apply and transfer the skills and knowledge they have gained toward interpreting their own place to new communities. Grounded in their own local places they become much more agile in making the cognitive leap to an understanding of other places around their country and the globe.

### Developmentally appropriate curriculum

When developing ways to engage students in sustainability it is also important to think about the developmental appropriateness of the curricula. Author David Sobel, for example, claims that introducing mathematical abstractions to young students too early is “one of the major causes of math phobia among children in the primary grades. Unable to connect the signs and symbols on the paper with the real world, many children were turning off to math.”

Sustainability has a similar potential to be too abstract for students (and adults). “If we prematurely ask children to deal with problems beyond their understanding and control, then… we cut them off from the possible sources of their strength.” (Sobel) To prevent this from happening and to keep students engaged, empowered, and excited to learn, we can develop age-appropriate units that are anchored in a real-world, local context. For instance, leave destruction of the rainforest and toxic waste issues until the middle grades or higher. This will prevent what David Sobel refers to as ecophobia—fear and hopelessness in the face of natural disasters. Sobel basically suggests that there “be no tragedies before grade three.”

In addition to age- and developmentally appropriate topics, it is also important to consider the definition of place as it relates to specific developmental stages. Figure 2 on the facing page defines the development of place concept in the curriculum.
Making a difference

Knowledge and connection to place do not necessarily foster an engaged citizen. Students need to feel confident in their ability and have actual opportunities to make a difference with this knowledge. They need to experience their own effectiveness (often called self-efficacy). We also must not let students get lost in the complexity of the world and its mounting issues, nor become simply rooted in compassion for it. They must experience some measure of control or power within themselves to effect the changes they now understand are needed. Service-learning, particularly when there is a strong commitment to student voice, provides specific opportunities for students to begin to exercise their power to create positive change.

How do we instill students with a sense of themselves as empowered citizens? As educators, we need to provide successful service-learning experiences to show students that they can actually make a difference in their school community, neighborhood, or town. A distant culture or ecosystem cannot supply such a context. Students need immediate contextual opportunities for decision-making—to inquire about their communities’ needs and to shape their contributions. Students also need the opportunity to reflect on their experience and to construct its meaning. Inquiry and reflection are crucial companions to helping students develop awareness of themselves as agents in the web of their communities.

EXAMPLE: Children decide that food donations should be the entry price for a school event, demonstrating interest in their community and awareness of others’ needs. Children ask the food shelf what food is most needed: Now they are considering the community’s system of providing food to people in need—its institutions and potential gaps. Children visit the food shelf and the farm that supplies surplus fresh produce. They then decide to make a cookbook featuring the fresh produce the food shelf supplies since they have learned that many clients are unfamiliar with cooking fresh produce. Now the children are inserting themselves into that food donation system and making it work better!

Engaging students in the sustainability of their community

“If education is responsible for helping students become aware of their options, then it should encourage them to become active and deliberate citizens.”

— STRAPP, WALS, STANKORB, 1996

To successfully contribute to the sustainability of local communities—and eventually the planet—youth civic engagement depends on three essential tenets.

1. Students understand that the world is interconnected;
2. Students know the natural and human communities in their community;
3. Students believe in and exercise their ability to make a difference.
EXAMPLE: Students roam their local riverbank picking up garbage: It’s a great one-day community service activity that removes trash and reminds everyone of the river flowing through the heart of the town. Students also study the many natural and human forces that have shaped the river, past and present, so they can put their experience in the complete context of the community. They can see the connections between their service project and the work of local farmers to stabilize riverbanks. Maybe they have had the opportunity in class to learn about non-point source pollution, historical trade routes, or riparian tree nurseries. Perhaps they will become aware of the presence of low-cost housing in the floodplain, the paddle club’s frustration with losing access near the high school, the local fishermen’s requests for stocking fish, and other students’ service efforts to remove invasive species. Finally, they get a chance to reflect thoughtfully about their experiences and studies.

Empowering students to become informed and active citizens is at the heart of the EFS work. Rather than feeding students information and projects to do, EFS is about students asking questions, developing research projects, finding answers, and sharing with others: the locus of control is with the students. In his book Children’s Participation: From Tokenism to Citizenship, Roger Hart shows a “ladder of participation” that outlines eight levels of participation (see Figure 3 on facing page). The steps move from “Manipulation” (least level of participation) to “Initiated by children, decisions shared with adults” (highest level of participation). The theory is that the more involved students are in their education, the more they learn, retain, and are inspired to act.

What are some ways to involve students in the sustainability of their community?

Gathering your colleagues and brainstorming answers to this question is a good way to start developing Education for Sustainability in your school or community. Below is an abbreviated list of what some teachers are doing.

Community Knowledge: Understanding and Assessing the Community

- Develop maps of the town.
- Work with elders to gather oral history of the community.
- Survey community to find out their issues/problems/solutions.
Food, Fiber, and Nutrition
- Visit local farms, cultivate appreciation for local agriculture.
- List essentials of life/living (needs), activities around those essentials.
- Support development of a farmer’s market.

Ecological Awareness and Stewardship
- Measure air/water quality in the community.
- Keep a nature journal.
- Research school practices: energy and water use, cleaning supplies, food purchasing, etc.

Community Building
- Have student government discuss issues for school to focus on for the year.
- Build an informational kiosk.
- Sponsor community functions.

Civic Engagement: Decision Making and Governance
- Organize student forums on local issues and decision making.
- Bring kids to town meetings to listen, present children’s issues, or videotape sessions.

The Benefits of Taking A School-Wide Approach
Experience and research both indicate that individual teachers can find more support, more excitement, and deeper, longer-lasting results when they work with their colleagues on curriculum innovation and school improvement. Often, school-wide efforts grow from the learning, experimentation, and innovation of a single teacher or team. When an effort becomes a more widely shared endeavor, teachers gain support from colleagues with discrete skills and expertise, and strengthen their professional community. While service-learning can certainly encompass an entire school through shared activities, fostering professional conversations, and collective learning, EFS can provide a larger and more compelling “umbrella” under which to work toward creating a contributing community of learners. Practitioners speak passionately to us about their sense of the importance of sharing the learning and successes that result from EFS and service-learning work. When adult educators work side by side with a shared passion, they also offer important positive role modeling for students.
A number of approaches to professional development consciously support school-wide participation. Study circles and transformational learning protocols, where teachers and administrators collaboratively explore aspects of their work, can help foster a professional learning community. Teachers who design their own on-site in-services and trainings can yield similar benefits. These teachers also develop a stronger sense of self-efficacy—an awareness of their own ability to make a difference. Models of teacher leadership and collaboration, including initially using a consulting teacher or coach throughout a school, help to build the unity, infrastructure, and attitude needed to sustain a long-term EFS effort. The shared learning and collegial critique that participants experience through such work together provide a powerful way to change the nature of learning itself. The strategies can also generate a common vocabulary and approach to EFS and service-learning, along with the shared purpose inherent to the effort.

How do I get others at my school or program interested in EFS?
Share your enthusiasm with colleagues by explaining the reasons why you’re interested in EFS. Service-learning often presents an excellent entry point, since overall awareness and support for service-learning has been growing dramatically. Find out what your fellow educators are interested in. They may be interested in similar issues or concepts but be unaware that these ideas fall under the umbrella of Education for Sustainability. You could also hold a meeting with colleagues to identify how you are already practicing EFS and service-learning and together find ways to enrich and extend what you are doing.

How can I explain EFS to parents, my school board, and community members?
Sustainability is a concept that has immediate relevance both to students’ own lives and to their families and community. At its best, EFS involves students, families, and community in learning as a direct experience of what working towards sustainability means. Education for Sustainability is a way of approaching teaching and learning that helps students make sense of the many different concepts and skills that they must learn and master in school. But equally important, it helps them make sense of the world in which they live. Rather than asking, “Why do I have to learn this?” students can actually see meaning in the content and skills because they are engaged in real local issues that they and their community care about. In their eyes they are learning for a purpose. With the support of their teacher, they are able to gain and practice knowledge while experiencing what it means to be an active citizen. Likewise, with student work and accomplishments taking place in public view, community members are able to see learning and student achievement firsthand.
What takes place in a school or program becomes part of the community itself as students’ studies and projects impact quality of life in neighborhoods and contribute to the collective understanding of social, environmental, and economic issues.

**The 4-C's Model of Education for Sustainability**

**Schools as models of sustainable systems**

For most students, school is the community with which they have the most contact and the strongest attachment. Therefore, EFS often starts with modeling, analyzing, and improving the school community. Campus ecology and culture, collaboration, and partnerships with the surrounding community might be considered the implicit curriculum. (See Figure 4.)

Students, teachers, administrators, parents, and local resource experts can work together to consider a school’s ecological, social, and economic systems. We can apply to this mini-community many of the same measures of sustainability that have been (and are being), developed for municipalities, businesses, higher education institutions, and governments. Some of these measures include social well-being, genuine progress indicators (i.e. gross national happiness), true-cost accounting, and livable wage campaigns. Educators can use these measures for inquiry into a school’s impact on various systems and to initiate improvement projects. In essence, the school is turned into a laboratory for sustainability. Experiential learning opportunities are created within the school building and grounds, where teachers and students can learn together. Whether seeking information or advice or demonstrating learning and improvements, educators can inspire the local community to engage with the school and to learn from its experience. Students often end up changing their community as well as their school.

**FIG. 4. The 4 C’s of EFS in Schools**

- Curriculum connections
- Community partnerships
- Campus ecology & culture
- Collaboration

**CURRICULUM CONNECTIONS:** Curriculum can be framed using the lens of sustainability to integrate curricular topics/themes, to teach skills and content, and to help students make connections.

**COMMUNITY PARTNERSHIPS:** On-going community partnerships are vital to connecting the curriculum to relevant, real-world issues. Our research shows that the development of community partnerships has staying power and carries on past the initial efforts to integrate sustainability into a school.

**CAMPUS ECOLOGY & CULTURE:** Sustainability must be modeled as well as taught. It could be integrated in everything from student-leadership and school-wide decision-making, to school lunch programs, to waste management, to cleaning products, and to purchasing policies.

**COLLABORATION:** To achieve sustainability, collaboration is an essential skill and process. Planning and learning must take place across all grade levels, content areas, as well as with the larger community (families, businesses, government, non-profits) in order to create sustainable communities.
EXAMPLE: Students conducted an investigation of their playground and discovered that the playground was unsafe with overall deterioration of the equipment and landscaping. They also noted that the play structures only targeted upper body physical fitness. The students researched play structures that promote whole body fitness and shared these findings as well as the data about the unsafe conditions with the principal. Though the school was unable to replace the play structures at the time, they immediately addressed the safety hazards presented by the students.

We have developed the 4 C’s model as a framework for the school-wide integration of EFS. In every community, there are opportunities for the school, its campus or schoolyard, and the surrounding neighborhoods to be rich components of the learning. They can help students see the connections between their everyday experiences, the world around them, and the curriculum.

Schools often begin by using the lens of sustainability to enhance either their curriculum or their campus practice. While it is possible to address each of the 4 C’s as stand-alone components, it is more fruitful to integrate the four.
In standards-based curriculum design, teachers target standards and align them with instruction and assessment. In this section, we look at some key questions that can help teachers who may not be familiar with designing standards-based curriculum.

**How does EFS help teachers address required standards?**

As educators, we often find ourselves teaching discrete, single subjects. By using an interdisciplinary teaching approach grounded in real-world examples, we can develop problem-solving techniques and critical thinking skills in students. Using the concept of sustainability and its related **Big Ideas** to guide your lessons, units, or program provides continuity to your curriculum, and practical evidence that our everyday actions affect all aspects of life.

By its nature, sustainability is an interdisciplinary concept. Using it as an integrative theme lends itself to incorporating many cross-curricular standards into a single unit. Teachers find that while investigating a real-world issue such as hunger, they are able to simultaneously address and evaluate particular science, social studies, literacy, math, and civics standards.

To get started, ask yourself the following about your curriculum, unit, lesson, project, or theme:

1. Is it age or developmentally appropriate?
2. What do I want the students’ level of participation to be?
3. Is it relevant to my students, their community, or their concerns?
4. Is it based in a real-world context?

**Aligning classroom curriculum with the standards**

The design of standards-based classroom curriculum is a continuous process of building strong relationships between standards, assessment, instruction, and the strengths and needs of learners, so that all students can reach the standards. The design should link learning with standards in a consistent and purposeful way across classrooms and grades.

Each standard includes criteria (evidence) for what students should know and be able to do. The criteria (or performance expectation) can be used to determine whether the students have successfully met...
FIG. 5

Next Generation Science Standard 5-LS2-1

Performance Standard: Students who demonstrate understanding can: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Science & Engineering Practices
Developing and Using Models
Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions. Develop a model to describe phenomena.

Disciplinary Core Ideas
LS2.A: Interdependent Relationships in Ecosystems
The diet of almost any animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants, and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, are “decomposers”: they break down dead organisms (plants, plant parts, and animals). Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
Matter cycles between air and soil, and among plant, animal, and microbe organisms as they live and die. Organisms obtain gases and water from the environment, and release waste matter (gas, liquid, or solid) back into the environment.

Crosscutting Concepts
Systems and System Models
A system can be described in terms of its components and their interactions.

the standard. The criteria also will suggest appropriate learning activities and assessments. For example, Figure 5 shows Next Generation Science Standard (NGSS) 5th Grade Life Science 2-1 (5-LS2-1). The performance standard describes what all students should demonstrate by the end of 5th grade. The Science and Engineering Practices indicate what a student might do or practice in order to meet the standard. The Disciplinary Core Idea (DCI) should relate to students’ life, be transferable over the grades, and have broader importance, while the Crosscutting Concepts are like Big Ideas of Sustainability and apply across multiple fields of science. NGSS also includes correlations to the Common Core Math and Language Arts standards to support integrative planning.

Key Questions

The following key questions can help guide the design process at each stage of unit development.

GOALS: What are the enduring understandings I want my students to come away with?
• What big idea will focus my unit and teaching?
• What essential question will guide student inquiry?
• What standards support this focus?
• What content will be explored to help students develop this understanding?
• In what context or setting will this learning take place?
**DOCUMENTATION:** How will I prepare, document, and revise the unit and learning opportunities?
- Is there a template that I will use to write up the unit and learning opportunities? (We recommend using an Understanding by Design® template, see appendix, p. 44.)
- Is the unit recorded in a format that will be useful to me or others in the future?
- How will I collect data on the implementation of the unit that can inform the revision of learning opportunities and assessments?
- Do I have a plan for collecting examples of student work for use as benchmark pieces?
- How will students create a public display of the learning in progress?
- How will students exhibit the final products of their learning?

**STANDARDS:** What do I want my students to know and be able to do?
- What are the standards that will be assessed?
- Have I considered both content and skill standards?
- How many standards are reasonable to address given the duration of the unit?
- Are the standards adequately supported by the learning activities (lesson plans)?
- Are the standards effectively assessed during the unit?

**ASSESSMENT:** How will students demonstrate understanding of the content and skills outlined in the standards?
- Do the assessments allow for students to apply and transfer the understanding to new situations?
- What assessments (formative and summative) can provide feedback to students about their learning?
- Can products and performances that emerge from the instruction be used to assess student learning?
- Is there opportunity for students to revise and update previous assessments to demonstrate new understanding?
- Are multiple formats of assessments used (formal: test, quiz, report, project; informal: participation, discussion)?
- Is there student choice in the ways that they demonstrate understanding (with respect to multiple intelligences and learning styles)?
- Do the assessments clearly evaluate whether a student has met the standard(s)?
- How will I evaluate the overall effectiveness of the unit?

**INSTRUCTION:** What learning opportunities do I need to provide so that all students can meet the standard?
- What background knowledge do students already have or need?
- What sequence of instruction should I use?
- Have I considered all learning styles?
- Do the activities build on one another in a logical sequence?
- Do the learning activities produce products and performances that can be used as assessment pieces?
- Are the learning opportunities engaging and relevant to the students?
- Do the activities build student understanding of key content and concepts?
- Are the activities age and developmentally appropriate?

**LEARNER NEEDS AND STRENGTHS:** How can I help all students learn?
- What standards have students already met?
- Are there opportunities to find out what learners already know about the identified standards?
- What do they need in order to meet the standards identified as the focus of the unit?
Standards and Sustainability

Vermont is fortunate to have two Standards in the Vital Results that explicitly support efforts to integrate sustainability into the curriculum (3.9, Sustainability and 4.6, Understanding Place). (See p. 33). These two standards cut across all disciplines and every grade-level. Many of Vermont’s Vital Results Standards are also geared toward skills and dispositions implicitly needed for students to understand and practice sustainability (e.g., Social Responsibility, Problem-Solving, Healthy Choices, etc.).

However, even if sustainability isn’t explicitly expressed in the standards guiding your curriculum design, there are still many opportunities to focus on the systems thinking, connections, and interrelationships that are important to understanding the concept of sustainability.

For example, Crosscutting Concepts in the Next Generation Science Standards (NGSS) support the understanding of, and align with the Big Ideas of Sustainability

• What accommodations are needed to meet individual and group needs. How will this be done?
• Are there opportunities for learners to be made aware of the standards that are the focus of the activities and assessments?
• Are there opportunities for learners to be made aware of how they will be assessed in relation to the identified standards?

Where to start applying the lens of sustainability?

Although standards-based curriculum design is not a linear process, it is crucial to know what learning results you are targeting to make sure that activities and assessments support those outcomes. Engaging in Education for Sustainability doesn’t mean that existing units of study need to be discarded or that all new units need to be created.

Starting points can originate from existing units of study or published materials, student questions, issues, or concerns, or standards. Wherever you begin, it is important to align standards, instruction, and assessment. In the next section, we explore curriculum design steps for EFS. Focusing on sustainability can enhance and support the standards you target.
“Every day, teachers everywhere observe children, listen to their conversations, and talk with them about their ideas, writings, drawings. Teachers routinely try to answer important questions about student learning and their own teaching: What experiences can I provide to prompt students’ exploring, investigating, testing, and understanding of the concept? How well are my students able to provide evidence to support their conclusions? Have my questions been effective in helping students make sense of their investigations?”

— THE CENTER FOR SCIENCE EDUCATION AND PROFESSIONAL DEVELOPMENT

**The purpose of assessment**

The purpose of assessment is to find out how our students are doing and support them in doing better. Teachers have learned to use a variety of assessment strategies to give all students a chance to demonstrate learning. At its best, assessment invites students into the learning process. It is easier to explain progress, or lack of it, to students and parents when we can point to standards or learning outcomes that we and the students have agreed to target, and can show concrete examples of what achievement looks like.

**Assessment tools with a sustainability lens**

The assessment tools you use to measure your students’ knowledge, skills, and attitudes in Education for Sustainability are like those used in authentic assessment of any subject area or topic, in that they

- are based on the criteria you and your students adapt to make the language concrete and comprehensible;
- give students the opportunity to demonstrate in varied ways that they have mastered the knowledge, skills, and attitudes you are assessing;
- are given to students in the beginning of a year, unit, or lesson so they know how they will be evaluated and can work to improve;
- are reused or generalized so that students are familiar with them.

For a culminating assessment of a unit focused on sustainability, you might use the same teamwork, writing, presentation, or product rubrics that you would use for any other unit, but add criteria related to the concepts of sustainability, such as the Big Ideas. (As an example, see K–4 Rubric, Appendix, p. xx.)

**Formative and summative assessment**

Assessment is used throughout a unit of study. It gauges student baseline understanding before you begin, monitors their progress along the way, and evaluates what they’ve learned at the end. Formative assessments are embedded in the unit or instruction to serve as a roadmap to the learning. They inform the teacher on what direction the learning may need to go and where students need to deepen their understandings. Formative assessment tools can be informal, such as conversations, reflective journals, and Socratic dialogues; or more formal, such as open response prompts. Formative assessments can be revised and reflected upon as students refine their thinking.
Summative assessments occur at the end of a unit of study and should require students to put their learning into context and to transfer and apply their thinking and skills. Summative assessments are used to formally grade students. Like formative assessments, they can be created in many formats. When creating summative assessments in Education for Sustainability, we suggest measuring performance tasks, or products that require integrative thinking. For example, if we wanted to assess student understanding of habitats, we might ask that they design and implement a habitat restoration plan for a local stream bank.

**Rubrics and checklists**

It is important that students understand the standards, as well as the criteria they will be assessed on. Rubrics and checklists should be created during the assessment design process, so that the essential elements can be clearly communicated to students. It is often helpful to design these tools with students, so that they develop a deep understanding of what and why they are learning.

**Assessment by journal**

Journal entries can be used as both formative and summative assessments. A critical component of EFS is reflection, and journals can be used to consider learning experiences and concepts. Journal entries take many forms: some have guiding questions, some are open-ended, and some combine free response with teacher direction. For journal assessments, it’s important that students know beforehand what the criteria for judgment will be. Entries can be formally graded, or they can serve as a “diary” of learning, that students can then further reflect upon.

**Curriculum Design Steps for EFS**

“Teachers are designers. An essential act of our profession is the design of curriculum and learning experiences to meet specified purposes.”

— WIGGINS AND MCTIGHE

This section is aimed at helping teachers include sustainability in their curriculum design process. The following steps in curriculum design are adapted from the principles of “Backward Design” in *Understanding by Design: Guide to Creating High-Quality Units* by Grant Wiggins and Jay McTighe. Their book outlines three stages of design:

1. Identify desired results (targeted standards and understandings).
2. Determine acceptable evidence (ongoing and culminating assessment).
3. Plan learning experiences and instruction (aligned with standards and assessments).
It can be tempting to begin with a learning activity that you are familiar with and that your students enjoy doing, and then try to identify standards and GEs to fit the activity. However, beginning the curriculum design process with the intended outcome(s) guides the development of relevant learning opportunities and assessments. This way, the standards and intended student outcomes purposefully drive the development of the learning opportunities and assessments. We have adapted Wiggins and McTighe’s Understanding by Design® template to incorporate the lens of sustainability. The original template is from the 2011 edition of *Understanding by Design: Guide to Creating High-Quality Units*. See the appendix, p. 50 for a blank template and examples. When you modify or enhance an existing unit to include EFS, make sure you choose the standards you will target before you adapt or add to the learning activities and assessments.

### Applying the Lens of Sustainability

- Look for economic, environmental, and social connections to the unit topic
- Ask what insights about sustainability students should take away from the unit
- Consider what students need to understand about this topic to be engaged and empowered citizens.
- Think about potential community partners and places where learning can be extended outside of the classroom.
- Identify the key concepts and enduring understanding(s) about sustainability that students will take away from this unit
- Think about what students should know, understand, and be able to do, related to the content area with the lens of sustainability (What Essential Questions and Enduring Understandings will guide their learning? What knowledge and skills will they acquire?)

“A key difference between knowledge and understanding based on knowledge is that the latter is always fluid, transferable to new contexts and transformable into new theory.”

— WIGGINS AND MCTIGHE

### Identify desired results

**Choosing a topic through the lens of sustainability**

Generally, the topic for a unit is dictated by school, district, or state requirements (standards, testing, or portfolio requirements), and by your classroom or community priorities. The US Partnership for the Decade of Education for Sustainable Development has drafted a set of national EFS standards. Further consideration needs to be given to the skills and content areas you need to address. Incorporating sustainability may seem daunting, but can instead be viewed as a way to integrate content areas, skills, concepts, and student voice. Sustainability is a holistic way of looking at the world, seeing the complex interplay between the environment, society, and the economy. The lens of sustainability can be used for any unit topic or content area, grade level, or school location. The *Big Ideas of Sustainability* include concepts such as diversity, interdependence, and equity (for complete list, see p. 3). These *Big Ideas* can be found in standards, GEs, school mission statements, educational priorities and programs. If students become aware of these *Big Ideas* and associated skills and practice them during their K-12 careers, they can be engaged in creating sustainable communities.
When considering how students will make meaning, and how and what skills and knowledge they will acquire, related to sustainability, ask yourself, “what do I want students to remember about this topic or content in 10 years? When they are 70?”

**Identifying enduring understandings**

Enduring understandings (EUs) are the foundational ideas that you want students to remember from a unit of study. They go beyond facts or skills to focus on larger concepts or principles, and are transferable to new contexts or topics. A standard itself might contain language that describes the enduring understanding. For example, the Common Core ELA standard for 8th grade (CCSS.ELA-LITERACY.SL.8.1) says “Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others’ ideas and expressing their own clearly.” The enduring understanding might be: Acknowledging diverse perspectives helps us build empathy, value others, and deepen our own thinking. Once you have defined the enduring understandings for a unit, you can identify what skills and background knowledge students need. In the example above, students will likely need to understand people have multiple viewpoints and opinions on complex issues, that diversity of thinking helps us to consider issues more broadly and deeply, and practice reflection, open-ended questioning, and listening skills. You may choose to integrate additional standards such as topics/themes in science or social studies that are meaningful and relevant to students.

Enduring understandings are not limited to the language in the standards or grade expectations. They can be defined by community, family, student, and school priorities as well.

In *Understanding by Design*, Wiggins and McTighe offer four filters to help craft enduring understandings:

- To what extent is the content, topic, or skill relevant and transferable to the larger world (does it connect to a Big Idea)?
- Is this a foundational concept or principle of the content area?
- What about this content or topic is often misunderstood by students and needs to be uncovered?
- How can the topic, content, and learning opportunities engage students?

**Framing an essential question**

“If you ask your students, ‘How does water get to the lake?’ there are simple answers. But if we ask ‘How do we affect our watershed?’ we must then think more carefully of what needs to be mastered. A student would have to understand the scientific workings of a watershed—and because the question reads ‘we,’ the student would need to explore ways in which his or her local community affects water quality.”

— AMY DEMAREST, “LESSONS FROM SUSTAINABILITY” CONNECT MAGAZINE, MARCH-APRIL 2001

Essential questions, as defined by curriculum expert Heidi Hayes Jacobs, are the “essence of what you believe students should examine and know in the short time they have with you.” Using questions rather than statements is a way to engage students in learning. Instead of telling them what they will learn, a question offers opportunities for student voice, inquiry, investigation, and interpretation. Essential questions may be thought of as a conceptual “umbrella” for the content and skills you will uncover in an entire unit or the academic year.
The essential question can put the Big Ideas of Sustainability into the context of your topic or subject area (see appendix: “Linking the Big Ideas of Sustainability and Essential Questions,” p. 40). As an overarching question for the unit or year-long study, it will be the bridge between learning opportunities or multiple units. Ideally, the essential question will open the door to the unit, engage, and even provoke students. It should awaken their interest and spur their learning, which they’ll then express in their culminating assessment. A great question can place the students themselves squarely in the middle of the study, preparing them to actively participate in their own learning, as well as in sustainability of their community.

In general, essential questions have no clear correct answer. They raise other questions, they recur naturally, and they address foundational principles and concepts. Defining the essential question you are trying to answer with your students helps guide the other choices you will make in the design process. Involving students in crafting the essential question builds ownership, and is in itself a powerful learning opportunity. The following checklist can help you and your students develop an essential question.

Does the essential question
- Address sustainability with personal or community relevance for your students?
- Present possibilities for personal and social action both in school and in the community?
- Cut across a wide range of knowledge, skills, and resources?
- Pose opportunities for in-depth and extended work?
- Present possibilities for a wide variety of teaching and learning activities?
- Allow for students to sufficiently explore it, given time and resources?
- Provide opportunities for culminating teaching and learning activities and assessments in which students demonstrate how they have grappled with the question?
Essential Questions are the framework for curriculum integration, providing a place to organize our Enduring Understandings and Big Ideas. Picture them like a sturdy branch, on which we can hang mobiles of interconnected ideas, tie together diverse experiences, climb to places of new learning, and swing from question to question. Essential Questions connect students to the processes of their place. The questions are engaging and inspire inquiry. Their timeframe is flexible—they can be used for each in-depth unit of study. The questions may overlap several units, explore a specific season, or connect yearlong learning. Especially in early childhood education, they can be reflected in everything students do at school from sensory activities, art projects, reading in the library, math investigations, singing, and meeting in circle time.

In my classroom, Essential Questions tend to arc across several units of study. For example “What’s happening in winter?” supported the Big Ideas of change, cycles, and responsibility. This took us about two months as we explored the changing landscape and weather from fall to winter, specifically observing trees, squirrels in our schoolyard, how we take care of ourselves and each other when the weather gets cold, and snowflakes. Questions like this are open enough to explore many topics of students’ interest, but focused enough to provide that vital place to hang our connections. Below are strategies I have found useful for using Essential Questions in early childhood.

**Post the question prominently.** We wrote our question on large paper and posted it in our gathering area. We sometimes made an additional banner to accompany student work displays in the hallway.

**Illustrate the question.** Start with a simple visual of what the question is about and populate the space as you continue to explore. For our question “What’s happening up in the sky?” we started with paper cut outs of clouds and as our studies took us to explore birds, we added photographs of birds. Eventually our exploration took us to the moon. At this point we added photos and drawings of the sun, Earth, moon, space shuttles, and stars.

**Illustrate the responses.** Record student responses to the question at various times throughout the exploration to assess evolving understanding.
Sometimes I write what students dictate to me and draw a quick visual to accompany their words. Other times, I give them index cards to draw their responses, and then I document their words to accompany the pictures. These responses stay posted with the questions throughout the exploration.

**Strategy 4:** Include parents, community partners, and your unique place.

To help answer our question “What is wonderful about water?” we met with a grandparent who is a marine biologist, a parent brought in shells and sand from a recent trip to the beach, another parent brought in rocks and logs from the pond near their house, and our music and movement teacher led activities about water and undersea creatures. We collected snow from our schoolyard to explore states of matter.

**Strategy 5:** Craft questions that reflect students’ own experiences and emerging interests.

Our question “What’s happening up in the sky?” emerged after “What’s happening in winter?” I think we were spending so much time looking up at trees and squirrel nests, that when the trees lost all of their leaves we were collectively more aware of the sky—aeroplane trails, storm clouds, birds flying south, the bright sun on a cold snowy day, and of course, beyond. Because Essential Questions undoubtedly lead to more questions, keep track of these and use with students to make decisions about further explorations.

**Strategy 6:** Use words that young children can access and interpret for themselves.

I like the term “happening” because it’s about process. How does that work? Why is it the way it is? Who is involved? What does it look, smell, feel, sound, taste like? How does it change? How does it impact us? We could scientifically explain what is happening in winter, but with Essential Questions like this we really want to engage in the processes through experience, observation, and discovery. I also like to use words like “wonderful” and “special” to describe a specific theme. Asking “What is wonderful about water?” and “What is special about seeds?” invites learners to make meaning of the topic for themselves based on experience and sharing ideas with others.

We concluded our year with the Essential Question, “How does our garden grow?” Local farmers and gardeners visited as guest teachers. We encouraged plant-themed dramatic play, provided science and math investigations, and grew plants in our classroom. We explored the Big Ideas of interdependence and diversity. This question also provided the opportunity to reflect on our class as a diverse and beautiful garden, and our growth as individuals and as a community.
When will students respond to the essential question?
Your work throughout the unit—each learning opportunity, discussion, and assessment—will help students build their understanding and formulate ideas to effectively respond to the essential question. Giving students the chance to reflect throughout the unit (in a learning notebook, journal, or class discussion) helps them build understanding, and gives you an ongoing awareness of their progress. It is also helpful to build in a series of formative assessments that allow both teacher and students to monitor progress.

**Determine acceptable evidence**

**Define criteria**

How will you know when your student has met a standard or mastered skills and content? The assessment tools you use to measure your students' knowledge, skills and attitudes in EFS are like those used in authentic assessment of any subject area or topic. First, you’ll define the criteria or the measurable pieces of the standards that should be articulated at the beginning of the design process. They provide a reference for how you will assess and evaluate students’ understanding and will help you design learning opportunities. Articulating criteria at the beginning of the design process helps you design learning experiences that can be evaluated effectively.

As with developing an essential question, examining the language of learning outcomes (standard, GE, enduring understanding, etc.) and their criteria with students can be a valuable learning experience. It’s helpful to choose a particular aspect of the criteria and turn it into a concrete learning expectation; e.g., “Students will be able to name at least two natural systems in their community and describe what those systems need to work better or to keep on working well.”

**Plan the culminating activity (final assessment)**

In keeping with the backward design process, crafting the final assessment (activity, performance, experiment, written or oral presentation, etc.) before any other learning activities is a good way to think about the skills and knowledge students will need to acquire along the way to help them achieve understanding. The culminating activity will give students a chance to engage in and respond to the essential question, and can often be an occasion to share their knowledge with the community. The product or performance should be designed to allow you to assess the key learning outcomes and criteria you have identified. An assessment rubric can specifically address the learning outcomes and criteria. (Note that a unit can potentially address many learning outcomes—standards, GEs, etc.—but it is only practical to teach and assess a limited number of them.)

At the end of the design process, revisit the criteria to ensure that the learning activities support what you will assess.

**Plan learning opportunities**

Learning opportunities, traditionally referred to as lesson plans, enable students to gain content understanding, and to acquire or strengthen skills identified in Stage 1 of the design process. Learning opportunities should be carefully considered and sequenced to build towards students’ ability to respond to the unit’s essential question in a summative assessment.

**Use focusing questions**

While the essential question you choose in Stage 1 is the overarching question, more specific focusing questions can drive learning opportunities. Focusing
questions are building blocks that target the specific content and skills that students need as a foundation to later respond to the essential question. They are questions used to shape individual or a series of lessons, that focus students on the issues at hand, and that foster strong intellectual habits. Focusing questions are often used to launch or assess each lesson: they offer an intriguing way to open activities and connect them to prior learning, as well as a reflective way to summarize learning.

Applying the lens of sustainability prompts questions in every discipline, and at every grade level. Focusing questions about sustainability put the Big Ideas into the context of your topic or subject area. Like essential questions, they should be important and relevant to the learner, and they should help organize the search for new answers. Putting “we” in the question (“What can we...?” “How can we...?” “What is our...?”) centers the learner in the learning activity and stimulates engagement.

Focusing questions also involve complex answers and lead to enduring understanding of the topic. They can also drive the ongoing assessment needed to support and evaluate student progress. Essential and focusing questions can recur across the curriculum and through the years. They frame the learning, engage the learner, link to more specific or more general questions, and guide the exploration and uncovering of important ideas.

Primarily, focusing questions help organize and direct the search for answers in the teaching and learning opportunities. For example, to work toward Next Generation Science Standard 5-LS-2-1 (see p. 20), the teacher and students might develop focusing questions such as

- What is an ecosystem?
- Who inhabits our natural and human communities?
- What do the nonhuman creatures in our ecosystems need to sustain life?
- What do we humans need to sustain life?
- What makes an ecosystem healthy?
- How does the ecosystem help our human community?
- How do our human activities help or harm our ecosystem? and finally,
- What do I do that helps or harms my community? What solutions can I design to care for and protect it?

In this example, each focusing question leads to activities designed to help students learn more about the interrelationships between the natural and human communities they occupy, which could include field trips to explore the community, reading and book discussions, teacher or guest presentations, art projects, and so on. During each lesson, students work on some activity or product—data collection, drawings, lists, poems, art projects, reports—that can be used as evidence of what they have learned, and can be assessed using criteria established beforehand. Each week’s work might culminate in a written piece, a drawing, science notebook entry, or a group discussion that attempts to respond to the focusing
question. As this unit progresses, each week’s learning opportunities and formative assessments build toward an “enduring understanding” of the essential question, “How can we care for and protect our community?”

**Perform continuous assessment**

Assessment is not something that happens only at the culmination of a unit in order to assign a grade. Its foremost purpose is to help students and teachers understand where they are now and where they need to go. Within the learning opportunities, you will be able to perform ongoing formative assessment of skills and content. You might assess journal entries, science notebooks, give quizzes, or use discussions as opportunities for assessment. Varying the types of assessment you do throughout a unit helps students demonstrate different skills and learning styles. Products, performances, tasks with scoring guides, peer review, self-assessment, and anecdotal observations are all valid methods. Opportunities for authentic assessment are often present with culminating projects or performances; for example, when students share their knowledge with community members by presenting before a local planning commission.

Providing students with assessment criteria at the beginning of a unit or year helps them work toward the targeted goals. Again, it can be beneficial to create the assessment criteria or tool with them. Frequently referring to a unit rubric or other generalized assessment tool that becomes familiar to students can be useful in evaluating student progress because it makes growth in understanding visible over time.

In Stage 2 you chose criteria to assess students’ understanding of sustainability content and application of skills. As you plan learning opportunities, make sure they support students in being able to respond to the essential question. Here are some guiding questions to consider:

- Do the learning opportunities enable students to acquire the specific skills and knowledge that I intended?
- Have I helped the students put the criteria into words they can understand?
- Do the criteria reflect what is most important to be learned in each activity or the unit as a whole? (i.e. is it an enduring understanding?)
- Are the focusing questions interesting and relevant to the students?
- Do the formative assessments allow for students to monitor their own progress?
- Am I able to be flexible and responsive to formative assessment data (can I adapt my unit plan to respond to student needs along the way)?

**List Resources**

In the final stage of design, make a list of resources you will use to enrich learning throughout the unit. Engaging resources can take various forms (text, videos, organizations, places, community or guest speakers, websites, electronic equipment, field trips, resource people, community events), and should be aligned with learning opportunities.

The way in which we approach curriculum design is a critical element of education for sustainability. This process, coupled with the Promising Practices of Education for Sustainability (as defined in Section II), has a synergistic effect on education and can help schools reorient toward a greater purpose: creating healthy communities.
Vermont as a Case Study in Education for Sustainability

Developing Standards for Sustainability and Place

In 1998, Vermont’s State-Wide Environmental Education Programs (SWEEP) secured funding from the Josephine Bay Paul and C. Michael Paul Foundation to convene Cultivating New Partnerships Project (CNP). The mission of CNP was to explore education for sustainability as a rallying point for diverse programs and help forge a consensus on overall goals and priorities. CNP was a unique collaboration of governmental and non-profit organizations including: SWEEP: State-Wide Environmental Education Programs, University of Vermont, Vermont Agriculture in the Classroom, Vermont Institutes, Vermont Agency of Agriculture, Food and Markets, Vermont Department of Education, Vermont Department of Public Service, Vermont Agency of Natural Resources, and Shelburne Farms.

In 2000, because of the work of Cultivating New Partnerships, the Vermont Department of Education formally recognized the importance of Education for Sustainability by including two new academic standards into its Framework of Standards and Learning Opportunities. These two standards, which apply to every K-12 student in every subject are: Sustainability (3.9), and, Understanding Place (4.6) (see box at right). Both of these standards, found in the Vital Results section, address what Vermonters felt was missing in preparing students for the 21st century.

Shelburne Farms played a lead role in the partnership that worked on the development of these new learning standards. While adding these new standards greatly enriched the existing framework, it became clear that teachers needed professional development and resources to effectively teach the content, skills, and ideas found in both of the new standards. To meet this need, Shelburne Farms began offering professional development opportunities for teachers, developing curricular resources, and supporting teachers in using sustainability and the local community to integrate school curriculum, projects, and district efforts. In 2001, Shelburne Farms launched an innovative whole-school professional development model called Sustainable Schools Project (SSP), defining sustainability as “improving the quality of life for all—economically, socially, environmentally—now and for future generations.”

Vermont Framework of Standards

Sustainability

3.9 Students make decisions that demonstrate understanding of natural and human communities, the ecological, economic, political, or social systems within them, and awareness of how their personal and collective actions affect the sustainability of these interrelated systems.

Understanding Place

4.6 Students demonstrate understanding of the relationship between their local environment and community heritage and how each shapes their lives.
Shelburne Farms’ Sustainable Schools Project

The Big Picture

Education, and the transformation of our schools, is critical to creating a sustainable future. The word sustainability comes from the Latin *sustenere* meaning “to hold up.” Understood this way, it suggests humanity “holding itself up” — as stewards of the environment and the communities that we inhabit, and by being mindful of our effect on future generations. While it has been defined in a variety of ways, without agreement on a universal definition, sustainability is commonly understood as “development which meets the needs of the present without compromising the ability of future generations to meet their needs.” This definition comes from the 1987 World Commission on Environment and Development Report’s Our Common Future (also known as the Brundtland Report). From this perspective, sustainability requires us to attempt to balance the 3E’s — economic vitality, an equitable and just society, and environmental integrity. SSP believes in a need for a fourth E, education, which is often referred to as the foundation for a sustainable future.

The transformation of formal education, including higher education and pre K-12 schools, is critical to students developing the skills, knowledge, attitudes and self concept to be lifelong participants in creating the solutions to our shared sustainability challenges. Further, students need an educational environment and system that values and cultivates their voices and allows them deep meaning and relevance. At the center of this project are educators, more than seven million in the US alone. To effectively support teacher practice, educators must have access to education programs and professional learning to prepare them to educate for a sustainable future. Education for Sustainability (EFS) is a transformative process that engages the whole student, including the intellectual, emotional, and physical components of self. Therefore, professional learning in EFS must similarly engage the whole educator.

The world is increasingly complex and unpredictable. Students need to be prepared to live, work, and play in communities and an environment we can’t yet imagine. EFS applies a critical, integrative lens to both the big picture and fine details of education. It implies a shift in the role of education in society from what has been (preparing a workforce for predictable
jobs that require little creative problem solving) to what will be (preparing innovative systems-thinkers and problem solvers for an ever changing world).

A just and sustainable future is relevant to all people on Earth. By providing students the opportunity to engage with the real work of creating a sustainable future through the contribution of meaningful, local solutions with global impact, students and teachers literally change the world. In addition to developing life-long problem solving, communications, collaboration, and discernment skills, the meta-cognitive transformation students and educators experience is profound. In the practice of creating change, we learn that we can create change, and that we do, in fact, have the ability to make a difference.

What is the Sustainable Schools Project?
The Sustainable Schools Project (SSP) is a dynamic model for school improvement and civic engagement designed to help schools use sustainability as an integrating context for curriculum, community partnerships, and campus practices.

Our professional learning model builds on the imagination and innovation of educators and community partners. We work with individual teachers, teams of teachers, entire schools and districts. Shelburne Farms’ Sustainable School Project offers a series of institutes, workshops, and year-long programs as well as tailor-made offerings for schools and organizations invested in a sustainable future. We share our work freely, including units of study, lesson plans, teaching materials, organizational tools, and evaluation tools, many of which can be found on our website. We are part of local, national and international networks devoted to education for sustainability, school transformation, professional development, and student learning.

Curriculum Development
Our goal is to help teachers use the integrative concepts and big ideas of sustainability to integrate, connect, and enrich their classrooms, teach content and skills, and build meaningful connections between their classrooms and the community. Teachers who work with SSP reframe their curriculum and teaching practice around local resources, student voice, and the cultivation of leadership skills and understanding necessary for civic engagement and social and ecological literacy.

Campus Practices & Culture
We work with schools to help them practice sustainability in the school and the school yard, to think creatively about everything from purchasing and waste management, to food service, to student leadership and behavior management. We work towards a school culture that reflects the values of the community and the big ideas of sustainability and justice.

Community Partnerships
We support schools in the development and maintenance of on-going community partnerships because we know these relationships are vital to connecting the curriculum to relevant, real-world issues. Our research shows that the development of community partnerships has staying power and carries on long past our initial intervention with a school.

View examples of many of our tools at: www.sustainableschoolsproject.org/tools-resources
Healthy Neighborhoods/Healthy Kids Project

The Healthy Neighborhoods/Healthy Kids Project was designed to engage youth in community planning and revitalization activities by encouraging them to draw connections between the design and condition of their communities and impacts on their health. The project, a collaboration between Shelburne Farms’ Sustainable Schools Project (SSP) and Smart Growth Vermont, began in 2004. With the support of the US Environmental Protection Agency, the project began at Champlain Elementary School in Burlington, Vermont and has since been supported by numerous funders and organizations.

Download the HN/HK Guide at: www.sustainableschoolsproject.org/tools-resources/hnhk

The Project Flow (above) is a framework for community investigation, revitalization, and community engagement. Through evaluating the health, safety, and sustainability of communities and initiating service-learning projects that address their findings, youth play key roles in developing solutions to community issues.

Given a voice, and the opportunity to make a real difference in their community, youth (and others) make connections across curricula and their lives, become excited about their learning, and become active and engaged community citizens.

The project has been adapted by communities around the globe, including China, California, New York, the Dominican Republic, and Kosovo. In all of its adaptations the project has supported youth voice and engagement in community decision making on a variety of local and national issues.

Healthy Neighborhoods/Healthy Kids Project Flow

1. STUDY NEIGHBORHOOD and PLACE
   Students explore their relationship to, and the uniqueness of where they live. They reflect on what they know and how they feel about their neighborhood.

2. DEFINE QUALITY of LIFE
   Students develop a list of quality of life features to define who and what contributes to a safe and healthy life for all. Students then decide which features they want to be the focus of their learning and community work and research topics related to those features.

3. CREATE NEIGHBORHOOD REPORT CARDS
   Based on their quality of life research, students develop Report Cards that they will use to grade the current condition of specific neighborhood features.

4. CONDUCT A NEIGHBORHOOD WALK
   Together with parents, volunteers, and community leaders, students explore their neighborhood to examine and document the condition of specific neighborhood features, using the report cards as a guide.

5. SHARE RESULTS
   Students compile Neighborhood Walk findings and make recommendations for fixing or improving conditions they deem unsafe and unhealthful. They share these results with appropriate community members, officials, and organizations through presentations, letter writing, or report writing.

6. PLAN A PROJECT
   Students choose and implement a neighborhood improvement project (or projects) that addresses report card findings and recommendations.

7. CELEBRATE and REFLECT
   Students organize and hold a community celebration where they honor and acknowledge their participation in making a difference in their community.

The Healthy Neighborhoods/Healthy Kids Project Guide © Shelburne Farms, 2007
Collaboration
We believe deeply that we’re better together. Not only do we help schools and teachers plan and learn together across discipline and grade levels, but we support them in collaboration with families, businesses, government, and nonprofits to create truly sustainable communities. We support school communities in building collaborative capacity across all members - students and teachers, teachers and teachers, students and students, families and schools, schools and communities, and so forth.

What is the impact?
The impact is a change in school culture. It can be measured at all levels, from individual student behavior and learning to teacher practice, from school culture to local, state and national and international policies and partnerships.

For example, a growing network of teachers is involved and engaged in EFS around the world and a growing number of professional associations now have EFS special interest groups or themes, such as ASCD, the National Science Teachers Association, the National Association of Social Studies Teachers and the National Association of the Education of Young Children.

Partnership
Shelburne Farms’ Sustainable Schools Project partners with The Children’s Environmental Literacy Foundation (CELF) to deliver professional development for K-12 teachers in New York. Program partners include the New York City Department of Education and Manhattanville College. The project aims to increase interest, preparedness, and diverse representation of students, particularly girls, in STEM disciplines, improve environmental literacy, attitude and behaviors and make connections between the new Common Core Learning Standards and the content and principles of Education for Sustainability. This project is part of the Clinton Global Initiative.

SSP has played a prominent role in Burlington School District (VT), including the opening of a new magnet school now known as the Sustainability Academy at Lawrence Barnes. The Sustainability Academy provides an inspiring story of promise of transformation for the district, the state, the country and the world. In addition to published research and case studies, the school has hosted hundreds of educators from around the world since it opened. Both the successes and the challenges have been shared with other educators to provide meaningful learning opportunities.

Through direct professional development with educators, evolving resources, building and expanding partnerships with K-12 schools in Vermont and beyond, forging new networks of EFS schools and practitioners, continuing research and evaluation on practice, and the continued development of transformative EFS professional learning opportunities, Shelburne Farms' Sustainable Schools Project aspires to be at the forefront of the field of Education for Sustainability.
Appendix
## Linking the Big Ideas of Sustainability with Essential Questions

<table>
<thead>
<tr>
<th>Big Idea of Sustainability</th>
<th>Enduring Understandings</th>
<th>Essential Questions</th>
</tr>
</thead>
</table>
| **COMMUNITY**              | • Communities are made up of the people, animals, and plants that live in them.  
• There are human and natural communities and they are interconnected.  
• Individuals can make a difference in their community.  
• There are different kinds of communities  
• Each person is part of a community/multiple communities  
• I shape, and am shaped by my community  
• Community is an outcome of relationships | • What is a community?  
• How can we help our community?  
• What makes a sustainable community?  
• What is your responsibility to the community?  
• Who lives in our human and natural communities? |
| **SYSTEMS**                | • Systems operate in human and natural communities.  
• Individuals can be part of multiple systems.  
• Many smaller systems are connected in larger systems.  
• Change in any part of a system will affect the whole system.  
• Individuals can affect a system.  
• Human systems can learn from natural systems.  
• Human systems consist of people, structures, and processes that work together to make an organization more or less healthy.  
• Natural systems include various elements like air, water, movement, plants, and animals that work together to survive.  
• Humans are part of natural systems.  
• Actions of humans have an impact on natural systems.  
• Understanding systems allows us to see a more complete picture and make better informed choices.  
• Understanding a system allows us to identify leverage points and create change.  
• Parts of systems are generally systems themselves and are composed of other parts, just as systems are generally parts of other systems. | • What role do economics play in shaping our world?  
• What is a system?  
• What systems are you a part of?  
• How does change happen in a system?  
• How do systems and changes in systems affect you?  
• How do you affect and make changes in systems?  
• What patterns can we find in our community?  
• How are human and natural systems connected? |
| **DIVERSITY**              | • Diversity is essential to the health of communities and systems.  
• Biodiversity is a measure of the health of ecosystems;  
• Diversity is a measure of the health of systems.  
• A diverse human community is more creative and can better adapt to change.  
• Multiple perspectives/inputs contribute to the resiliency and strength of a system/place.  
• Organisms, communities, places and systems would cease to function with out diversity.  
• Diversity happens on multiple scales.  
• Diversity is essential in both human and natural systems.  
• Diversity is a fundamental ecological principle. | • In what ways is human diversity related to biodiversity?  
• What makes a place diverse?  
• How does the diversity of a system affect its health?  
• What is our community made of?  
• Why is diversity important? |
<table>
<thead>
<tr>
<th>Big Idea of Sustainability</th>
<th>Enduring Understandings</th>
<th>Essential Questions</th>
</tr>
</thead>
</table>
| **INTERDEPENDENCE**       | • All things are connected.  
                            • Every organism depends on others.  
                            • Every system depends on others.  
                            • Every place depends on others.  
                            • Human communities can learn from natural systems and other human systems.  
                            • Human systems depend on natural systems.  
                            • Our choices have multiple impacts on human and natural communities. | • How do our choices affect us, our community, and the world?  
                            • How are human and natural systems interrelated?  
                            • What can communities learn from natural systems to improve our common future?  
                            • In what ways do you depend on others?  
                            • In what ways do you depend on natural systems?  
                            • How are we all connected?  
                            • Who or what depends on you? | **CONTINUED** |
| **CYCLES**                | • Many cycles are found in the natural world.  
                            • Humans can impact natural cycles.  
                            • Humans are part of natural cycles.  
                            • Every living thing has a life cycle.  
                            • Living things have different needs at different life stages.  
                            • There is no “away” or end to a cycle.  
                            • Cycles will continue unless acted upon or interrupted by an outside force.  
                            • Humans can impact cycles and vice versa.  
                            • There are all sizes and shapes, types and lengths of cycles (i.e. butterfly life cycle, seasons, a product, phases of the moon).  
                            • Cycles are the foundation for systems, understanding of cycles is the foundation for understanding systems. | • What cycles can we find in our community?  
                            • In what ways do we impact cycles?  
                            • What cycles are we a part of?  
                            • What and how are cycles related to one another? | **CONTINUED** |
| **CHANGE OVER TIME**      | • Living things must adapt to changes in their environment in order to survive.  
                            • Systems are constantly changing .  
                            • We can learn from the past.  
                            • Humans shape and are shaped by the land.  
                            • Individuals/communities/organisms can bring about or slow change.  
                            • Change occurs at different rates and on different scales.  
                            • Change impacts ecosystems & communities in different ways. Some ways are healthy and some ways are unhealthy.  
                            • Change may not always be seen as it occurs.  
                            • Change is constant.  
                            • Change in any part of a systems affects all other parts of a system. | • What can we learn from the past?  
                            • Whose story is it?  
                            • How do living things adapt to changes in their environment?  
                            • How do we shape the land? How does the land shape us?  
                            • How has our community changed over time?  
                            • How have you changed over time? | **CONTINUED** |
<table>
<thead>
<tr>
<th>Big Idea of Sustainability</th>
<th>Enduring Understandings</th>
<th>Essential Questions</th>
</tr>
</thead>
</table>
| **LIMITS**                 | • Every system has a limit/carrying capacity, which if exceeded will results in loss of balance in the system.  
• There are limits to environmental, social, and economic systems.  
• Systems have a natural rate of change and set of limitations.  
• A system’s limitations help keep that system in balance.  
• Natural selection limits the total number of individuals in any group.  
• The earth, and other closed systems, has a finite amount of resources. | • Why do living things move from place to place?  
• Who decides what limits something?  
• What determines limits in the natural world? In economic systems? In social systems?  
• What happens when a system reaches its limits? |
| **FAIRNESS/EQUITY**        | • Resources must be shared across time and space to meet the needs of all living things now and in the future.  
• Environmental, economic, and social equity perspectives must be considered when determining fairness.  
• Inequitable allocation of resources can lead to conflict.  
• Actions we take now will impact the future.  
• Equity is a uniquely human concept.  
• Equity/fairness requires each individual to be aware of his or her own needs and the needs of others and to change his or her behavior accordingly.  
• Communities need to conserve natural resources.  
• Not everyone gets everything they want, but we try to ensure everyone has what they need.  
• Equal and equitable are not the same.  
• Different people/organisms have different needs and meet them in different ways. | • Who decides what is fair or equitable? Who should decide?  
• What is the difference between fairness and equity?  
• How should we balance the rights of individuals with the common good?  
• What determines value?  
• Is there a difference between wants and needs?  
• What happens in a system when resources are limited?  
• What happens when resources are inequitably allocated?  
• Why is it important to think about the future? |
| **PLACE**                  | • Human culture shapes, and is shaped, by the land.  
• Landscape impacts how we live.  
• Human and natural communities interact in place.  
• We are connected to the people that lived in this place before us.  
• Each person, living and non living thing is native to and influenced by a place.  
• Living and non-living things influence and contribute to their place.  
• Humans have the unique ability to chose their place and to choose to switch places.  
• The needs, concerns, systems and cycles in each place are different and indicative of the ecological, geological, cultural and historic cycles that have happened and are happening there. | • How are we shaped by the land? How do we shape the land?  
• How do humans and the natural world interact?  
• How does where we live impact how we live?  
• How are people connected to the past?  
• What stories are here?  
• What makes up your place? Who makes up your place? |
<table>
<thead>
<tr>
<th>Big Idea of Sustainability</th>
<th>Enduring Understandings</th>
<th>Essential Questions</th>
</tr>
</thead>
</table>
| **ABILITY TO MAKE A DIFFERENCE** | • Our choices impact ourselves, our communities, and our world.  
• I can make a difference.  
• We can make a difference.  
• Everyone has the ability to make a difference to themselves, their community, and their place.  
• No one can do everything, but everyone can do something.  
• Everyone can, and does, affect systems positively or negatively. | • How do our choices affect ourselves, our communities, and the world?  
• What is your responsibility to yourself, your community, and the world?  
• How can one individual make a difference?  
• How can a group of individuals make a difference?  
• What does it mean to be a citizen in our neighborhood?  
• What can you do to make change in a system? | |
| Everyone has the ability to change or impact a system, community, and themselves | How do our choices affect ourselves, our communities, and the world?  
• Our choices impact ourselves, our communities, and our world.  
• I can make a difference.  
• We can make a difference.  
• Everyone has the ability to make a difference to themselves, their community, and their place.  
• No one can do everything, but everyone can do something.  
• Everyone can, and does, affect systems positively or negatively. | |
| **LONG-TERM EFFECTS** | • How we live today impacts how people will live in the future.  
• Our elders made choices that impact how we live today.  
• We can make choices that ensure a healthy future.  
• I can make choices that contribute to a healthy future.  
• My actions impact the future of others.  
• What you do now has both immediate and long-term effects on you, your community, the environment, and the economy.  
• Change in any one system can have long-term effects on human and natural systems that limit the systems’ ability to regenerate.  
• Human behavior can have long-term effects on natural systems that can be irreversible.  
• The impact of human behavior, choices, and decisions isn’t always immediate.  
• Short-term or temporary effects are much easier to measure than long-term effects.  
• When we operate outside the natural limits of our ecosystem, the long-term effects have the potential to be irreversible.  
• We don’t always know the long-term effects of our actions. | • How do living things adapt to changes in their environment?  
• In what ways does how we live today impact how people live in the future?  
• What choices did our elders make that affect the way we live today?  
• How can we make choices to ensure a healthy future?  
• How do your actions impact the future of others? | |
| Actions will have effects beyond immediate reactions | | |
| **EQUILIBRIUM** | • Equilibrium is achieved when all parts of a system are in balance.  
• A system regulates itself and tends to maintain a stable, constant condition.  
• When equilibrium is lost a system can cease to function.  
• The diversity of a system impacts its equilibrium.  
• Systems require equilibrium to stay healthy and/or alive.  
• Cycles, diversity, and change over time are natural forces to maintain equilibrium  
• Human intervention can destroy or repair equilibrium.  
• Changes in system can destroy or repair equilibrium.  
• To maintain equilibrium we must operate within a system’s limits. | • Why do animals or humans move from place to place?  
• What makes a system balanced? What throws off its balance?  
• How do systems achieve equilibrium?  
• What happens in a system when it is out of balance?  
• What is the relationship between diversity and equilibrium?  
• What happens when you or your community is out of balance? | |
| A state of balance | | |
# What Does Education for Sustainability Look Like in Grade...

<table>
<thead>
<tr>
<th>Grade</th>
<th>Big Idea</th>
<th>Curricular Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-K/Kinder-garten</td>
<td>COMMUNITY</td>
<td>Students study community by exploring the roles that people play in the community and how community members depend on each other. Students explore their own role as community helpers through service projects in their school and community.</td>
</tr>
<tr>
<td>1st &amp; 2nd</td>
<td>CYCLES</td>
<td>Students engage in a study of cycles through exploring cycles all around them—investigating everything from insects to state of matter to seasonal cycles in nature—and how these cycles impact their own lives. Students learn about the local agricultural cycles of maple sugaring and apple growing, and engage with local farmers and businesses in the community involved in these product cycles.</td>
</tr>
<tr>
<td>3rd &amp; 4th</td>
<td>SYSTEMS, DIVERSITY</td>
<td>Students investigate local food systems by tracing locally available selections back to their source and evaluate and assess the impact of different food choices. Students also explore best practices in farming through working with local farmers to better understand the importance of ecological diversity. Students develop skills for reading and writing informational text by creating informational posters about the local food system for display at a local co-op.</td>
</tr>
<tr>
<td>5th &amp; 6th</td>
<td>CHANGE</td>
<td>Students learn about change over time as they explore biological and social adaptation. They research local immigration patterns through time, and how shifting demographics and diversity has shaped the local community. Students also explore the impacts of human migration on the natural world. As a culminating project, students create a museum display with maps illustrating how their community has changed over time.</td>
</tr>
<tr>
<td>7th &amp; 8th</td>
<td>INTER-DEPENDENCE</td>
<td>Students explore economics by launching a small business with their classmates. With the help of local business people, they conduct market research, create a business plan, and track data on costs and revenues. Finally, students write annual reports to shareholders, describing the economic, environmental, and social outcomes of their business.</td>
</tr>
<tr>
<td>9th &amp; 10th</td>
<td>LIMITS, EQUITY</td>
<td>Students are immersed in a study of water: watersheds, management, rights, natural limits, and equity issues. They compare local water use and regulation to locales with similar demographics and geography, both nationally and internationally. Students then make recommendations to local regulating agencies on resource management.</td>
</tr>
<tr>
<td>11th &amp; 12th</td>
<td>LONG-TERM EFFECTS</td>
<td>Students analyze energy sources and usage in the community and evaluate locally available options. Students then research best practices, and compare local finding with the ideal. Students present their findings and recommendations to the city, making recommendations to improve the energy infrastructure and efficiency.</td>
</tr>
</tbody>
</table>
### What Does Education for Sustainability Look Like in Content Area...

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Lens of Sustainability</th>
<th>Curricular Example</th>
</tr>
</thead>
</table>
| **Reading**  | Students develop literacy skills using texts themed with sustainability content, both fiction and non-fiction, enriching and deepening other content-area studies. | PRIMARY: Picture books collections on gardening, compost, and animal life cycles are used to enhance social studies and science units.  
SECONDARY: Students launch a study of local food systems by reading *The Omnivore’s Dilemma* Young Reader’s Edition. |
| **Writing**  | Students write to communicate with a real community audience: to inform, to persuade, and to share personal views. | PRIMARY: Students create posters to inform the community about local maple sugaring process from sugar bush to table.  
SECONDARY: Students write speeches to persuade school board members to adopt a “green school” purchasing policy or an “affirmative hiring” policy. |
| **Math**     | Students collect and work with real data in the context of real projects. | PRIMARY: Students create quality of life report cards and collect data on these indicators in their neighborhood.  
SECONDARY: Students collect and compile data on energy use or on student dropout rates on the school’s campus, and analyze it to find area for improvement. |
| **Social Studies** | Students explore how social and economic systems work to inform community planning. They also investigate historical patterns and change over time in these systems. | PRIMARY: Students explore how local businesses operate and how services offered in the community change to meet consumers’ needs.  
SECONDARY: Students host a politicians’ forum prior to election day and prepare questions for the candidates. |
| **Science**  | To inform decision-making, students learn how natural systems work. They learn inquiry skills that enable them to pose questions, conduct research, and interpret patterns. | PRIMARY: Student conduct water quality analysis of rivers in the watershed and present their findings and recommendations to the local natural resource agency.  
SECONDARY: Students conduct a biotic survey in a local park and based on their findings, design a park management plan that they submit to the city manager. |
| **Family & Consumer Sciences** | Students study how to best manage personal and family responsibilities and resources, and promote wellness while considering the impacts of their choices—community/personal, ecological and economic. | SECONDARY: Students identify consumer habits and home management practices that embody sustainable resource use. |
CONTINUED: What Does Education for Sustainability Look Like in Content Area...

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Lens of Sustainability</th>
<th>Curricular Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Education</td>
<td>Students understand the importance of vitality and health, and the mind-body connection. They have the opportunity to develop gross motor skills in diverse settings.</td>
<td>PRIMARY: Children engage in free play on outdoor play structures that feature natural spaces and uneven terrain to develop dexterity and balance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECONDARY: Classes are outdoor-based and include mindfulness exercises and yoga as well as physical fitness.</td>
</tr>
<tr>
<td>Visual/Performing</td>
<td>Students develop their expressive skills in order to communicate their understanding of the world and their vision for it.</td>
<td>PRIMARY: Students create murals of their ideal communities, learning about perspective and dimension.</td>
</tr>
<tr>
<td>Arts/Music</td>
<td></td>
<td>SECONDARY: Students film and edit a documentary informing recent immigrants on what resources are available to them to help get them established in the community.</td>
</tr>
</tbody>
</table>
# K-4 EFS Rubric

<table>
<thead>
<tr>
<th>EFS Capacity</th>
<th>Member (1)</th>
<th>Participant (2)</th>
<th>Citizen (3)</th>
<th>Leader (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Understands communities; Knows systems within human and natural communities</strong></td>
<td>I can name different people’s roles in the school.</td>
<td>I can discuss different roles in the school and community</td>
<td>I can explain how/why people work together in our school community.</td>
<td>I work with others to improve our school community.</td>
</tr>
<tr>
<td><strong>Knows cycles of human and natural communities</strong></td>
<td>I can describe some of the plants and animals in our schoolyard.</td>
<td>I can describe where and how different plants and animals live in our schoolyard</td>
<td>I can discuss different habitats within our schoolyard.</td>
<td>I take care of the built and natural environments in our schoolyard and community</td>
</tr>
<tr>
<td><strong>Understands interdependence of human and natural systems</strong></td>
<td>When I think of our community, I think of plants, animals and people.</td>
<td>I can discuss what people, plants and animals need to live in our community</td>
<td>I can discuss how our plants, animals and people have affected and depend on each other</td>
<td>My choices and actions reflect my understanding of how our plants, animals and people affect and depend on each other.</td>
</tr>
<tr>
<td><strong>Feels ability to make a difference</strong></td>
<td>I am respectful of natural and human beings at school.</td>
<td>I am involved in taking care of our natural and human community.</td>
<td>I can describe what we do in our community that helps natural/human systems</td>
<td>I take action to improve the quality of life in our community that helps natural/human systems.</td>
</tr>
<tr>
<td><strong>Feels connected to place and community</strong></td>
<td>• I can use my senses to learn.</td>
<td>• I try out different ways to observe.</td>
<td>• I keep track of what I observe on my own.</td>
<td>• I analyze what I observe on my own to guide my behavior.</td>
</tr>
<tr>
<td></td>
<td>• I find human and natural communities in stories.</td>
<td>• I can describe human and natural communities in stories.</td>
<td>• I make connections between my communities and those in stories.</td>
<td>• I learn from connections between my communities and those in stories.</td>
</tr>
<tr>
<td></td>
<td>• I can talk and write about what I like in my school.</td>
<td>• I can describe other members of my school community.</td>
<td>• I can explain how we are/have become a community &amp; ecosystem.</td>
<td>• My actions demonstrate understanding of how we are/have become a community and ecosystem.</td>
</tr>
</tbody>
</table>
EFS Curriculum Tools

In this section of the appendix (p. 50–57), you will find two templates for use in curriculum design. A completed example is provided for each template to demonstrate how to use them. Please note that while you may find inspiration in the examples, they do not provide the complete unit. More information on the units is available at links in box.

Unit Snapshot

This template provides a brief summary of the unit, outlining the goals, assessments and a brief overview of some key lessons or learning events.

EFS Understanding by Design© Unit Template v2.1

We have adapted Wiggins & McTighe’s Understanding by Design© template, with their permission, to incorporate the lens of sustainability in unit planning.

For more information on the example units:
email: sssp@shelburnefarms.org or www.sustainableschoolsproject.org
## STAGE 1: Desired Results

What concepts should students learn as a result of this unit?

<table>
<thead>
<tr>
<th>Big Ideas</th>
<th>Enduring Understandings</th>
<th>Essential Questions</th>
</tr>
</thead>
</table>

Established Goals (Standards)

Unit Topic

## STAGE 2: Evidence

What evidence (assessments) will show that students have met the Stage 1 goals?

## STAGE 3: Learning Plan

What key learning events (lessons) will help students learn and be successful on the assessments?
### STAGE 1: Desired Results

What concepts should students learn as a result of this unit?

<table>
<thead>
<tr>
<th>Big Ideas</th>
<th>Enduring Understandings</th>
<th>Essential Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interdependence</td>
<td>Human health and environmental health are linked, and reflected in the health of the food system.</td>
<td>How do individuals’ choices affect themselves, their communities, and the world? How are food systems related to human and environmental health?</td>
</tr>
</tbody>
</table>

Established Goals (Standards)

|----------------|-------------|--------------------------|--------------------------|

**Unit Topic**  
You are what you eat

### STAGE 2: Evidence

What evidence (assessments) will show that students have met the Stage 1 goals?

**Students will research and analyze the school food system, and present their findings for improvement to the Food Service Director and School Board.**

**Students will provide a rationale for their suggestions that demonstrates their understanding of how human health and environmental health are linked, and reflected in the health of the food system.**

### STAGE 3: Learning Plan

What key learning events (lessons) will help students learn and be successful on the assessments?

**Key lessons will include:**

**SCIENCE: SUSTAINABLE AGRICULTURE**

- Ecosystem interactions (LS2.A)
- Dynamics & Resilience (LS4.C)
- Biodiversity (LS4.D)
- Developing Solutions (ETS1.B)

**SOCIAL STUDIES/ELA**

- Cite textual evidence
- Speaking & listening (CCSS.ELA-LITERACY.SL.7.1)
- Consult multiple sources, ID bias
## STAGE 1: Desired Results

### Established Goal(s)

*Students will have the opportunity to:*

- learn outside of their classroom
- participate in service-learning
- learn more about their place
- engage in the inquiry process
- work with a community partner
- participate in a community event to share their learning

### MEANING

#### Big Ideas of Sustainability

Students will understand that...

#### Enduring Understandings

Students will understand that...

#### Essential Questions

Students will keep considering...

### ACQUISITION

#### Students will know...

#### Students will be skilled at...

### TRANSFER

#### Students will be able to independently use their learning to...

### Lens of Sustainability

*Choose the most relevant.*

1. *Collaboration will happen through...*

2. *Students will make a difference by...*

3. *Students will address real-world issues through...*
### STAGE 2: Evidence

<table>
<thead>
<tr>
<th>CODE</th>
<th>EVALUATIVE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Performance Task(s)</strong>&lt;br&gt;Students will show that they really understand by evidence of...</td>
</tr>
<tr>
<td></td>
<td><strong>Other Evidence</strong>&lt;br&gt;Students will show they have achieved Stage 1 goals by...</td>
</tr>
<tr>
<td>CODE</td>
<td>Pre-Assessment</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
</tr>
<tr>
<td>(link to Goals, Big Ideas &amp; Lens)</td>
<td>of driving knowledge, skill, understandings and attitudes using surveys and simulations</td>
</tr>
</tbody>
</table>

### Learning Events

*Student success at transfer, meaning, and acquisition depends on...*
## UNIT TITLE: The Triple Bottom Line—Sustainable Economics Unit

### STAGE 1: Desired Results

<table>
<thead>
<tr>
<th>Established Goal(s)</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CCSS W.4-5.1: Opinion Writing</td>
<td>Students will understand that...</td>
</tr>
<tr>
<td>2. CCSS W4-5.2: Information Writing</td>
<td>- The economy, environment, and humans are composed of interconnected systems</td>
</tr>
<tr>
<td>3. CCSSW4-5.6 Using Technology to Collaboratively Write</td>
<td>- Our decisions affect humans, the environment, and the economy</td>
</tr>
<tr>
<td>4. CCSS SL.4-5.1 Collaboration</td>
<td>- You vote with your wallet</td>
</tr>
<tr>
<td>5. CCSS SL.4-5.4 Presentation</td>
<td></td>
</tr>
<tr>
<td>6. CCSS SL.4-5.5 Use of media in presentation</td>
<td></td>
</tr>
<tr>
<td>7. VT State Standard 3.9 Sustainability</td>
<td></td>
</tr>
<tr>
<td>8. VT State Standard 6.15 &amp; 6.16 Economics, GES H+SS 3-6:18, 20</td>
<td></td>
</tr>
</tbody>
</table>

**MEANING**

- **Big Ideas of Sustainability**
  - Interdependence/Systems
  - Equity
  - Ability to make a difference

- **Enduring Understandings**
  - Students will understand that...
  - The economy, environment, and humans are composed of interconnected systems
  - Our decisions affect humans, the environment, and the economy
  - You vote with your wallet

- **Essential Questions**
  - Students will keep considering...
  - How do our decisions affect humans, the environment, and the economy?

<table>
<thead>
<tr>
<th>ACQUISITION</th>
<th>TRANSFER</th>
<th>Lens of Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will know...</td>
<td>Students will be able to independently use their learning to...</td>
<td>Choose the most relevant.</td>
</tr>
<tr>
<td>• Factors (source, process, quality, price) to consider when purchasing a product</td>
<td>• BE THOUGHTFUL CONSUMERS &amp; PRODUCERS</td>
<td>i. Collaboration will happen through...students working in groups to connect to local businesses</td>
</tr>
<tr>
<td>• The process of creating and running a business (market research proposal, business writing, production, marketing)</td>
<td>• As consumers, evaluate their choices to make informed decisions</td>
<td>ii. Students will make a difference by...Running a business and donating profits to a student-chosen local nonprofit</td>
</tr>
<tr>
<td>• They can make a difference by making thoughtful choices</td>
<td>• Describe the layered and interconnected systems that reach from the economy to the environment and to the human community</td>
<td>iii. Students will address real-world issues through...Participating in the economic system</td>
</tr>
</tbody>
</table>

**ACQUISITION**

- Students will know...
  - Factors (source, process, quality, price) to consider when purchasing a product
  - The process of creating and running a business (market research proposal, business writing, production, marketing)
  - They can make a difference by making thoughtful choices

**TRANSFER**

- Students will be able to independently use their learning to...
  - BE THOUGHTFUL CONSUMERS & PRODUCERS
  - As consumers, evaluate their choices to make informed decisions
  - Describe the layered and interconnected systems that reach from the economy to the environment and to the human community
  - Identify & explain cause & effect, and value & worth beyond the economic bottom line (the triple bottom line)

**Lens of Sustainability**

Choose the most relevant.

i. Collaboration will happen through...students working in groups to connect to local businesses

ii. Students will make a difference by...Running a business and donating profits to a student-chosen local nonprofit

iii. Students will address real-world issues through...Participating in the economic system

iv. Students will use campus and community-based learning sites when they...Visit local businesses: Seventh Generation, Ben & Jerry’s, Lake Champlain Chocolates, Burlington? Markey survey for their own business
### STAGE 2: Evidence

<table>
<thead>
<tr>
<th>CODE (link to Goals, Big Ideas &amp; Lens)</th>
<th>EVALUATIVE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCSS W.4-5.1:</td>
<td>• Opinion Writing</td>
</tr>
<tr>
<td>W4-5.2:</td>
<td>• Information Writing</td>
</tr>
<tr>
<td>W4-5.6</td>
<td>• Using Technology to Collaboratively Write</td>
</tr>
<tr>
<td>SL.4-5.1</td>
<td>• Collaboration</td>
</tr>
<tr>
<td>SL.4-5.4</td>
<td>• Presentation</td>
</tr>
<tr>
<td>SL.4-5.5</td>
<td>• Use of media in presentation</td>
</tr>
<tr>
<td>VT State Standard 3.9, 6.15, 6.16</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance Task(s)</th>
<th>Students will show that they really understand by evidence of...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: School Supply Purchasing Web 2.0 Project</td>
<td>Assess school supply school currently uses (paper, paperclips, pencils, etc), find out budget, current source, amount used. Then, students evaluate current choice, research alternatives, use tri-venn as analytical tool, submit findings and recommendations and advocate for choice with regard. Share findings and recommendations via Web 2.0 Project/Presentation with School Purchaser</td>
</tr>
</tbody>
</table>

| Phase 2: Running a Business Service-Learning Project | Groups of 4-5 students will collaboratively conceive of a product, conduct a market survey, write a mission statement, business plan, and make a pitch/presentation to the class and investor; then the class as a whole will select one of the businesses and run it, write an annual report, and share the profits with a local non-profit of their choice |

<table>
<thead>
<tr>
<th>Other Evidence</th>
<th>Students will show they have achieved Stage 1 goals by...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written portions of the projects above, Participation in class discussions &amp; activities Exit tickets</td>
<td>Open response prompts</td>
</tr>
<tr>
<td>• Product process posters</td>
<td>• Paper Towel Inquiry worksheets and short constructed paragraph</td>
</tr>
<tr>
<td>• Comparison of two products: short constructed paragraph</td>
<td>• Field Trip Worksheet</td>
</tr>
<tr>
<td>• Business ideas: descriptive paragraph</td>
<td>• Market Survey</td>
</tr>
<tr>
<td>• Business Plan</td>
<td>• Annual Report</td>
</tr>
<tr>
<td>• Marketing materials</td>
<td></td>
</tr>
</tbody>
</table>

Unit developed by Emily Hoyler, Shelburne Farms’ Sustainable Schools Project, based on a unit written by Aziza Malik & Kellie Smith of Sustainability Academy Adapted from the Understanding by Design Guide to Creating High-Quality Units by Grant Wiggins and Jay McTighe, ©2011
STAGE 3: Learning Plan

**Pre-Assessment**

of driving knowledge, skill, understandings and attitudes using surveys and simulations

Tri-Venn: students will be asked to consider the last purchase they made, and try to see how it’s connected to each of the 3 spheres

**Learning Events**

*Student success at transfer, meaning, and acquisition depends on...*

**PHASE ONE: BUILDING THE FOUNDATION**

1. Decision-making Activity
2. Where did my product come from (source, systems)?
3. Local store vs. non-local store (source, economy)
4. Food miles (source, environment)
5. Label Decoding (process)
6. What is Fair Trade (process/source, equity)
7. Cocoa Farmers Simulation (process/source, equity)
8. Paper Towel Inquiry (quality, decision making)
9. Ice Cream Product Comparison (quality/price, decision making)
10. Choices—Roll the Dice (synthesis—transfer, decision making)
11. The Lorax—Literacy/Assessment
12. School Supplies—Web 2.0 Project

**PHASE TWO: CLASS BUSINESS**

1. From Consumer to producer
2. Our Class Business
3. Market Survey & Results
4. Field Trips/Interviews
5. Mission Statements
6. Business Plan
7. Pitch to Investor
8. Starting the Business
9. Annual Report
10. Profits
11. Running the Business
12. Reflection & Closing
13. Celebrate & Share

Students will reflect after each lesson, a complete exit tickets, and make contributions to learning wall.

Students will regularly consider the following prompt in their reflections:

- What?
- So what?
- Now what?