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Standards-Based Curriculum Framework**

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Sustainability in Vermont's K-12 Standards-Based Curriculum Framework

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Abstract: Vermont's Curriculum Framework (1996) did not include the concepts of sustainability and sense of place. This paper chronicles how collaboration among environmental organizations transformed the original Framework in ways that recognized their groups historic support of environmental learning in K-12 schools. Themes include: (1) A tour of the original framework and its lack of explicit objectives valued by Vermont's environmental education community, (2) Description of the political process that brought together grassroots environmental organizations to change state educational policy, (3) Elaboration of Standard 3.9 Sustainability, and 4.6 Understanding Place, and how they provide learning outcomes central to the mission of the sponsoring groups, (4) Examples of exemplary sustainability projects covering all grade levels, (5) Assessment strategies to insure that sustainability is taught and results in standards-based learning outcomes, (6) How to insure the ongoing use and enhancement of the new standards, (7) Replays: How might the curriculum enhancement process have been conducted more effectively?

Keywords: Curriculum Frameworks (K-12), Sustainability in K-12 Curriculum, Sense of Place in K-12 Curriculum

What is the Purpose of this Article?

THIS PAPER CHRONICLES the collaboration by Vermont's grassroots environmental organizations and state agencies to revise an existing state K-12 curriculum framework that stipulated what teachers were expected to teach. Its original version (1996) did not include emphasis on the critical environmental concepts of *sustainability* and *sense of place*. An extended advocacy process led to the adoption of two new standards for inclusion in the *Vermont's Framework of Standards and Learning Opportunities (2000)*. These sustainability inspired enhancements were identified as Vital Results Standard 3.6, "Sustainability," and Vital Results Standard 4.6, "Sense of Place." Several

popular Vermont programs that respond effectively to this curricular mandate are highlighted.¹

The Process of Curriculum Change in Vermont's K-12 Schools

Changing a state prescribed curriculum is not trivial and follows a process that seeks broad participation by interested parties. Indeed, the difficulty of curriculum change has been likened to the challenge of moving a country cemetery. Vermont's education authorities have established a six-month long time frame for action to consider another environmentally associated component of Vermont's Framework.² The existing Standard 6.17, Natural Resources, is under consideration for modification and must follow the steps below:

Action Required	Time Frame
1. Letter to Commissioner of Education	early January
2. Framework Review Group will be notified	mid January
3. Timeline of Process to Requesting Party	end of January

¹ Vermont's Curriculum Framework can be viewed at <http://www.state.vt.us/educ/new/html/pubs/framework.html>

² Gail Hall, Vermont Department of Education, January 2005, URL <http://www.state.vt.us/educ/new/html/pubs/framework.html>



AND Completion of Proposal and letters of recommendation	end of January
4. Review Group reviews proposal and makes recommendations to Department of Education and Requesting Party	February
5. Proposal to State Board and Commissioner of Education	late February
6. Hearing Process	March
7. Requesting party incorporates suggestions	April
8. Review Group meets with Requesting Party	April
9. Review Group forwards proposed standards to Commissioner of Education	April
10. Commissioner of Education schedules consideration of proposed standards at a State Board of Education meeting	TBA
11. Requesting Party and representatives of Review Group attend State Board discussion	May or June
12. State Board votes	June

The process now underway to recast *Vermont's Framework (2000)* Standard 7.16, Natural Resources, is analogous to the route taken by Vermont environmental organizations in 1998 to include *sustainability* and *sense of place* standards in the *Vermont's Framework (1996)*.

The Education for Sustainability (EFS) Project was formed following the release of *Vermont's Framework (1996)* when some non-school based organizations were concerned that it omitted topics and skills their programs addressed. Initiated by the State-Wide Environmental Education Programs [SWEEP served as the *Requesting Party* in the change protocol] organization with funding by the Josephine Bay Paul and C. Michael Paul Foundation, it held a series of public forums in the fall of 1998 which gathered community perspectives from more than 300 participants around the meaning of *sustainability* and what K-12 students need to know and be able to do to achieve sustainability.³ This process identified a list of 35 recurring themes that were compared with the contents of the 1996 standards. While it found most of the identified themes to have been well covered they found inadequate representation of the topics of 1) making decisions about sustainability, and 2) the importance of place based education. Thus, proposed new standards were written and taken to the State Board of Education in March 1999, approved, and subsequently included

in the revised *Vermont's Framework (2000)* as Vital Results Standards 3.9 (*sustainability*) and 4.6 (*sense of place*).⁴ Environmental groups thus hoped to increase access to schools by showing how their programs were supported in the new state curriculum guidelines.

What Environmental Standards were added to Vermont's Framework (2000)?

Vermont's Framework of Standards and Learning Opportunities (2000) is a comprehensive guide to what Grades K-12 students should learn. Thousands of Vermont teachers, parents and students participated in group meetings and reviews aimed at improving the original 1996 standards. Not surprisingly this effort benefited from reviewing nationally recognized standards and standards from other states.⁵ It recognizes *Vital Results* that cut across all fields of knowledge and *Fields of Knowledge Standards* that identify the content or concepts of traditional disciplines such as "The Living World," "History," "Artistic Process," "Mathematics Understanding and Reasoning." The *sustainability* and *sense of place* standards are found within the *Vital Results* category, which includes the following headings:

- Communication
- Reasoning and Problem Solving

³ Community Works: On-Line Resource Center, found at <http://vermontcommunityworks.org/cwresources/programs/edsustain/edsustain.html>

⁴ *Vermont Education for Sustainability Project Newsletter*, Spring 2002, available by contacting the EFS Project based at Shelburne Farms with e-mail to Erica Zimmerman, Coordinator, ezimmerman@shelburnefarms.org. EFS Partners include The Vermont Department of Agriculture, Vermont Department of Education, Vermont Department of Public Service, Vermont Agency of Natural Resources, Agriculture in the Classroom Partners, SWEEP (State-Wide Environmental Education Programs), University of Vermont, VISMT (Vermont Institute of Science, Math, & Technology (now called Vermont Institutes), and Shelburne Farms)

⁵ Richard H. Cate, Commissioner of Education, Forward to *Grade Expectations for Vermont's Framework of Standards and Learning Opportunities, Summer 2004 (Science)*

- Personal Development
- Worth and Competence
- Healthy Choices
- Communication
- *Making Decisions (3.7-3.9)*
- Relationships
- Workplace
- Civic and Social Responsibility
- Service
- Human Diversity
- *Change (4.5-4.6)*

Representative *Vital Results Standards (3.9) Sustainability* and **(4.6) Understanding Place** curriculum expectations are as follows:

Sustainability Standard 3.9 PreK-4

3.9 a. Identify items that they consume on a daily basis and analyze the resources used in producing, transporting, using, and disposing of these items, including the origins of the resources;

3.9 b. Distinguish between personal wants and needs and identify how marketing and advertising inform their consumption patterns;

3.9 c. Identify and practice ways to repair, re-use, recycle, and design and implement a plan to monitor personal resource consumption;

3.9 d. Explore local natural and human communities, identify the systems within them, and what is required for these communities to be sustained.

Understanding Place Standard 4.6 Grades 5-8

1. aa. Apply knowledge of local environment through active participation in local environmental projects;

4.6 bb. Explore the interrelationship between the local environment and the local community culture (e.g., settlement patterns, tourism, hunting, agriculture);

4.6 cc. Explore and participate in sustaining or building on unique and valued elements of past and present community heritage.

Sustainability and Sense of Place Standards Grades 9-12

3.9 aaa. Prepare an impact assessment that analyses the effect of a particular product's or project's life-cycle on the sustainability of a natural and human community. [sustainability]

4.6 bbb. Evaluate and predict how current trends (e.g., environmental, economic, social, political, technological) will affect the future of their local community and environment [understanding place]

Sustainability and Sense of Place Exemplars

There are numerous examples of programs offered by Vermont's non-profit sector in support of *Vital Results Standards 3.9 (sustainability)* and *4.6 (sense of place)*. Ten representative programs will be profiled based on the following criteria:

1. A program must be explicitly attentive to *Vermont's Framework (2000) Vital Results Standards 3.9* and/or *4.6, sustainability and sense of place*
2. Instructional connections must exist beyond the specific lesson or unit offered to the school
3. Collaboration with others must be possible in keeping with current interest in *service learning*, i.e., students should reach out to the community
4. Experiential or active/hands-on learning complements more traditional teaching methods
5. Conceptually rich material must challenge learners
6. Authentic (non-contrived) work is associated with activities conducted
7. Programs must have a rich history and a promising future in teaching the concepts of *sustainability and sense of place*
8. Serve diverse learners

Profiles of "Sustainability" and "Sense of Place" Exemplars

The E.L.F. program of the Vermont Institute of Natural Sciences

The Vermont Institute of Natural Sciences (VINS) based in Woodstock and Quechee has enjoyed a longstanding presence in environmental education with notable emphasis on bird (raptor) rehabilitation. Their *Environmental Learning for the Future (E.L.F.) Program* began in 1972 and has served more than 14,000 children in 85 towns throughout Vermont and New Hampshire. Presentations are made in grades K-6 classrooms, always with a popular puppet show, and have a theme that changes annually around the concepts of *habitats, adaptations, cycles, earth and sky, and designs of nature*. Trained parents and community volunteers conduct the typically one-hour long presentations.

E.L.F. is promoted as a hands-on nature program in direct support of *Vital Results Standards 3.9 Sustainability and 4.6 Sense of Place*. However, like many other programs, VINS makes it clear that E.L.F. addresses a variety of the Vermont learning standards, not just environmental ones. These may include *listening, expression, mathematical understanding, artistic expression, notation and representation, reasoning and problem solving, respect,*

making decisions, teamwork, and scientific method

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FEED Project

Vermont FEED is a collaborative project of the Northeast Organic Farming Association, Food Works, and Shelburne Farms. Teams of K-8 teachers, farmers, food service staff and local leaders are brought together to create a “*curriculum of place*” that introduces students to farm life, agricultural cycles, nutrition education, and local history. Summer professional development institutes help teachers write hands-on, standards-based units with local farms that include gardening, harvesting, cooking and baking, all leading to a community-wide celebration where student work is showcased. Personalized to each community it works with VT FEED argues that it is not an add-on, but can be woven into current school curriculum. It identifies three components to its 3 C’s approach: Curriculum, Cafeteria and Community, with an important goal being the integration of local foods into the school’s lunch program.⁷

A Forest for Every Classroom

A Forest for Every Classroom (FFEC) is collaboration between Shelburne Farms, The Conservation Study Institute, Marsh-Billings-Rockefeller National Historical Park, Green Mountain National Forest, the Northeast Office of the National Wildlife Federation and the Northern Forest Center. It is a professional development program where Grade 1-8 teachers are supported through workshops and summer institutes to develop *place-based learning opportunities* for students.

Wanda Seeley Stetson, a grade 7 teacher, developed “Caring for our Forests: A Legacy of Stewardship,” as a global studies and English interdisciplinary unit for middle school grades. Essential questions addressed are: How can we use our forests sustainably? What do forests mean to us? How have forests changed over time? How can we use our forest and ensure their long-term health? What is forest stewardship? Other units have been similarly developed around soils (grade 1), the mathematics of forestry (grade 7), soils, insects, and forests (grade 3). A central tenet of the project is identified as follows: *At the heart of the FFEC program is the belief that students immersed in the interdisciplinary study of “place” are more eager to learn and be involved in stewardship of their community’s public lands.*⁸

The Living Machine—Sustainable Schools Project

The *Sustainable School Project (SSP)* helps schools use sustainability as an integrating context for curriculum and community partnerships. Pilot elementary schools in Burlington help students to: 1) understand the interconnectedness of the world, 2) develop knowledge of Place--human and natural communities, 3) become aware of one’s own abilities to make a difference.

Anna, a Grade 5 student in Burlington, talked about her study of civic engagement, a keystone of SSP curriculum:

The stream, even though it’s not near my house is important because 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 this year, because there’s living things in it. It’s all part of the life cycle, and things need to eat it.

A popular instructional device used in classrooms is the “Living Machine,” a technology invented by John Todd that uses sunlight and a managed environment and a diversity of organisms including bacteria, plants, snails and fish to break down and digest organic pollutants. The “Living Machine” is also used in middle schools, secondary schools and in college/university settings.⁹

Shelburne Farms Field Trips

Perhaps the most heralded environmental education venue in Vermont is Shelburne Farms located on Lake Champlain in Shelburne. Created in 1886 on 1400 acres by William Seward and Lila Vanderbilt Webb as a model agricultural estate, it exemplifies sustainability. Since becoming an educational nonprofit in 1972 it has operated partnership programs with many environmental organizations and conducts active yearlong programming for schools and the public. Field trips are but one curriculum venture but are a very popular activity with schools. Teachers apply months in advance to participate and are chosen by lottery. Some titles of Kindergarten-Grade 3 field trips include: From the Farm to You, Super Soil, Active in Winter, Sugaring Time, Spring in the

⁶ Detailed information on E.L.F. is found at <http://www.vinsweb.org>

⁷ URL is <http://www.nofavt.org/programs/vtfeed.php>

⁸ <http://www.nps.gov/csi/trends/forestclassroom/stetson.htm>

⁹ URL is <http://www.sustainableschoolsproject.org/about/index.html>

Forest, Milk and More, and Buds, Blooms, & Bullfrogs. Choices for Grades 4-8 include: Wetland Ecosystem Investigation, Stories in Stone, Winter Trekking, and Farmer for a Day. "Join the Flock," is offered for grades 4-8 in March of each year:

Spend a day on the farm during lambing season. Students will explore the life of sheep from their care to the wonders of wool fibers. Students will card, spin, and felt wool. Hands-on experiments will help students investigate the amazing properties of wool.

Educational Standards Taught

*Visual Arts, 5.29-5.30; Natural Resources 7.16 (a-c and aa-cc); Understanding Place 4.6 (a-c); Sustainability, 3.9 (d)*¹⁰

The Intervale

The Intervale is a 700-Acre working landscape tucked between Lake Champlain and the foothills of the Green Mountains and lying along the Winooski River. The Rena Calkins Farmstead, the last working dairy farm in Burlington, is being renovated to provide a center for experiential learning. It seeks to develop land and farm-based enterprises to generate economic and social opportunity while protecting natural resources. In 2004 12 independent Intervale farms generated 500,000 pounds of food for the region and provided nearly 6% of Burlington's fresh produce. Plans for future work include:

Interactive dialogue and education (will) take place around land, food and land-and-food-based commerce. Interactive learning and project demonstrations, workshops, lectures and tours will educate the general public about diversified and sustainable farming, composting, riparian restoration and value-added ventures—everything from bio-diesel production to growing mushrooms on spent barley or attaching an ice-cream business to a small dairy. A youth garden, educational winter greenhouse and community kitchen are opportunities for hands-on, get dirty learning, eating, and cooking. Increasingly, the Intervale is likely to develop close links with schools and conduct activities supportive of Vermont's Framework Standards of sustainability and sense of place.

¹¹

ECHO at the Leahy Center for Lake Champlain

The ECHO Lake Champlain is a recently dedicated (2002) regional environmental center on the shores of Lake Champlain in Burlington with strong programming for schools as well as the public. ECHO stands for *Ecology, Culture, History, and Opportunity*. Teachers find descriptions of both on-site and school-based program options on the ECHO website and determine how presentations connect to *Vermont's Framework (2000)* they are expected to use in their classrooms. For example,

Hands on the Lake Grades 4-7

*This 45 minute program features changes that have taken place in the Lake Champlain Basin over time. It presents material connected to Standard 4.6 bb. which includes human impacts including hunting, intentional fires, forest cutting, agriculture, development, pollution, resource use.*¹²

The Sharon Academy, the Minister's Lot Project

Andrew H. Lane, teacher at The Sharon Academy, has developed a middle grade social studies curriculum with a yearlong theme of "Who Am I?" A site-based unit, "How Does Place Influence Who We Are?" sought these essential outcomes: 1) Gather and present evidence [town survey] 2) consider perspective [personality and lifestyle] 3) consider supposition [what might Sharon look like in 50 years without zoning laws?] 4) Demonstrate social commitment [service learning] 5) Make connections [language arts interviews, science] 6) Consider relevance [how place influences their lives] 7) Employ creativity [personal special places map].

Instruction on the use of donated GPS mapping and other equipment enabled 36 students to conduct a technology-based survey of The Minister's Lot, an isolated 84 acre parcel of town-owned land that needed careful study to inform wise management. A local resident asked for directions to the property could use the "You can't get there from here" expression. Grade 7 students came up with research-based suggestions for appropriate use of the property that were presented to the Sharon Conservation Commission. A sample of student perspectives on how best to manage the special place that is The Minister's Lot follows:

There are too many trees, too close together, and the land needs to be logged. I think there are too many maples and that there needs to be something done to prevent diseases, and forest fires.

¹⁰ Information about Shelburne Farms and its programs can be found at URL <http://www.shelburnefarms.org>

¹¹ URL is <http://www.intervale.org/>

¹² The URL for information on ECHO is <http://www.echovermont.org>

I think that the Minister's Lot should be left alone. It is a good place for a preserve and not a good place for the public

I think that trails should be made for people to walk on whenever they choose

I think there should be a paintball field in the Minister's Lot because we could charge people a small fee to get in and play and use the income towards whatever the town needs and it could go towards supplies for our schools. There is not much to do in Sharon so this would give families time to spend together.

*Making a campground, walking/cross country skiing trails, and leaving a habitat for the animals would benefit many people in different ways.*¹³

Landscape Change Project

Paul Bierman, a geologist at The University of Vermont, developed the Landscape Change Project believing that *place-based learning* and understanding human-geology linkages over space and time are not only fundamental to earth science education, but are critical to human survival as recent events (Indonesia's tsunami) so disastrously indicate. It is a 10,000+ image, web-based archive of historic and current photo pairs of Vermont geographic and cultural features. Developed with support from The National Science Foundation, he contends that,

*There is no better way to catch people's attention and promote an informed citizenry, than the scientific, environmental, and historical awareness catalysed by the visceral impact of imagery.*¹⁴

While The Landscape Change Project does not claim to meet *Vermont's Framework (2000)* standards, it has enjoyed strong implementation in middle and high school social studies and science classrooms. The point here is that some environmental related projects are so compelling and in demand that developers have not found it necessary to promote the *Vermont's Framework (2000)* connections that are certainly there. Presentations at teacher conferences, museums, a user-friendly website, workshops and short-courses, have prepared teachers with the technical and instructional skills to effectively use this "time travel" tool with their students.¹⁵

The Last Link/the Next Link: Building Sustainable Communities

This project is a professional-quality documentary on Pete Camino, an 83-year old shepherd who is one

of the last Basque farmers in Buffalo, Wyoming. Developed by Tim Kahn, a high school French teacher, it is a tribute to family-based agriculture and the loss we are now facing in the United States and around the world with the disappearance of family farms. By focusing on interviews with a new generation of Basque-American teenagers who are steeped in American pop culture we come to see that the biggest threats to the Basque culture and traditions are economic, technological, and social changes that affect us all.¹⁶

Tim Kahn has poignantly stated why such instruction for high school students is so important:

I've watched an increasing number of teenagers coming to school with no sense of place, no sense of community and no sense of self. And yet, I am heartened by those extraordinary young people in their midst who struggle daily to gain perspective and grounding. It is our responsibility as educators to offer our students the opportunity to examine and sustain the best of their culture while they better the world for themselves and for generations to come.

The website he has created presents teacher lesson plans and samples of student work to show how this project exemplifies the meaning of **Vital Results Standard 4.6, Sense of Place.**¹⁷

Assessment of Learning Outcomes for Vermont's Framework (2000) Standards 3.9 and 4.6

Most impressive about the work of teachers and their students who engage in study associated with **Vermont's Standards (2000) 3.9 and 4.6** are the multiple ways that learning has been documented. There is much "reaching out to the community" in the form of public presentations and what has been learned. Teachers increasingly employ *Scoring Rubrics*, or guidelines for their student's work performance. The academic connections between social studies, art, science, reading and language arts are prominent and celebrated. Connections are made between science, social studies, language arts, art, and mathematics. Learning in our public schools probably doesn't get much better than it does under the leadership of talented, environmental savvy teachers working with students on topics that touch their lives and the lives of their community and world.

¹³ Information on The Sharon Academy's project can be found at: <http://www.cmapgallery.org/gallery/TSA/index.htm>

¹⁴ Paul Bierman, Department of Geology, UVM, *Project Summary* for funding proposal, February 2005

¹⁵ <http://www.uvm.edu/perkins/landscape/>

¹⁶ Movie notes on The Last Link, in *Straight.Com*, 12 February 2004, found at: <http://www.straight.com/content.cfm?id=766>

¹⁷ <http://www.uvm.edu/~smelcher/nextlink/>

Analysis and Commentary on Vermont's Sustainability and Sense of Place Curriculum Standards

The importance of standards-based instruction associated with *Vermont's Framework (2000)*¹⁸ led non-profit environmental groups to make sure their agendas were recognized by the public schools. They became a *Requesting Party* in the curriculum change process, rallying around the concepts of *sustainability* and *sense of place* they found inadequately treated in *Vermont's Framework (1996)*. The process of change was effective thanks to the strong advocacy work of many individuals who were able to agree on some important concepts that deserved inclusion in state school curriculum.

What has been presented here acknowledges the accomplishment of Vermont grassroots non-profit organizations who sought to make more prominent how schools might respond to critical environmental issues. Some potential downsides remain. Funding for non-profits always seems to be a problem not only in Vermont but everywhere. The ten programs profiled here cannot be delivered free and their organizers must continually look for revenue to sustain their important work. Many schools are unable to budget general funds for participation and must depend on volunteerism, PTO support, and interns from nearby colleges and universities to participate. Environmental organizations can support and encourage

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talented teachers to create unique learning experiences for students. Often these one-of-a-kind happenings cannot be replicated with the same passionate engagement, but can serve as models to inspire others.

Another challenge to be overcome is competition between organizations that serve the same educational market and vie for the field trips, in-school presentations, and technical resources to conduct outstanding programs. Perhaps not widely recognized is the concern of some school leaders that utilization of outside organizations may lead some teachers to "offload" the teaching of important material on those visitors and not be attentive to what would otherwise be their instructional responsibility. And finally, organizations that may have excellent resources to support school programs may not choose or be able to develop promotional or informational materials catering to state educational standards.

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¹⁸ After initial identification of *Vermont's Framework of Standards and Learning Opportunities (2000)* it may subsequently be referred to as *Vermont's Framework (2000)*

Note: This paper is an expanded version of a presentation made at the International Conference on Environmental, Cultural, Economic and Social Sustainability, held at The East-West Center, The University of Hawaii-Manoa on February 28, 2005. A PowerPoint version can be found at <http://www.uvm.edu/~ragne/>

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