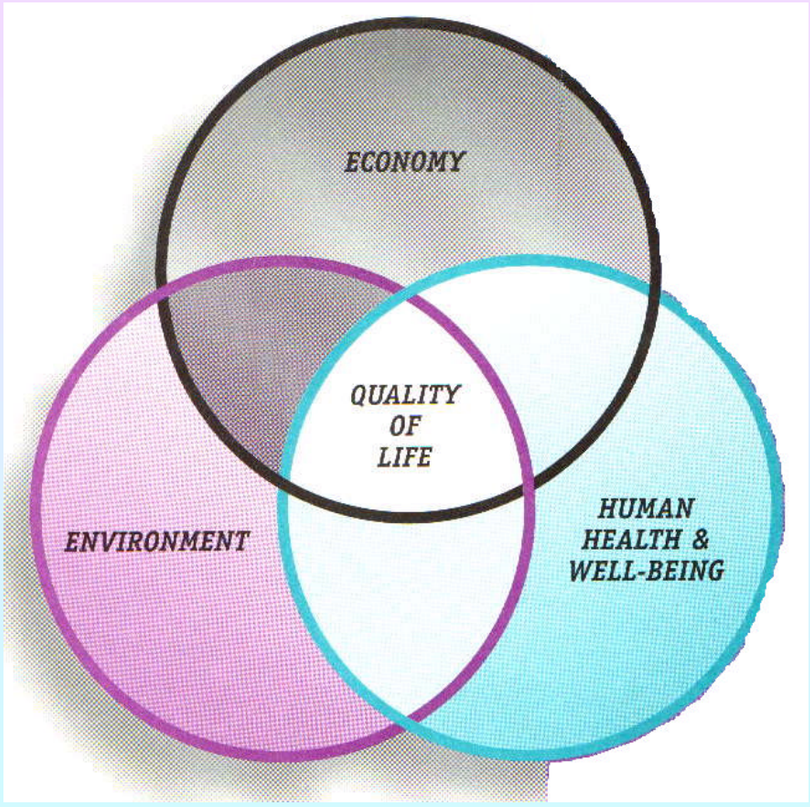
EDUCATING FOR SUSTAINABILITY

The Status of Sustainable Development Education in Canada



Council of Ministers of Education, Canada

Working Together for a Sustainable Future

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EXECUTIVE SUMMARY

This report was prepared for the Council of Ministers of Education by Manitoba Education and Training (Sustainable Development Initiative). It has been developed to serve three purposes. First, to provide a historical review of sustainable development/sustainability and to provide a rationale for educating for sustainability. Second, to provide a current and comprehensive view of the progress that has occurred across Canada related to sustainable development education. Third, to provide an appropriate context for continuing dialogue and to identify a relevant framework for desired future action.

It is important to acknowledge the tremendous debate, exploration and controversy surrounding topics related to "sustainability", "sustainable development", "environmental education", and "educating for sustainability". Differences in perspectives exist and they are significant. Rather than viewing these differences as obstacles, this document provides a snap-shot of what currently exists in all areas in the hope of achieving a vision of "sustainability" that all human beings can work towards. The perspective of each jurisdiction should be considered an asset, as each has something vital to contribute. It is to be considered the beginning of the process of discussion and debate, not a conclusion. Among the jurisdictions contributing to the preparation of this report were: Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Northwest Territories, Nova Scotia, Nunavut, Ontario, Prince Edward Island, Quebec, Saskatchewan, and Yukon.

Beginning with the introduction, the paper begins with a visualization exercise to project a vision of the kind of world we would want our children to live in. The scenarios chosen were developed by the Shell Group in 1992. Part I ("Sustainable Development and Sustainability" and "Educating for Sustainability") examines sustainability and sustainable development, and Educating for Sustainability. This sections refers to Appendix A "Historical Perspective" which focuses on sustainable development, sustainability and education for sustainability from the 1960s onward. International meetings, agreements, declarations and reports such as the Stockholm Declaration, The World Commission on the Environment and the Economy, *"Our Common Future,"* Rio's Earth Summit and consequential *Agenda 21*, are presented. The role of education is seen as a critical component for achieving sustainability in the future.

Part II ("The Status of Sustainable Development Education in Canada") provides a summary of sustainable development education activities being undertaken in each jurisdiction in Canada, including a review of education and training policies, guidelines, curricula (K-12 and post-secondary), teacher education, professional development, materials/resources, educational models, educational priorities and other innovative practices as they relate to educating for sustainability. This section should be considered a "work in progress". Some jurisdictions have not yet completed work on their responses. As information becomes available, it will be incorporated into this section.

Part III ("Where Do We Go From Here?") presents three options for consideration by the CMEC, depending on the level of priority and commitment Ministers wish to place on educating for sustainability in Canada.

INTRODUCTION

It is widely agreed that education is the most effective means that society possesses for confronting the challenges and opportunities of the future. Indeed, education will shape the world of tomorrow.

Education serves society in a variety of ways.

"The goal of education is to make people wiser, more knowledgeable, better informed, ethical, responsible, critical and capable of continuing to learn. Education also served society by providing a critical reflection on the world, especially its failings and injustices, and by promoting greater consciousness and awareness, exploring new visions and concepts, and inventing new techniques and tools. Education is also the means for disseminating knowledge and developing skills, for bringing about desired changes in behaviours, values and lifestyles, and for promoting public support for the continuing and fundamental changes that will be required if humanity is to alter its course, leaving the familiar path that is leading towards growing difficulties, and starting the uphill climb towards sustainability. Education, in short, is humanity's best hope and most effective means to the quest to achieve sustainable development" (UNESCO, 1997).

Williams (1994, p. 612) asks an important question pertaining to the goals of creating a sustainable society: What would life in a sustainable society be like?

This question calls for a visualization or scenario-building exercise. Scenarios would project a vision of the kind of world that we would want our children to live in.

Scenarios have been used extensively to help shape the business world. In 1992, Shell Group published two popular scenarios of the world order and how it is emerging in terms of economics and politics, energy and the environment, business and people, and the implications based on two very different scenarios. The first scenario was called "The Story of the Barricades". It was, and is, a chilling picture of an increasingly divided world with anarchy enveloping society without our children's lifetime. This story was built on the foundation of the Newtonian model which is based on determinism, incremental change and a belief that the way the world works is based on cause and effect. As the name implies, in this story no agreements are reached, tension grows around the world, relationships are stressed, and the fissure between the rich and poor grows ever larger. This obviously does not portray a vision of a world we might want our children to grow up living in.

The second scenario "New Frontiers" was developed through the eyes of modern physics which emphasizes an interconnected web of relationships, all matter constantly in motion and fundamentally open. In this scenario, the future was not fixed. The world was full of possibilities for change and creativity. It's a story of new demands, new opportunities, turbulence, and vast change. In "New Frontiers", rich and poor alike recognize their economic, social, and environmental interdependence.

It is both interesting and informative to envision what opportunities and challenges may exist in education in Canada in the future if the goals of education are oriented towards "sustainability" concepts.

Internationally, organizations such as The United Nations Education, Scientific and Cultural Organization (UNESCO) are also embarking on orienting educating towards sustainability. In an existing project entitled**, "***Educating for a Sustainable Future (Environment, Population and Development)*", UNESCO has included educating for sustainability in their programming over the last two years, and are continuing for the next two. Appendix B includes a synopsis of this particular project with expected results including: policy guidelines, teacher education modules, teaching/learning packages and other materials for use in both formal and non-formal contexts, sharing of best practices, reviews of national educational policies from the perspective of sustainable development, and others. Canada may want to play a role in the implementation of this and other related projects.

This report has been developed to provide a current and comprehensive view of the progress that has occurred across Canada related to sustainable development education initiatives. The scope of the report will include initiatives including a review of education and training policies, guidelines, curricula (K-12 and post-secondary), teacher education, professional development, materials/resources, educational models, educational priorities, and other innovative practices as they relate to educating for sustainability. The expected outcome of this report is to provide an appropriate context for continuing dialogue and a framework for future action.

I. WHAT ARE "SUSTAINABLE DEVELOPMENT", "SUSTAINABILITY" AND "EDUCATING FOR SUSTAINABILITY"?

The concept of sustainable development is complex and involves many dimensions. Sustainable development is both a goal and a concept. As a goal, sustainable development is an idea of a world where people protect the environment as they carry out their day-to-day activities. As a concept, sustainable development calls for conceptual probing about limits on natural resources, capacities of ecosystems, and interactions among social, economic, political and environmental systems. The central theme underlying this concept is working towards a sustainable quality of life, now and in the future.

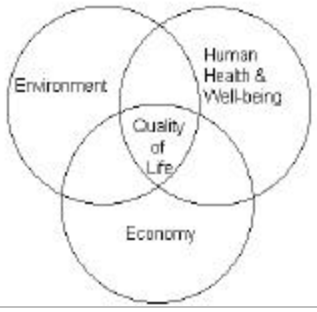
A brief historical overview of sustainable development, sustainability and educating for sustainability is provided in Appendix A.

Sustainable development supports principles of equity (Williams, 1994, p. 52) and social responsibility. Williams points out that equity is essential to the attainment of sustainability. This includes equity among nations, equity within nations, equity between humans and other species, as well as equity between present and future generations.

The concept of sustainable development also calls for particular skills, knowledge, values and attitudes regarding the environment, the economy and the well-being of people. Consequently, the nature of sustainable development is a decision-making process, a way of thinking, a philosophy, and an ethic.

Closely related to sustainable development is the notion of sustainability. Sustainability is defined as the intended destination of sustainable development and should be considered a moving target. How our current decisions affect the future in terms of the economy, the environment, and the health and well-being of people are questions that arise when considering sustainability. Responding to these questions involves both short- and long-term planning as well as the necessity to backcast as well as to forecast into future centuries. Characterized by its continuous nature, sustainability is perhaps best described as a process with a beginning and no end. Future predictions are inherently tenuous and subject to a multitude of unpredictable factors. However, based on informed predictions, measures can be taken to maximize the chances of a sustainable future.

Although this destination is somewhat fluid, the aim is to make decisions and conduct activities in such a manner that ecosystems, the economy, and the health and well-being of people on the planet can be improved and maintained for a long time. In other words, sustainability is "*the persistence over an apparently indefinite future*" (Robinson, 1990, p. 46).



A model of the components of sustainable development would therefore include interrelated strategies for the environment, the economy, and societal health and well-being, all vital in determining our quality of life. The environment pertains to the life-sustaining processes (systems) of the earth and its natural resources. The economy includes such aspects as the provision of jobs, incomes and individual and collective wealth resulting from economic activity. Societal health and well-being refers to such dimensions as the overall physical, psychological, spiritual, and social health and well-being of individuals, families and communities. Given the interdependence of these components, a change in one component has a significant impact on the others. A sustainable environment is one in which the Earth's resources are able to sustain ecosystem life, health and acceptable progress in a renewable way. A sustainable economy occurs when development decisions, polices and practices of people do not exhaust the Earth's resources. A sustainable society is characterized by people who live in harmony with nature and one another globally.

Clearly, "sustainability" is a complex idea which requires some knowledge of social, environmental, and economic issues and how these issues are interrelated. Sustainability challenges people's priorities, their habits, their beliefs and their values. As a species, humans have now reached a point where they must admit that all things might not be possible (or all that is possible might not be wise). There might be limits. Humans have also reached a point where they have reason to believe that they have the obligation and capabilities (technological, social, and ethical) to make "sustainability" happen.

Having defined "sustainable development" and "sustainability" in this broad and somewhat value-laden manner, it is important to acknowledge the tremendous debate, exploration and controversy that surround this topic. Differences in perspectives of business/industry, environmentalists, so-called "developed" and "developing" countries, indigenous peoples, women, etc. are significant. Even informed opinion differs on key issues such as global climate change and sustainable practices in industry. These differences can be an obstacle to achieving a vision of "sustainability" that all human beings can work towards. However, these differences are also an asset, as each has something vital to contribute.

The challenge ahead is probably best understood as collectively creating our future and our grandchildren's future. Striving for sustainability calls for inclusiveness and learning together what it is we want to "sustain" and how this can be done. This challenge is at the heart of "educating for sustainability".

It is clear that education is a fundamental influence in inspiring the changes in attitudes, values and skills needed to ensure our future survival. If a paradigm shift in the way we do things is to occur, educating for sustainability must become a global priority.

Filho (1996) raises several questions related to educating for sustainability which should be addressed by all jurisdictions:

1. Which characteristics should educating for sustainability have?

2. How does one introduce sustainable development education into the pool of teaching practices?

3. At which stage of the educational process should sustainable development education be incorporated?

4. What are the instructional strategies and learning resources most adequate for use in formal teaching in this field?

Round Tables in Alberta and Manitoba have emphasized the importance of education and training in Sustainable Development Strategies. This can include strategies for sustainable agriculture, sustainable forestry practices, natural resource management, and other sectors of the economy. The concept of life-long learning has been raised as a key thrust to achieving sustainability.

Changes in education and training are necessary to meet the challenges of the 21st Century. Learners will require new ways of thinking, new attitudes and skills to creatively address complex issues and opportunities related to over-population, skill shortages, disease, poverty, environmental degradation, climate change, the depletion of the ozone layer, uneven distribution of resources, and other interrelated issues. Learners (both adult and youth) will require a greater understanding of the interdependence of the economy, environment, and social issues; understanding of interrelationships and systems thinking, consensus building, and decision-making; and the ability to identify both sustainable and unsustainable practices. People will be challenged to envision a sustainable future, so that they will know what to aim for and can think through the consequences of their behaviour and actions.

II. THE STATUS OF SUSTAINABLE DEVELOPMENT EDUCATION IN CANADA

This section provides a summary of educating for sustainability initiatives specifically being undertaken in each jurisdiction across Canada as we embark on the 21st Century, including: a review of education and training policies and priorities; guidelines; curricula (K-12 and post-secondary); professional development; teacher pre-service and in-service; learning resources; educational models and other innovative practices as they relate to educating for sustainability.

Educating for Sustainability Policies and Priorities

Educating for sustainability policies include direction and priorities for K-12 education, university and college, and other training institutions. Relevant policies could also include labour market development policies.

Pan-Canadian

The Council of Ministers of Education, Canada recognized the importance of educating for sustainability. The *Common Framework of Science Learning Outcomes, Pan-Canadian Protocol for Collaboration on School Curriculum,* Council of Ministers of Education, Canada, 1997, p. 4-5, states:

> *"Canadian society is experiencing rapid and fundamental economic, social, and cultural changes that affect the way we live. Canadians are also becoming aware of an increasing global interdependence and the need for a sustainable environment, economy, and society."*

Related to science education, the same document states,

> *"…Science education aims to:*
>
> *Encourage students at all grade levels to develop a critical sense of wonder and curiosity about scientific and technological endeavours.*
>
> *Enable students to use science and technology to acquire new knowledge and solve problems, so that they may improve the quality of their own lives and lives of others.*
>
> *Prepare students to critically address science-related societal, economic, ethical, and environmental issues."*

And,

> *"Scientific literacy is an evolving combination of the science-related attitudes, skills, and knowledge students need to develop inquiry, problem solving, and decision-making abilities, to become lifelong learners, and to maintain a sense of wonder about the world around them."*

And,

> *"It is expected that, by the end of grade 6, students will…*
>
> *Describe positive and negative effects that result from applications of science and technology in their own lives, the lives of others, and the environment."*
>
> *"It is expected that, by the end of grade 9, students will….*
>
> *Analyze social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives."*
>
> *"It is expected that, by the end of grade 12, students will….*
>
> *Evaluate social issues related to the applications and limitations of science and technology, and explain decisions in terms of advantages and disadvantages for sustainability, considering a variety of perspectives."*

Alberta: In Alberta, the school system is governed by the *School Act* which provides the basis for ministerial authorization of Programs of Study and on learning resources authorized by the minister. Decisions regarding selection and use of learning resources and development of appropriate teaching and learning strategies are made in local jurisdictions – often at the school and classroom level.

Although no specific policies have been framed to address the concept of educating for sustainability, the concept of sustainability is implicit in the statement of basic education and in authorized programs of study.

British Columbia: British Columbia has a School Act supported and enhanced by regulations and Ministerial Orders. Collectively, these set out the required areas of study, provincially recommended learning resources, provincial curriculum documents and graduation requirements. Additional decisions on the selection, approval, or use of learning resources are made at the local school district, typically at the classroom level.

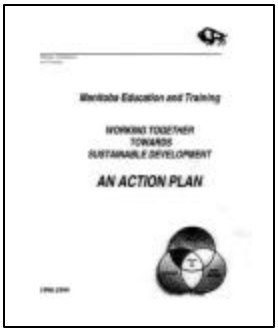
Although there are no formal policy documents related to the concept of educating for sustainability, concepts related

to "Environment & Sustainability" have been integrated across all new BC curricula since 1995.

Manitoba:

The Government of Manitoba has identified sustainable development as the framework of its overall economic, environmental, and social agenda. Recognizing that legal and institutional changes are required to meet the goal and objectives of sustainable development, the Government of Manitoba proclaimed the *Sustainable Development Act (July 1998)*. This Act requires all public organizations and agencies to conform to the principles and guidelines outlined in the Act. Developmental work on regulations that will accompany the Act is also progressing.

As a result of the proclamation of this Act, in 1998, Manitoba Education and Training established a Sustainable Development Initiative (Unit). The **Role** of the Sustainable Development Initiative is to provide leadership in developing and communicating the concept of sustainable development in the public and private sector and to ensure that all decisions made in the determination and execution of legislation, activities, programs, curricula, policies, initiatives and strategies within Manitoba Education and Training are consistent with the principles and guidelines of sustainable development and the Sustainable Development Act. Sustainable development initiatives include the development of a *Departmental Sustainable Development Action Plan* which mandates all branches within the Department to submit annual strategic plans identifying how the principles and guidelines of sustainable development are considered in activities, programs, curricula, policies, initiatives and strategies. Plans are reviewed and revised annually. Examples of targets identified by branches in their sustainable development strategies include: training for all branch staff; distribution of documentation to staff and clients; reducing costs by reducing the use of paper; reducing purchases and waste; injury prevention; reducing stress-related absences; and maintenance of a healthy working environment; as well as other targets too numerous to mention.



The Manitoba Round Table for Sustainable Development (formerly the Manitoba Round Table on the Environment

and the Economy) has determined that a Sustainable Development Education Strategy is needed in order to fully understand and communicate the importance of sustainable development and to ensure its successful implementation throughout Manitoban society. This strategy requires public comment prior to implementation. The Sustainable Development Initiative (Coordinator) in the Department of Education and Training is responsible for managing the process related to the development of the Education Strategy on behalf of the Manitoba Round Table. The process involves the following: the preparation of draft policies and actions to be taken to meet the intent of the policies (Concept Paper and/or Workbook); public consultation conducted by the Manitoba Round Table and the Department of Education and Training; release of a report on the results of public consultations and recommended policies and actions by the Manitoba Round Table (What You Told Us); a document which presents the policies adopted by Cabinet (Policy Applications Report); and a plan for implementing the policies and actions (Implementation Plan).

The Education Strategy is intended to establish goals, objectives and priorities for action and clarify future direction in education for sustainable development. The proposed objective of this policy is to put in place learning opportunities for every resident of this province, which will facilitate the transition to a sustainable future. It also serves to fulfill the obligations of the Department of Education and Training set out in the *Sustainable Development Act*. To date, a document entitled, *Educating for Sustainability* has been developed, and focus-group testing and open public sessions have been conducted in eight regions in Manitoba in order to determine future directions with regard to educating for sustainable development in Manitoba.

Also relevant is the Manitoba Round Table Strategy for Aboriginal people living in the City of Winnipeg. The Manitoba Government has adopted a policy in this area based on the recognition that "*no single issue is of more importance to the sustainability of our province in the new millennium than the well-being of our Aboriginal peoples*".

Manitoba Education and Training has launched an Aboriginal Education and Training Strategy consistent with

priority being placed on the well-being of Aboriginal people in Manitoba. The Strategy has three goals: to increase partnerships with Aboriginal communities; to increase graduation from high school and post-secondary programs; and to increase employment of Aboriginal Manitobans.

New Brunswick:

The Premier's Round Table on the Environment and the Economy in 1990 released *Towards Sustainable Development in New Brunswick: A Plan for Action.* Section 2 of that report underscores the vital role that public education and information must play in fostering a move toward sustainable development and identifies as a goal, "To have a society fully informed about the issues and implications surrounding sustainable development". To achieve this goal, the Round Table makes the following recommendations for action:

7. *Establish university chairs in sustainable development with government, industry and the universities each providing one-third of the funding. One of the key roles will be to ensure teachers are prepared to effectively teach the program noted in the following recommendation.*

8. *Establish a program to integrate the concept of Sustainable Development at all school grade levels leading to a comprehensive and factual understanding of the scientific, environmental, social and economic factors in sustainable development decisions*.

9. *Drawing on resources from all sources, develop and disseminate information on sustainable development. This public information will allow all individuals a more complete understanding of current economic and environmental issues and promote informed decision-making. The New Brunswick Round Table supports the National Round Table on the development of a national public information / education strategy based on a model of "participation*".

Curriculum development in New Brunswick is the responsibility of the Curriculum Branch of the Department of Education and curriculum implementation is undertaken by the individual school districts. In order to realize the implementation of the above recommendations for action, the cooperation and support of each of these organizations

is therefore essential. That cooperation and support has been consistent.

Newfoundland and Labrador:

In Newfoundland and Labrador, the school system is governed by the School Act which provides the basis for ministerial authorization of Programs of Study and learning resources. There is no formal policy on sustainability education. The concept of sustainability is mentioned in the Essential Graduation Outcomes which are common to the four Atlantic provinces. The Department of Education of the province of Newfoundland and Labrador participated in the Pan-Canadian Science Framework project and supports the inclusion of sustainability statements in Science-Technology-Society-Environment (STSE) Foundation.

The concept of sustainability is present in the Sciences and Social Studies curriculum.

Northwest Territories:

In the Northwest Territories, the education system is governed by the Education Act, which provides the basis for Ministerial authorisation for programs of studies. Decisions regarding selection and use of learning resources and the development of appropriate teaching and learning strategies are made in the local jurisdiction. District Education Authorities and District Education Councils select resources that are approved by the Western Canadian Protocol or those recommended by the Department of Education for the NWT. Additional decisions on the selection, approval or use of learning resources are also made at the school or classroom level.

There are no specific policies to address the concept of "educating for sustainability", however the concept of sustainability in the current Science and Aboriginal programs (Dene Kede and Inuuqatigiit) is implicit throughout the program of studies. The revisions to the science curriculum will mirror the conceptual expectations of "educating for sustainability", as expressed in the Pan Canadian Science Framework, Dene Kede and Inuuqatigiit.

Nunavut:

On April 1, 1999, Northwest Territories divided into the Northwest Territories and Nunavut. Nunavut has not changed its current policies or legislation. It should be noted that what was in existence before the division still exists at this time.

In Nunavut, the education system is governed by the Education Act, which provides the basis for Ministerial authorisation for programs of studies. Decisions regarding selection and use of learning resources and the development of appropriate teaching and learning strategies are made in the local jurisdiction. District Education Authorities and District Education Councils select resources that are approved by the Western Canadian Protocol or those recommended by the Department of Education for Nunavut. Additional decisions on the selection, approval or use of learning resources are also made at the school or classroom level.

There are no specific policies to address the concept of "educating for sustainability", however the concept of sustainability in the current Science and Aboriginal programs (Inuuqatigiit) is implicit throughout the program of studies. The revisions to the science curriculum will mirror the conceptual expectations of "educating for sustainability", as expressed in the Pan Canadian Science Framework and Inuuqatigiit.

Ontario:

Although there are no specific provincial policy documents written to address the concept of educating for sustainability, the concept of sustainability has been integrated within the new Ontario provincial curriculum policy documents. For example, Ontario's new Grades 1-8 Science and Technology curriculum and the new Grades 9 and 10 Science curriculum both deal with the concept of sustainability and related issues. Also, both documents are closely aligned with the Pan-Canadian Common Framework of Science Learning Outcomes.

As part of the diploma requirements for graduation all students must now complete 40 hours of community involvement activities. This community involvement requirement is designed to encourage students to develop awareness and understanding of civic responsibility and of the role they can play in supporting and strengthening their communities."

Prince Edward Island: There are no specific policies that govern sustainability in the Prince Edward Island Government.

Although no specific policies have been framed to address the concept of "sustainability", the concept is implicit in Prince Edward Island's Philosophy of Education, which states in part, "The purpose of the Prince Edward Island public education system is to provide for the development of children so that each may take a meaningful place in society." Goals state in part, "The goals of public education are to enable the students to:

- develop an understanding of the natural world and of the applications of science and technology in society.
- acquire knowledge about the past and an orientation to the future;
- develop an appreciation for one's heritage and a respect for the culture and traditions of others;
- develop a respect for community values, a sense of personal values, and a responsibility for one's own actions;
- develop a sense of pride and respect for one's community, province and country;
- develop a sense of stewardship for the environment".

Saskatchewan: In 1992, a Round Table Education Advisory Committee released a report entitled *An Education Strategy for Sustainable Development Education in Saskatchewan*. Since then, Saskatchewan Environment and Resource Management (SERM) has released a document called *Saskatchewan's Environmental Agenda: Securing a Sustainable Future*. These documents can be accessed via the SERM website at **www.gov.sk.ca/gov't/environ/**.

The Saskatchewan Department of Education has no formal policy on Sustainability Education (SE). The policy foundation was set for EE in the 1970's and the twelve key concepts identified then are the foundation for SE. Skills/processes and value dimensions are accommodated today by the incorporation of the Common Essential Learnings (CELs) into all core curricula. Recently, the Department participated in the Pan-Canadian Science Framework initiative and promoted the inclusion of the Science-Technology-Society-Environment (STSE) Foundation that supports SE statements in the context of Science. Themes and concepts in Social Studies and

Language Arts dealing with the "Environment" or "Resources" are found in those curricular areas at various grade levels.

Yukon: In the Yukon, there are no policies developed or directives specifically addressing the educating for sustainability concept.

Educating for Sustainability Guidelines

Educating for sustainability guidelines can include key principles, outcomes and ways of working such as consensus building, interdisciplinary approaches, etc.

Alberta:

The Government of Alberta's 3-year plan for Education identifies a set of broad outcomes for students that together comprise a basic education. The following outcomes are part of this list. Students will:

- Understand the physical world, ecology and the diversity of life.
- Understand the scientific method, the nature of science and technology, and their application to daily life.
- Know the history and geography of Canada and have a general understanding of world history and geography.
- Understand Canada's political, social, and economic systems within a global context.
- Demonstrate critical and creative thinking skills in problem-solving and decision-making.

These basic outcomes are given further substance in the general and specific outcomes of the various programs of study.

British Columbia:

Although there are no formal policy documents related to the concept of educating for sustainability, concepts related to "Environment & Sustainability" have been integrated across all new BC curricula since 1995.

Manitoba:

Manitoba Education and Training is committed to continuous improvement towards ensuring that the determination and execution of all activities, programs, curricula, policies, initiatives and strategies within the Department are consistent with the principles and guidelines of sustainable development. The guidelines are: efficient use of resources; public participation; understanding and respect; access to adequate information; integrated decision-making and planning; and substitution. See Appendix C – Principles and Guidelines of Sustainable Development.

New Brunswick: Although no specific guidelines have been articulated for education for sustainability, various Department of Education documents include vision statements, goals and outcomes which represent implicit support for the principles which are central to educating for sustainability. These include support for curriculum integration, promotion of an ethic of conservation and stewardship, attention to the concept of inter-generational rights, recognition of competing perspectives and the benefits of cooperative work and consensus building. These principles and guidelines are outlined in greater detail in the curricula section.

Educating for Sustainability in New Brunswick has written a document entitled, *Learning for a Sustainable Future: A Context*. This paper outlines a rationale for educating for sustainability and discusses the implications for content selection and methodology within the context of the New Brunswick curriculum requirements. A copy of the paper is included in Appendix D.

Newfoundland and Labrador: There are no formal policy documents related to the concept of educating for sustainability. However, the Essential Graduation Learnings dealing with Citizenship require students to be able to demonstrate understanding of sustainable development and its implications for the environment.

Northwest Territories: Although there are no formal policy documents related to the concept of educating for sustainability, concepts related to the environment and sustainability are inherent in the science curricula and the Aboriginal foundation curricula Dene Kede and Inuuqatigiit which promotes the ethics of stewardship, conservation, intergenerational rights, science - technology - society and the environment.

Nunavut: There are no formal policy documents related to the concept of educating for sustainability in Nunavut. However, concepts related to the environment and sustainability are inherent in the science curricula and the Aboriginal foundation curricula (Inuuqatigiit) which promotes the ethics of stewardship, conservation, intergenerational rights, science - technology - society and the environment.

Ontario: The Ministry of Education has not developed any specific provincial guideline for educating for sustainability. However, the concepts and principles of sustainability are integrated throughout some of the provincial curriculum documents including Grades 1-8 Science and Technology, Grades 9 and 10 Science, the History and Geography program for Grades 7 and 8, and the Canadian and World Studies program for Grades 9 and 10.

Prince Edward Island: There are no guidelines specifically developed to address educating for sustainability concepts in Prince Edward Island.

Yukon: In the Yukon, there are no guidelines specifically developed to address educating for sustainability concepts.

Educating for Sustainability Curricula (K-12 and Post-Secondary)

Educating for sustainability curricula (a written and unwritten plan depicting the scope and arrangement of the educational program in K-12 and post-secondary) could contain: a statement of intention for use of the document as a guiding force for planning instructional strategies; statements outlining the goals for which the curriculum was designed; a body of cultural content that has the potential for the realization of the goals; a set of outcomes (what do we want learners to know and be able to do); a wealth of experiences; a set of values that guide learners to improve society; and a statement of an evaluation scheme for determining the worth and effectiveness of curricula. These curricula may be separate courses or programs, or any curricula that include sustainability elements.

Pan-Canadian

In terms of curriculum planning, the concept of sustainable development has been recognized in the Pan-Canadian Science Curriculum Framework of Outcomes, the Atlantic Provinces Common Curriculum, the New Ontario Science Curriculum, the New Quebec Curriculum process, and in the Western Protocol.

Atlantic Provinces (New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland)

The Atlantic Provinces Education Foundation (APEF) has developed and is implementing a common curriculum for K - 12 Science and Social Studies. These documents include educating for sustainability concepts and are presently in various stages of development and piloting.

Teachers' Federation Resolutions

In April and July 1999, the Ontario Teachers' Federation (OTF) and the Canadian Teachers Federation adopted a resolution pertaining to education for sustainable development. The Policy (3.9) specified that teachers should incorporate the perspective of sustainability in the teaching/learning process. Education for sustainability in this policy includes any teaching approach designed to promote understanding of issues of the environment, economy and society and the interconnections among them, and which fosters the knowledge, skills and values needed to participate in appropriate change for a more sustainable future. The resolution also states that curriculum and related activities should incorporate, where appropriate, issues related to concerns for the environment, the needs and aspirations of societies, and the role of economic development, recognizing their equal importance in shaping a sustainable future:

- Concepts of interaction, interdependence and change to enable students to develop a holistic view of life;

- Issues affecting preservation and conservation of the environment and its resources and the impact of human development on it;
- Critical examination of the choices arising from environmental preservation and economic development and the balance between them;
- Issues of human rights, social justice, social responsibility and equity;
- Respect for diversity within the human community;
- Issues surrounding the impact of poverty, illiteracy, violence and militarism on all people and nations and their negative effect on human relations and the natural environment;
- Strategies for the promotion and maintenance of peace.

Alberta:

Themes related to sustainability are addressed in programs of study for Science, Social Studies and other areas of the curriculum. A review of programs of study conducted in 1996 shows the scope of these links. For further information, please refer to the document *Learning for a Sustainable Future: Curriculum Linkages with Science, Social, Mathematics, Language Arts and selected Career and Technology Studies Courses*, Tammy Conacher, 1996. This document identifies how sustainable development is currently being addressed in Alberta school programs.

Secondary school Science programs in Alberta are currently under revision. Projected dates for implementing revised Science programs is September 2001 for Science 7 and 8; September 2002 for Science 9, 10 and 14; September 2003 for Science 20 and 24; and September 2004 for Science 30. Projected dates for implementation of discipline-based programs is September 2004 for Biology 20, Chemistry 20 and Physics 20; and September 2005 for Biology 30, Chemistry 30 and Physics 30.

Sustainability themes within the recently developed *Pan-Canadian Science Framework* are largely reflected in draft revisions to the Alberta program, with some extension of focus in specific areas. Examples of subject matter related to a sustainability theme can be seen in draft unit summaries (Appendix E).

British Columbia:

British Columbia focuses on “Peace Education”, “Environmental Education” and “Global Education”. Sustainability themes that appear in the *Pan-Canadian Science Framework* were previously incorporated across several areas of the British Columbia K-12 curriculum, including the Science curriculum.

The aforementioned information related to curricula is contained in the new K-12 curriculum in addition to K-12 teacher organizations (Provincial Specialists Associations or PSAs).

A significant number of British Columbia's post secondary institutions also have courses and/or programs that include or relate to sustainability, environmental education, and global education.

Manitoba:

Renewing Education: New Directions, A Foundation for Excellence (1995) indicates that sustainable development is recognized as an essential element to be integrated into Manitoba curricula. Integration is occurring within three types of curriculum documents for various subject areas: 1. Curriculum frameworks of outcomes and standards (defining expectations for student achievement); 2. Foundation for implementation documents (providing suggestions for instruction, assessment, and learning resources); and 3. Support documents (developed as necessary resources to provide a particular curricular focus). The processes for integrating sustainable development concepts into curricula can be found in Appendix F. To date, the Manitoba Department of Education and Training has released new curricula for Mathematics and Language Arts (Kindergarten to Senior 3), and for Science (Kindergarten to Grade 4). In all other subject areas, schools continue to use existing curricula. Although these curricula may reflect sustainable development concepts, no consistent effort was made to integrate the principles and guidelines before the proclamation of the *Sustainable Development Act*.

Sustainable development concepts are integrated into all disciplines; however, particular attention has been paid to the Science curricula. Manitoba science curricula are presently in a state of transition. New curricula will be implemented gradually according to the following schedule: Kindergarten to Grade 4, fall 1999; Grades 5 to 8 and Senior 1, fall 2000; Senior 2, fall 2001; Senior 3, fall 2002; Senior 4, fall 2003. These curricula will be based on five **Foundations for Scientific Literacy**, twenty-eight **General Learning Outcomes** which apply from Kindergarten to Senior 4, and **Specific Learning Outcomes** for each grade.

Indeed, the Science, Technology, Society, and Environment Foundation and a general learning outcome address sustainable development directly. As a result of the Early, Middle, and Senior Years science education, Manitoba students will identify and demonstrate actions that promote a sustainable environment, society, and economy, both locally and globally. Students' knowledge of sustainable development will grow as they attain specific learning outcomes at each grade. Examples of specific learning outcomes in the Early Years curriculum include:

Grade 1: Students will demonstrate ways to reduce, reuse, and recycle materials during classroom learning experiences.

Grade 2: Students will recognize that clean water is an increasingly scarce resource in many parts of the world, and describe consequences of a shortage of clean water.

Grade 3: Students will use the design process to construct a simple composter that returns organic matter to the soil.

Grade 4: Students will investigate natural and human-caused changes to habitats, and identify resulting effects on plant and animal populations, including endangerment and extinction.

The Middle and Senior Years Science curricula will continue to present sustainable development in diverse contexts, leading students to develop increasingly sophisticated attitudes, skills and knowledge.

The work related to the integration of sustainable development concepts and principles into Manitoba Education and Training curricula is continuing.

Program and curricular modifications are also occurring at the post-secondary level (universities, colleges, apprenticeship). Examples could include an increased focus on sustainable agriculture in agriculture programs, sustainable cities in urban planning, sustainability practices in natural resources management, and specific curriculum content such as addressing ISO standards or the requirement to recover ozone-depleting substances by technicians in the refridgeration field.

New Brunswick:

Curriculum initiatives to support educating for sustainability received considerable support with the establishment of the New Brunswick Global Education Project in 1987. Educating for sustainability was regarded as an integral sub-set of global education. This was reflected in the efforts of the Global Education Project to take advantage of existing curricula and to influence curriculum development so as to allow students to explore the diversity of cultural perspectives, the causes and consequences of global inequities, the concept of interdependence as reflected in global environmental and economic trends, and the need to identify those policies and practices which may better guarantee a more sustainable future.

Curriculum opportunities to investigate the above were found largely, but not exclusively, in the Social Studies and Science curricula. Specific courses included *A Window on the World* (Primary Social Studies), *World Regions* (grade 6 Social Studies), *Developing a Global Perspective Through Cultural Understanding* (grade 9 Social Studies), *Environmental Science 112-113* (grade 11 Science), and *World Issues 120* (grade 12 Social Studies).

More recently, two key documents and one course have enhanced the curriculum opportunities to explore issues of sustainable development**.** *Foundations for the Atlantic Canada Social Studies* and the *Pan-Canadian Common Framework of Science Learning Outcomes* provide the framework for present and future Social Studies and Science curriculum development in New Brunswick. The Nova Scotia report found in this section outlines the Atlantic Provinces' mandate to include consideration of sustainable development in future Social Studies curricula and need not be repeated here except to note that Educating for Sustainability in New Brunswick , which is affiliated with Learning for a Sustainable Future (LSF) helped to shape the document *Foundations for the Atlantic Canada Social Studies.*

The implementation of a new social studies course, *Atlantic Canada in the Global Community*, which is taught in grade 9 in Nova Scotia, Prince Edward Island and Newfoundland and in grade 8 in New Brunswick, is in keeping with the *Social Studies Foundation Document*, which is rich in opportunities to explore issues of sustainable development.

Provincial workshops were held for teachers that focused on the sustainability issues in this course.

The science, technology and society component of the Science curricula also provide natural opportunities to integrate considerations of sustainability into the classroom and these have received considerable attention in professional development efforts of late.

Newfoundland and Labrador

The two (2) key documents "Foundation for the Atlantic Canada Social Studies" and the "Pan Canadian Common Framework of Science Learning Outcomes" provide the framework for present and future curriculum development in Newfoundland and Labrador. Sustainable Development Education will continue to be integrated in future Social Studies and Science curriculum development.

- Newfoundland and Labrador, along with the other Atlantic provinces, collaborated in the development of the "Foundation for the Atlantic Canada Social Studies" framework. In this particular document, references are made to the document **The Atlantic Canada Framework for Essential Graduation Learning in Schools**. In this document, Essential Graduation Learnings include a component on "Citizenship", whereby graduates will be expected to assess social, cultural, economic, and environmental interdependence in a local and global context. Graduates will be expected, for example, to demonstrate understanding of sustainable development and its implications for the environment. In this framework, general curriculum outcomes include a component on "interdependence" whereby students will be expected to demonstrate an understanding of the independent relationship among individuals, societies, and the environment – locally, nationally, and globally – and the implications for a sustainable future.

  Examples of statements relating to sustainability follow:

  **By the end of grade 3, students will be expected to:*

  - identify and describe examples of interactions among people, technology, and the environment;
  - demonstrate an understanding of the concept of sustainability;

- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world.

By the end of grade 6, students will have achieved the outcomes for entry – grade 3 and will also be expected to:

- identify and describe examples of positive and negative interactions among people, technology, and the environment;
- identify and explain the key characteristics of sustainable practices;
- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world.

By the end of grade 9, students will have achieved the outcomes for entry – grade 6 and will also be expected to:

- explain how values and perspectives influence interactions among people, technology and the environment;
- analyze selected issues to illustrate the interdependence among society, the economy, and the environment
- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world

By the end of grade 12, students will have achieved the outcomes for entry – grade 9 and will also be expected to:

- evaluate current technological developments and their potential impact on society and the environment;
- articulate and justify a personal vision of a sustainable future;
- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world.

*The section **People, Place and the Environment** is another important general curriculum outcome in which students will be expected to demonstrate an understanding of the interactions among people, places and the environment.*

By the end of grade 3, students will be expected to:

- identify some of the basic physical processes that have shaped the earth;
- identify ways people depend on, modify, and are influenced by the physical environment.

**By the end of grade 6, students will have achieved the outcomes for entry – grade 3 and will also be expected to:*

- explain how physical processes have shaped and affected the landscape and human systems
- describe how the environment affects human activity and how human activity endangers or sustains the environment

**By the end of grade 9, students will have achieved the outcomes for entry – grade 6 and will also be expected to:*

- describe and analyse how ecosystems are created, influenced, and sustained by physical processes;
- analyse the influences of human and physical systems on the development of distinctive characteristics of place;
- analyse ways in which social, political, economic, and cultural systems develop in response to the physical environment.

**By the end of grade 12, students will have achieved the outcomes for entry – grade 9 and will also be expected to:*

- evaluate issues concerning the diversity and sustainability of the Earth's ecosystems;
- evaluate how physical and human systems shape the features, uses, and perceptions of place;
- analyse the causes and consequences of human modification of the environment on systems within the environment;
- evaluate the role of perspective, power, and authority in the use of and development of policies to manage the Earth's resources.

There are also understandings pertaining to sustainability in the following courses:

- Canadian Geography 1202/Géographie canadienne 1232
- Global Issues 3205
- World Geography 3202
- Canadian Economy 2103/ Economie canadienne 2133
- Global Economics 3103/ Economie mondiale 3133
- Environmental Science 3205/ Sciences de l'environnement 3235
- Biology 3201 /Biologie 3231(modules sur la pêche et la oresterie)
- Science, Technology and Society 2206

- Home Economics
- Comprehensive Health Program 4-5-6, 7-8-9/ Vers un programme de santé compréhensif, 4-5-6, 7-8-9
- Chimie 2249
- Chemistry 2202
- Chemistry 3202
- Religious Education 1104/ 3104 Enseignement religieux 1134-3134
- Religious Education (primary)/ Enseignement religieux (primaire)

Northwest Territories:

Themes related to sustainability are addresses through the program of studies for Science, Social Studies, Dene Kede and Inuuqatigiit. These curricula address the themes which incorporate the concepts of sustainability. The revised science curricula for grades K to 12 will largely reflect the outcomes of the Pan Canadian Science Framework with a strong emphasis on science - technology - society and the environment.

Aurora College offers programs that relate to sustainability, environmental education and global environmental issues.

Nova Scotia:

The two key documents *Foundation for the Atlantic Canada Social Studies* and the *Pan-Canadian Common Framework of Science Learning Outcomes* provide the framework for present and future curriculum developments in Nova Scotia. Sustainable Development Education will be integrated into the Social Studies and Science curricula.

In the *Foundation for the Atlantic Canada Social Studies* framework, essential graduation learnings including a component on "citizenship", whereby graduates will be expected to assess social, cultural, economic, and environmental interdependence in a local and global context. Graduates will be expected, for example, to demonstrate an understanding of sustainable development and its implications for the environment. In this framework, general curriculum outcomes include a component on "interdependence" whereby students will be expected to demonstrate an understanding of the interdependent relationships among individuals, societies, and the environment – locally, nationally, and globally – and the implications for a sustainable future.

By the end of grade 3, students will be expected to:

- identify and describe examples of interactions among people, technology, and the environment
- demonstrate an understanding of the concept of sustainability
- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world.

By the end of grade 6, students will have achieved the outcomes for entry – grade 3 and will also be expected to:

- identify and describe examples of positive and negative interactions among people, technology, and the environment
- identify and explain the key characteristics of sustainable practices
- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world.

By the end of grade 9, students will have achieved the outcomes for entry – grade 6 and will also be expected to:

- explain how values and perspectives influence interactions among people, technology and the environment
- analyze selected issues to illustrate the interdependence among society, the economy, and the environment
- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world.

By the end of grade 12, students will have achieved the outcomes for entry – grade 9 and will also be expected to:

- evaluate current technological developments and their potential impact on society and the environment
- articulate and justify a personal vision of a sustainable future
- plan and evaluate age-appropriate actions to support peace and sustainability in our interdependent world.

"People, place and the environment" is another important area of curriculum outcomes in which students will be expected to demonstrate an understanding of the interactions among people, places and the environment.

By the end of grade 3, students will be expected to:

- identify some of the basic physical processes that have shaped the Earth

- identify ways people depend on, modify, and are influenced by the physical environment.

By the end of grade 6, students will have achieved the outcomes for entry – grade 3 and will also be expected to:

- explain how physical processes have shaped and affected the landscape and human systems
- describe how the environment affects human activity and how human activity endangers or sustains the environment.

By the end of grade 9, students will have achieved the outcomes for entry – grade 6 and will also be expected to:

- describe and analyze how ecosystems are created, influenced, and sustained by physical processes
- analyze the influences of human and physical systems on the development of distinctive characteristics of place
- analyze ways in which social, political, economic, and cultural systems develop in response to the physical environment.

By the end of grade 12, students will have achieved the outcomes for entry – grade 9 and will also be expected to:

- evaluate issues concerning the diversity and sustainability of the Earth's ecosystems
- evaluate how physical and human systems shape the features, uses, and perceptions of place
- analyze the causes and consequences of human modification of the environment on systems within the environment
- evaluate the role of perspective, power, and authority in the use of and development of policies to manage the Earth's resources.

In the grade 10 Geography curriculum, outcomes include:

- exhibit an awareness of humanity's relationship with the natural environment
- develop and demonstrate a perspective of the planet as fragile where policy and development decisions have a global impact.

In grade 12 Global Geography, the goals are to have students:

- develop both an individual and a shared responsibility for the well-being of the planet, its life forms, its resources, and its peoples
- acknowledge that individually and collectively each person makes choices which have an impact upon the natural environment, locally and globally
- acquire a working knowledge of geographic methods, techniques, and skills whereby they are better able to study and understand the world around them
- explain and illustrate the interrelationships among, and the interdependence of, global mechanisms and systems
- recognize, examine and explain changing world conditions, and to identify and discuss emerging global trends
- recognize, appreciate, and describe the great geographic diversity within and among the nations and regions of the world
- respect diversity among the world cultures and to acknowledge various perspectives on human and natural environments, and on global affairs and issues, that are generated by cultural diversity.

Nunavut:

In Nunavut, sustainability themes are addresses through the program of studies for Science, Social Studies and Inuuqatigiit. The concepts of sustainability are incorporated in these themes. The revised science curricula for grades K-12 will largely reflect the outcomes of the Pan Canadian Science Framework with a strong emphasis on science - technology - society and the environment.

Nunavut Arctic College offers programs that relate to sustainability, environmental education and global environmental issues.

Ontario:

Ontario's new Grades 1-8 Science and Technology curriculum integrates environmental/sustainability issues throughout topics covered in each grade. In each grade there is a section in every major topic area or strand called *Relating Science and Technology to the World Outside the School*; in the grades 9-10 Science curriculum, there is a section in every strand called *Relating Science to Technology, Society, and the Environment*. This curriculum emphasizes science as an activity-based discipline in which students will understand concepts, develop skills, and be able to relate science to technology, society, and the environment (STSE). Ontario is currently developing the

grades 11-12 Science curriculum. There are no separate Environmental Science courses in the validation draft of this curriculum. This situation will be re-evaluated after the completion of the validation process with the universities, colleges and workplace organizations.

Ontario's approach to teaching science is an integrated approach and is consistent with the vision for scientific literacy in Canada outlined in the *Pan-Canadian Common Framework of Science Learning Outcomes*.

The History/Geography curriculum for Grades 7 and 8 and the Canadian and World Studies curriculum for Grades 9 and 10 deal with the concepts and principles of sustainability and related societal issues.

The current secondary school Science curriculum contains 5 separate courses for Environmental Science: 3 general-level courses (1 each for grades 10, 11 and 12) and 2 advanced-level courses (1 in grade 10 and the other in grade 12).

Additionally, a Benchmark Study series of research reports was produced by the Ontario Learning for Sustainability Partnership (now Learning for a Sustainable Future – Ontario) in 1996.

Prince Edward Island: Currently, sustainability concepts are integrated across K-12 curricula at both the Atlantic and local levels.

Pertaining to Social Studies, the outcomes identified by Nova Scotia in the *Social Studies Foundation Document for Atlantic Canada K-12* also apply to Prince Edward Island. In addition, specific courses offered in PEI curricula which foster sustainability include: Canadian Geography (Global Issues); Language Arts; Science (ranging from Attitudinal Stewardship Outcomes, Materials Objects and Our Senses, Needs and Characteristics of Living Things, and Daily and Seasonal Changes in grade 1 to Oceanography, Chemistry, Biology, Physics, Agri-Science, Animal Science, Agriculture, Environmental Management, Environmental Studies, and Conservation in grades 10-12). Please refer to Appendix G for an in-depth report of sustainability concepts in PEI curricula.

Recommendations from the following report have been used as a framework for curriculum development in the province of Prince Edward Island. Specific reference to Recommendation #87 is noted.

Report to the Legislative Assembly of Prince Edward Island Respecting the Round Table on Resource Land Use and Stewardship, November 1997

Recommendation #87
"We recommend further efforts by the Department of Education in consultation with industry to incorporate into school curricula, either through existing courses or by new offerings, educational material pertinent to the environmental, social, and technical aspects of resource land use and stewardship."

Acknowledgement of the work presently done with respect to this issue has been recognized. It is recommended that continuation and expansion of these pertinent educational materials be continued as well as gaps identified and resources developed for other curricula.

One option from the recommendation that has been adopted is the development of lesson plans and modules in the area of waste management.

Prince Edward Island is presently developing Waste Management curriculum resources that will be implemented in the incoming school year. These resources use the concepts of the 3 R s as the framework for resource development. Teachers will be able to utilize these resources to meet many outcomes in their curriculum areas that address the concepts of sustainability.

Saskatchewan:

Since 1970, environmental education (EE) topics, concepts and issues have been integrated into Saskatchewan curricula.

In the fall of 1994, a team of researchers was contracted to map the connections between parts of the Saskatchewan curriculum and the knowledge, skills, and values statements of the Learning for a Sustainable Future framework (Appendix H). The areas of the curriculum chosen for mapping were: Science 1-12, Social

Studies/History 6-11, Language Arts 1-5, and Arts Education 6-9. Researchers examined learning outcomes, foundational objectives, knowledge objectives and common essential learnings of the various curriculum documents and tallied them by grade level against the LSF framework statements. The correlations were completed during December 1994 and January 1995. The results of this mapping project indicated that when the subject areas were examined (Language Arts, Mathematics, Science, Social Studies, Health, Physical Education, Arts Education, and Practical & Applied Arts) and considered together, Saskatchewan curriculum documents do indeed support many "connections" to the LSF goal statements and do so in a complimentary manner.

Saskatchewan Education decided to incorporate six Common Essential Learnings (CELs) into the eight curriculum areas mentioned above. As a foundation policy, the CELs such as Technological Literacy, Critical & Creative Thinking, and Personal and Social Values and Skills support SE. Most environmental issues and topics require problem solving, decision-making, and values clarification content in relation to the impact of technology and societal needs and wants.

Yukon:

The Yukon follows the British Columbia curriculum. At present the Science Curriculum Guide (K-7) is being implemented in grade 7. Integration of the K-6 program will be implemented in 2000-2001. The Social Studies Curriculum Guide is targeted for implementation in grades 4-7 in 2000-2001.

The Yukon, as a member of the Western Canadian Protocol, supports the *Foundation Document for the Development of the Common Curriculum Framework for Social Studies K-12* as it relates to educating for sustainability. Section 4: Social Studies – line item #20 states: "develop a consciousness for the limits of nature and a sense of stewardship for the land, as well as commitment to the practice of sustainable development."
Some contract work has been initiated to develop a local environmental curriculum that is related to educating for sustainability, i.e. backyard bio-diversity.

Professional Development for Sustainability Education

Professional development pertaining to educating for sustainability could include all activities intended to increase awareness and understanding of the interdependence between the environment, the economy, and the health and well-being of people. Professional development focuses on the implications of sustainability for the content and process of education as they pertain to their role, whether the role is teacher, principal, faculty member, instructor, administrative support, maintenance personnel, or other educational stakeholder.

Alberta: Professional development in Alberta involves a variety of partner groups and organizations including: local school jurisdictions; professional development consortia (a partnership between jurisdictions within a region); Alberta Learning; the Alberta Teachers' Association (through specialist councils, and through convention associations); developers of learning resources; universities and colleges; environmental resource groups and service providers; individual schools; and individual teachers.

British Columbia: Professional development in British Columbia is delivered by a partnership of educational organizations similar to that described for Alberta. Provincial Specialists Associations, teacher organizations (Peace Educators, Environmental Education and Global Education associations) have annual conferences and sponsor workshops in addition to more formal programs available to K-12 educators through post-secondary institutions.

Manitoba: Information Sessions related to the history and evolution of sustainable development, provincial legislation, and the *Departmental Sustainable Development Action Plan* have been presented to each branch within the Department.

New Brunswick: Professional development for sustainable education has been a cooperative effort involving the provincial Department of Education, the individual school districts and Educating for Sustainability in New Brunswick Schools. Initial presentations to raise awareness and solicit support have been made to the district superintendents and to curriculum consultants in the Department of Education.

The subsequent strategy will focus on identifying curriculum opportunities to explore issues of sustainable development, to identify and develop resources which will allow teachers to take advantage of those opportunities, to

sponsor the necessary professional development which alert teachers to both the opportunities and resources, and to encourage and support teacher efforts in this regard.

During each of the past five years, a combination of summer institutes and district, provincial and school-based workshops has been held with selected teachers. In order to ensure that the workshops influence classroom practices, care has been taken to focus on issues of sustainability which are relevant to the curriculum the workshop participants are charged with delivering. The workshops have aimed at establishing a balance between increasing teachers' understanding of selected issues of sustainable development and examining strategies and resources for exploring those issues in the classroom. Workshops have included teachers of all grade levels and a variety of subjects. Individual workshops have focused on such topics as forestry, agriculture and fishing within the context of sustainable development; energy and sustainable development; waste management and sustainable development; the ecosystem approach to sustainable development; entrepreneurship and sustainable development; eco-tourism and sustainable development; developing sustainable communities; protected areas and sustainability; and aquaculture and sustainable development.

Newfoundland and Labrador:

In Newfoundland and Labrador, sustainability concepts may or may not be a part of inservice delivered for Science and Social Studies (e.g.: Geography, Global Issues).

Northwest Territories:

Professional development in the NWT is delivered in partnership with District Education Authorities, District Education Councils, professional associations, the Department of Education, Culture and Employment and the Department of Renewable Resources, Wildlife and Economic Development.

Nunavut:

In Nunavut, professional development is delivered in partnership with District Education Authorities, District Education Councils, professional associations, the Department of Education, and Department of Sustainable development which comprises of tourism, wildlife and economic development.

Ontario: In Ontario, sustainability concepts may or may not be part of inservice training delivered for areas such as Science, Technology, and Social Studies - Geography and History. Professional Development opportunities include Summer Institutes and subject specific workshops which address the new curriculum documents.

Prince Edward Island: Presently, there is no required professional development related to sustainability education. However, teachers have access to Summer Institutes that may be offered in the region.

Saskatchewan: All of Saskatchewan's core curricula are developed with the help of professional seconded teachers – a tremendous professional development (PD) experience. Every one of the new core curricula are presented to teachers at in-service before they are implemented. Many areas of study have follow-up sessions. All of the subject area councils of the Saskatchewan Teachers' Federation (STF) host workshops and hold conferences to support PD. Other government departments and many NGOs provide PD opportunities dealing with the environment; e.g., Saskatchewan Environment and Resource Management (SERM) sponsors Project WILD and its "extensions"; there are many activities and events sponsored and supported by the Saskatchewan Outdoor and Environmental Education Association (SOEEA).

Yukon: Yukon has been involved in several educating for sustainability professional development initiatives. A "Traditional Knowledge Conference" held at Yukon College on April 1, 1998 was attended by a staff member responsible for the First Nations' Curriculum. This conference explored first-hand, with the assistance of First Nations' resource personnel and community elders, many elements related to educating for sustainability.

On May 12-13 1998, the staff member responsible for the First Nations' Curriculum attended a workshop where once again, with the assistance of First Nations' resource personnel and community elders, many elements related to educating for sustainability were explored. This workshop explored these matters with an international perspective.

At the July 8 General Assembly of Yukon First Nations, several elements related to education and educating for

sustainability were also explored; ex., wildlife and land management, renewable resources, lifestyles, environmental concerns, traditional knowledge, role of the elders, culturally relevant curriculum development, etc.

Teacher Pre-service and In-service for Educating for Sustainability

Teacher pre-service and in-service for educating for sustainability includes all activities that initially prepare or update the knowledge, skills, values, and attitudes of educators. This may include teachers in teacher education programs specializing in K-12, as well as teachers specializing in vocational, university, colleges, and other training programs. Faculty members may also be included.

In April and July 1999, the Ontario Teachers' Federation (OTF) and the Canadian Teachers' Federation adopted a resolution pertaining to education for sustainability. Policies (3.9) specified that, where appropriate, education for sustainability should be incorporated into pre-service and in-service programs.

Alberta:

In Alberta, the qualifications for teaching are governed by *Teacher Certification and Development*. No specific requirement is set for knowledge and skills related to educating for sustainability. Information on the pre-service training of teachers in Alberta can be obtained from the University of Alberta, University of Calgary, University of Lethbridge, Red Deer College, Lakeland College, Grande Prairie Regional College and other institutions in Alberta that provide programs leading to teacher certification.

In-service activities related to educating for sustainability take place through the work of each of the groups named above. The primary organizers of in-service activities are local jurisdictions and the specialist councils of the Alberta Teachers' Association. These councils include the Science Council, the Social Studies Council, and the Environmental and Outdoor Education Council.
As part of its agenda of programs, the Alberta Teachers' Association offers in-service activities in educating for sustainability in cooperation with the organization Learning for a Sustainable Future.

British Columbia:

The situation in British Columbia is similar to that for other jurisdictions. There is no requirement for a sustainability component in teacher pre-service and in-service activities.

Manitoba:

Information sessions related to sustainable development education have been conducted at some teacher education programs in the province, however, only at the request of those programs. Information sessions related to sustainable development education have also been conducted for

practising teachers at the request of school divisions or school principals. The Department's Sustainable Development Coordinator conducted these sessions.

The organization Learning for a Sustainable Future has conducted "Train the trainer" sessions pertaining to educating for sustainability for the last two consecutive years. These sessions will continue in 1999-2000.

New Brunswick:

New Brunswick has recognized the need to ensure that teachers entering the profession have an understanding of sustainable development and its relevance for curricula. Teacher training programs are offered at the University of New Brunswick in Fredericton and Saint John, St. Thomas University, and until recently Mount Allison University. Presentations have been made in successive years to students in the Introduction to Social Studies course and the course in Global Education at each of the above universities. The presentations have examined the concept of sustainable development, the educational implications of sustainable development, and the teaching resources which support educating for sustainability.

Newfoundland and Labrador:

In Newfoundland and Labrador, the qualifications for teaching are governed by the Teacher Certification Division. No specific requirement is set for knowledge and skills related to sustainability education.

Teacher pre-service and inservice related to sustainability concepts could be part of Science, Environmental Science or Social Studies courses (Geography, Global Issues).

Northwest Territories:

Teacher inservice in the NWT is delivered in partnership with District Education Authorities, District Education Councils, Professional Associations, the Department of Education, Culture and Employment along with other government and non-government organizations.

Nunavut:

In Nunavut, teacher inservice is delivered in partnership with District Education Authorities, District Education Councils, Professional Associations, the Department of Education along with other government and non-government organizations.

Ontario: Teacher pre-service and in-service related to "sustainability" concepts could be part of Science, Environmental Science or Geography courses delivered at faculties of education.

Prince Edward Island: With the implementation of The Atlantic Provinces Education Foundation (APEF) foundation and curriculum documents, teachers are encouraged, but not required, to participate in in-service training in the specific curriculum areas.

Quebec: A Resolution for sustainable development education was passed in Quebec. The Quebec Teachers' Federation (Centrale de l'enseignement du QuJbec - CEQ) has been involved in education for sustainable development since the early 1990s. In 1994, the CEQ created a network of schools called the Brundtland Green Schools (I coles vertes Brandtland – EVB) now numbering 409. The EVB network supports teachers, students, parents and administrators in their quest to create a world where peace, ecology and solidarity are intrinsic values. Students are encouraged to get involved in recycling, composting and other environmental activities, non-violent action and international cooperation projects. Next fall, the highest level of the CEQ, the General Council, will approve a policy paper linking education for a sustainable future with the fundamental goals of education for the 21st Century.

Saskatchewan: Both universities in Saskatchewan provide teacher pre-service training for all of the eight subject areas mentioned above. In addition, the universities offer courses focused on environmental and/or outdoor education. Extension courses provide additional opportunities to teachers for SE. Dr. Paul Hart, professor of Science Educationat the University of Regina, developed the foundation document for Core Curriculum Science supported by Dr. Glen Aikenhead of the University of Saskatchewan in Saskatoon. They are both world-renowned educators.

Learning Resources for Educating for Sustainability

Learning resources supporting educating for sustainability may include all materials (print and non-print) and experts in particular areas (i.e., people with relevant knowledge and or experience). Learning resources can be used to support the continuum of education and training opportunities.

Alberta:

Learning resources used in Alberta classrooms include those authorized by the Minister and those that are reviewed and selected locally. Provincially authorized resources must address the outcomes within a given program of study.

A variety of print and not-print resources are used. No formal review of resources based on sustainability themes is available, but there are nevertheless many resources that incorporate sustainability themes.

Learning resources to support the program revisions at grades 7 and 8 are currently under development

British Columbia:

Learning resources for classroom use in British Columbia must be approved through the Ministry or a Board approval process. There has been a considerable number of resources approved through both avenues that contain or incorporate environmental and sustainability themes.

Manitoba:

Learning resources used in Manitoba classrooms include those that are authorized by the Minister and those that are locally developed and departmentally approved.

A variety of print and non-print resources is used. Many resources incorporate sustainability themes. A searchable website exists which identifies resources supporting sustainability content (available in French and English).

New Brunswick:

A variety of learning resources has been identified or developed to support educating for sustainability. The following is representative of the resources distributed as part of the in-service efforts in New Brunswick.

- *Towards a Sustainable Future* -a video developed by Learning for a Sustainable Future to introduce teachers to the origins of the concept of sustainable development and its implications for education.

- *Inquiries for a Sustainable Future* - a series of teaching units organized around a decision-making approach to the study of selected Canadian Issues.

- *Indicators for Action* - developed by Rescue Mission: Planet Earth and distributed by Environment Canada, this resource is designed to have students investigate the extent to which their communities are sustainable and encourage the students to act on their findings.

- *Teaching About Sustainability: Some Strategies* - developed by New Brunswick teachers, this resource provides lesson plans designed to assist in integrating the study of sustainable development into a variety of subject areas.

- *Sustaining Our Future* - a simulation developed by the Heritage Project and designed to have students take the measure of Canada's environmental record

- *Decisions for Development* - a simulation developed by the Heritage Project and designed to have students examine Canadian policy towards the developing world.

- *A Forest For All* - a simulation developed by the Canadian Pulp and Paper Association that focuses on development that is sustainable, and on the many uses and values of the forest. It considers the views of various individuals and groups as they relate to major expansion proposals by a fictitious company in the forest industry.

Numerous other videos and print materials have been distributed as part of the professional development initiatives but the list is too long to be included here. A considerable number of resource persons has also been identified and these individuals have been most helpful in making presentations at our workshops. This speakers list includes individuals from the private and public sector in such areas as forestry, energy, agriculture, fishing, waste management, eco-tourism, and protected areas.

Newfoundland and Labrador: Learning resources used in the province are authorized by the Minister. A variety of print and non-printed resources are used . Many resources incorporate sustainability themes. No formal review of resources based on sustainability is available.

Northwest Territories: Learning resources used in NWT schools include those authorized by the Minister and those that are reviewed and chosen by local District Education Authorities / District Education Councils or schools. The resources chosen must address the program of studies and should be reflective of the foundation documents Dene Kede and Inuuqatigiit.

Nova Scotia: Two documents from the Nova Scotia Round Table on the Environment and the Economy (1992 and 1993) provide a clear view of sustainability education in Nova Scotia (past, present, and future). *Sustainable Development and the Environment: The Role of Formal Education*, a report of the Subcommittee on Environment and Sustainable Development Education, provides guiding principles for sustainability education, and provides a conceptual framework for SDE. This document includes an overview of the public school program (K-12) as well as what exists in universities and colleges. Adult learners are also emphasized in this Report. The document *Sustainable Development Strategy for Nova Scotia* is useful in providing a vision for SDE.

Nova Scotia has also provided learning resources supporting sustainability education for principals. *Environmental Education and Sustainable Development – An Introduction for Principals* is a useful learning resource. This document provides resources that have been developed and adopted by Nova Scotia schools such as Project Wild, the Project Learning Tree, and others.

Nunavut: Learning resources used in Nunavut schools include those authorized by the Minister and those that are reviewed and chosen by local District Education Authorities / District Education Councils or schools. The resources chosen must address the program of studies and should be reflective of the foundation documents and Inuuqatigiit.

Ontario: In Ontario, learning resources used in classrooms include those approved for purchase by the Minister, those

developed by provincial teacher organisations, and those developed locally by district school boards. Ministry approved learning resources must address a substantial part of a particular curriculum document and are selected for approval by teams of teachers.

Prince Edward Island:

As of December 1998, newly developed resources in the area of Enterprise/ Entrepreneurship Education have been integrated into our K-12 classrooms in Atlantic Canada. These resources were developed with sustainability as part of the focus. Through these resources, teachers encourage students to recognize, utilize, and manage our natural resources, identify and respect the environments in which we live, utilize and replenish the resources which are available within our communities, and develop problem-solving and decision-making skills.

Another potential initiative that has been undertaken by a local community is the establishment of a Community Environmental Centre that could be utilized by the provincial school system as a field test site.

Saskatchewan:

The Department of Education has a resource-based learning policy. Print and non-print materials are continuously recommended to support the teaching and learning of the eight areas of study. Bibliographies are released at the time of implementation. Updates are provided periodically – usually yearly. (The bibliographies and updates are posted on the Saskatchewan Department of Education website. Items supporting sustainability education can be searched through this website. The Learning Resources Distribution Centre stocks recommended materials for purchase by schools.

Educating for Sustainability Education Models/Innovative Practices

Educating for sustainability models/innovative practices may include any approach to education that reflects sustainability concepts. The focus is on "how to", reflecting sustainability in the process. Models may exist in areas such as decision-making, program development, policy development, service delivery, etc. Examples could include cooperative education models, community based approaches, funding incentives for education innovation, holistic and integrative approaches, etc.

Alberta:

Models for educational delivery are determined at a local level. Both subject-specific and integrated models for instructional delivery are used. Adaptation of program delivery to meet the needs of individuals and groups involves a wide range of learning activities and instructional media.

Some general suggestions regarding effective programming are provided in the *Guide to Education*, a reference document developed by Alberta Learning. Models for delivery are described in learning resources, sometimes explicitly and sometimes implicitly. Alberta Education authorizes learning resources that support a variety of instructional models.

Sustainable Communities Initiative

Alberta has an interesting new program called the Sustainable Communities Initiative (SCI) which is available to Alberta communities wishing to further environmental or sustainable development activities in their local community. The program's goal is to support community action to become healthy and sustainable through public education, participation and communication. The SCI represents a partnership between Alberta Environmental Protection, industry, and FEESA (a provincially-based environmental education society). Appendix I provides more detail on this initiative.

British Columbia:

Instructional strategies are determined primarily by classroom teachers. Specific models for organization or delivery of instruction may be determined at the school or school-district level. There are several BC school districts with outdoor education centres or other programs which have a significant environmental or sustainability component and many schools and districts have specific programs in place to address related topics or concepts.

Manitoba:

In Manitoba, many educators and schools have been recognized for their innovative ways of integrating sustainability concepts into teaching and learning. The Sustainable Development Innovation Fund (a fund directly aimed at encouraging sustainable development activities in the province of Manitoba) has provided several resources. Examples include:

Sustainable Development in the Boreal Forest (Queenston School)

A grant was approved to produce and distribute 3,000 copies of a multimedia, interactive CD-ROM entitled "Sustainable Development in the Boreal Forest". This project will include the sustainable development curriculum in Manitoba schools and it will educate our community about safe, clean and healthy environmental habits. This interactive CD-ROM will be distributed to all elementary schools (K-9), the Manitoba Round Table for Sustainable Development, environmental agencies in Manitoba, and to community groups in Manitoba. CD-ROMs are available.

Sustainable Development and the Integrated Curriculum: Real World Teaching and Learning in the Middle Years Classroom (Arthur A. Leach Junior High School)

A grant was approved to assist Arthur A. Leach in the development of an Integrated Curriculum which will promote and foster an understanding of the integration of the environment, the economy and the well-being of the community. This proposal emphasizes many characteristics of sustainable development including "real-world" and "hands-on" experiences which will be researched and published on the Internet through the creation of a website. The information will be globally accessible and will be beneficial to students, teachers, principals, businesses and organizations. Students and teachers will serve as role models for others through the use of technology and research.

Electricity: A Project for Science and Sustainable Development (Green and Growing)

A grant was given to Green & Growing Environmental Education Projects Inc. for the production of a ½hour video and printed *Teacher's Guide of Electricity: A Project for Science and Sustainable Development Education*. The project will provide education and awareness of electricity

from a sustainable development viewpoint. The video and Teacher's Guide will analyze social issues related to the applications of science in terms of advantages and disadvantages for sustainability. The project will also describe the properties of energy and energy transfers and transformations. The information gathered and analyzed will be available on the Internet. The project hopes to reach hundreds of thousands of students and teachers for K-9.

Self '98 - Learning for a Sustainable Future

A grant was approved to assist Learning for a Sustainable Future to organize professional development workshops for teachers and other educators focusing on the content and teaching methodology of Education for Sustainable Development (ESD), including a *Sustainability Education Leadership Forum* at Riding Mountain National Park Project activities include three workshops and a number of case studies. The aim of these activities is to provide educators with the skills necessary to promote the idea of a sustainable future, both in their classrooms and in their communities.

1-Nature Place: A Manitoba Nature Encyclopedia for Kids (Nature North Zine)

A grant was approved to assist the Nature North Zine Organization in the development of a nature encyclopedia for children to be available on the Internet. The encyclopedia would serve to educate K-S1 educators and students about Manitoba plants and animals and their ecology. There will be a publicly accessible pilot version of 1-Nature Place available on-line which will provide Manitobans with information about the natural heritage and biodiversity of this province. It will also provide new teaching resources for schools, particularly in the area of computer- and Internet-based skills development.

Additionally, the Manitoba Department of Education and Training's Aboriginal Education and Training Strategy and the province's Urban Aboriginal Strategy may be seen as innovative models in two respects. First, they are founded on partnership. Second, they explicitly link education and training to the larger social, economic, and environmental picture. They are both committed to a cross-sectoral and holistic approach.

New Brunswick: The following initiatives in New Brunswick represent innovative approaches to educating for sustainability:

- ***The Tantramar Wetlands Centre (TWC)*** - Tantramar High School in Sackville, N.B. has developed a community-based centre of excellence in wetlands education providing innovative, experiential programming for students, teachers, local residents and visitors to the Tantramar region. TWC's mission is to promote the value of wetlands, teach the importance of biodiversity and educate the public to understand the need for sustainability in the way we live.

- ***The Hurley Island Project*** - this project originated in Ontario and consists of a two-credit interdisciplinary studies course entitled *Environmental Sustainability and Internet Technology: The Hurley Island Project*. Two students from Carleton North High School will participate in the project this year and we hope to expand our participation in future years. Appendix J provides more information about the *Hurley Island Project*.

- ***Destination Conservation*** - under this program students conduct an energy audit of their school, and recommend and undertake energy saving measures. Savings derived from these measures are returned to the school.

- ***Sustainable Communities*** - the Provincial Department of Fisheries and Oceans has funded a number of sustainable development initiatives in selected communities, each with an educational component. DFO has also cooperated with Educating for Sustainability in New Brunswick Schools in the planning and delivery of workshops for provincial teachers.

In addition to the above, numerous schools have participated in such initiatives as the Seeds Project or Project WILD and the Green Wings Project, to name a few.

Newfoundland and Labrador:

A Global Education Project was in effect in Newfoundland and Labrador schools from 1992 to 1996. Various schools participated in this project.

The Global Education Project: Sharing the Planet

A Global Education Project was in effect in Newfoundland and Labrador' schools from 1992 to 1996. Various schools participated in this project.

"Global education is aimed at preparing students for citizenship in the globalized society of today and tomorrow. It encompasses international development, environmental awareness and action, peace education and human rights." (Sharing the Planet- brochure)

An evaluation report was prepared in July 1996.

Northwest Territories: Instructional strategies are determined primarily by classroom teachers. Adaptation of programs are encouraged to meet the program needs of individuals and be reflective of the communities culture and heritage. Outdoor education and summer / fall field camps at the Junior and Senior High level have enabled schools to deliver innovative programming related to environmental and cultural sustainability.

Nunavut: In Nunavut, classroom teachers determine instructional strategies. Adaptation of programs are encouraged to meet the program needs of individuals and be reflective of the communities culture and heritage. Outdoor education and summer / fall field camps at the Junior and Senior High level have enabled schools to deliver innovative programming related to environmental and cultural sustainability.

Ontario: Ontario has developed, with partners, a grade 12 two-credit, interdisciplinary studies course entitled *Environmental Sustainability and Internet Technology: The Hurley Island Project.* This is a partnership project made possible by the Independent Learning Centre, the Ontario Ministry of Education and Training, and Learning for a Sustainable Future (Ottawa). Students (two from each province and territory) will exchange views on local, national, and global sustainability issues, while exploring

ways in which Internet technology can facilitate the sharing of information (See Appendix J for an excerpt of the Hurley Island Project Proposal).

Saskatchewan:

The Department of Education pursues a child/learner-centered, inclusive model of education. This means promoting active learning using a variety of instructional methods, using a wide range of learning materials, and adapting curricula, instruction, and assessments to meet the needs of the individual learner. The Core Curriculum process has identified the essential knowledge, skills, processes, and value dimensions to be learned in schools. This includes much EE content, hence SE content.

Some STSE Science content is assessed by the SAIP and provincial assessments. Many science fair projects have an environmental connection. The SEEDS Learners in Action schools demonstrate much leadership by students, teachers, parents and communities in Saskatchewan. Saskatchewan has a very comprehensive recycling program – closely linked to schools. Most schools have outdoor and environmental education projects and extra-curricular programs.

III. WHERE SHOULD WE GO FROM HERE?

If the decision of the CMEC is that "Educating for Sustainability" should move forward, the following recommendation could be considered:

Recommendation:

That the CMEC, either as a Core Activity or through a Consortium, select one of the following options for consideration:

Option #1:	CMEC develop K-12 Educating for Sustainability policies and guidelines.
Option #2:	CMEC develop K-12 Educating for Sustainability policies, guidelines, and curricular outcomes.
Option #3:	CMEC take a leadership role in the development of a Pan-Canadian Strategy for Educating for Sustainability for K-12 and Post-Secondary Education including skills training and labour market development. Such a Strategy could include a vision, principles and guidelines, priorities, roles and responsibilities, and an Action Plan.

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APPENDIX A. HISTORICAL OVERVIEW OF SUSTAINABLE DEVELOPMENT, SUSTAINABILITY, AND EDUCATING FOR SUSTAINABILITY

1915

Sustainable development is not a new idea. In 1915, Canada's Commission on Conservation declared our need to live within the world's means. The Commission supported the notion that each generation is entitled to the interest on the natural capital, but the principal should be handed down unimpaired.

1960's

The concept of "sustainability" was also discussed by ecological authors such as Muir, Leopold and Carson as early as the 1960's and 1970's. Their concerns stemmed from the exponential growth of the human population and the resulting load this growth placed on the natural environment. The argument that the world has finite resources and a finite capacity to absorb the ecological burdens that humans may put on it was widely espoused by many authors and scientists during this time period. Many authors proposed solving the world's population problem by recommending that developed countries embark on a process of "de-development" and that underdeveloped countries pursue a different type of development. To create a better balance of equity between developed and underdeveloped countries, some suggested that developed countries should share their wealth and resources with developing countries.

1972

The Stockholm Declaration

In 1972, delegates from 113 countries attended the United Nations Stockholm Conference on human environment "Only One Earth" to discuss environmental problems such as acid rain and pollution. This gathering of nations resulted in The Stockholm Declaration and Action Plan. The Action Plan highlighted 109 recommendations for action in areas of conservation of natural resources, education, human settlements, and pollution at the national and international levels. The Stockholm meeting also resulted in the creation of the United Nations Environment Program (UNEP). Several United Nations Conferences focusing on such themes as water, climate, science and technology, air and water pollution, women, and others continued to occur between 1974 and 1981.

1983

World Commissio on the Environm And the Economy

In 1983, the United Nations General Assembly appointed an independent commission to study the critical environmental issues that have arisen as a consequence of development. The intent of this Commission was to generate solutions that would effectively address these issues. This Commission was known as the World Commission on Environment and Development (WCED) chaired by Prime Minister Gro Harlem Brundtland of Norway.

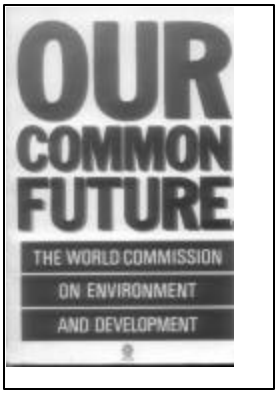
The specific mandate of the Commission was (WCED, 1987):

1. To re-examine the critical issues of environment and development and to formulate innovative, concrete and realistic action proposals to deal with them;
2. To strengthen international co-operation on environment and development and to assess and propose new forms of co-operation that can break out of existing patterns and influence policies and events in the direction of needed change; and
3. To raise the level of understanding and commitment to action on the part of individuals, voluntary organizations, businesses, institutes and governments (p. 356).

1987

Brundtland Commission

From 1983 to 1987, the Commission (also known as the Brundtland Commission) undertook research and conducted public hearings to explore global solutions to problems caused by environmental degradation. The Commission was confident that *"it was possible to build a future that is more prosperous, more just, and more secure."* The Commission report, ***Our Common Future***, was presented to the UN General Assembly in 1987 and concluded that the world was facing a serious threat brought on by unsustainable development. This report, also known as the Brundtland Report, captured the world's attention and has become a highly influential document. The Report emphasized the links between problems of growth, technology, environment and economics and offered the solution – sustainable development. It was this report that defined sustainable development as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (WCED, 1987, p. 8) referenced in the introduction of this paper. Central ideas contained in the report include sustainability as a condition that the global human population should strive toward, and development as the process of change required to attain sustainability.



1992

World Conference on Environment and Development (Earth Summit)

Almost a decade later (1992), the United Nations voted to hold a World Conference on Environment and Development (Earth Summit) in Rio de Janeiro. Representatives from 178 countries, along with 117 heads of state met in June 1992 to discuss the relationship between the environment and the economy. The Conference delegates adopted the Earth Charter (Appended).

The Conference resulting in the production of an 800-page report entitled *Agenda 21* which discusses future sustainable development initiatives.

The Earth Summit – Agenda 21 Chapter 36

One of the key reference points for the advancement of a sustainable future through education has been Chapter 36 of *Agenda 21* (Rio de Janeiro, 1992). This chapter is titled "Promoting education, pubic awareness and training," and has been adopted and approved by 178 countries.

Education is the basis for action:

Education, including formal education, public awareness and training should be recognized as a process by which human beings and societies can reach their fullest potential. Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and development education, the latter needs to be incorporated as an essential part of learning. Both formal and non-formal education are indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviours consistent with sustainable development and for effective public participation in decision-making. To be effective, environment and development education should deal with the dynamics of both the physical/biological and socio-economic environment and human (which may include spiritual) development, should be integrated into all disciplines, and should employ formal and non-formal methods and effective means of communication.

36.5 (b) Governments should strive to update or prepare strategies aimed at integrating environment and development as a cross-cutting issue into education at all levels within the next three years. This should be done in cooperation with all sectors of society. The strategies should set out policies and activities, and identify needs, cost, means and schedules for the implementation, evaluation and review. A thorough review of curricula should be undertaken to ensure a multidisciplinary approach, with environment and development issues and their socio-cultural and demographic aspects and linkages. Due respect should be given to community-defined needs and diverse knowledge systems, including science, cultural and social sensitivities;

(c) Countries are encouraged to set up national advisory environmental education coordinating bodies or round tables representative of various environmental, developmental, educational, gender and other interests, including non-governmental organizations, to encourage partnerships, help mobilize resources, and provide a source of information and focal point for international ties. These bodies would help mobilize and facilitate different population groups and communities to assess their own needs and to develop the necessary skills to create and implement their own environment and development initiatives.

1996

The united nations Commission on Sustainable Development (CSD)

Mandated to ensure the follow up of *Agenda 21,* in April 1996, the 52 member countries of the United Nations Commission on Sustainable Development recommended 1) the development of an international strategic alliance among UNESCO, UNEP, the World Bank, UNDP, UNICEF, WHO and international NGOs such as WWF, IUCN and others and 2) the development and implementation of a workplan.

At its Fourth Session in April 1996, the Commission on Sustainable Development (CSD) recommended that a Work Programme be developed with the following objectives:

- Develop a broad international alliance, taking into account past experience and promoting networks in partnership with UNEP, IUCN and other key institutions;

- advise on how education and training for sustainable development can be integrated into national educational policies;

- advance education and training for sustainable development for educators at the national level;

- refine the concept and key messages for sustainable development;

- provide financial and technical support.

1997

The Extraordinary Session of the U.N. General ASSEMBLY (June 1997)

In preparation for the Extraordinary Session of the United Nations General Assembly (June 1997), which looked at progress since the Earth Summit, the CSD recommended that:

- Chapter 36 be considered a cross-sectoral chapter of *Agenda 21*. Since 1992, this chapter has continued to enjoy unanimous support from governments, major groups and the educational community of both developed and developing countries, as it had in Rio. Education is considered indispensable for sustainable development and for increasing the capacity of people to address environment and development issues. The implementation of Chapter 36 is, therefore, seen to influence progress in the implementation of all the other chapters of ***Agenda 21***.

- Recommendations concerning education also appear in each of the action plans of the major United Nations conferences held after the United Nations Conference on Environment and Development as well as in the three conventions (on biodiversity, climate change and diversification). For this reason, education can be seen as the cornerstone of sustainable development in all its dimensions.

As demonstrated at the Extraordinary Session, many countries have already made the initial steps necessary to reorient education toward sustainable development.

Paragraph 105 of the Final Declaration endorsed by all countries states the following:

Even in countries with strong education systems, there is a need to reorient education, awareness and training to increase widespread public understanding, critical analysis and support for sustainable development. Education for a sustainable future should engage a wide spectrum of institutions and sectors, including but not limited to business /industry, international organizations, higher education, government, educators and foundations, to address the concepts and issues of sustainable development, as embodied throughout Agenda 21*, and should include the preparation of sustainable development education plans and programmes, as emphasized in the Commission's work programme on the subject adopted in 1996. The concept of education for a sustainable future will be further developed by UNESCO, in cooperation with others.*

The importance of sustainable development education has been recognized at different regional meetings. Those meetings include:

- The Workshop on Sustainable Development Education and Awareness, Prague, Czech Republic, November - December 1995;

- The Seventh Conference of the Ministers of Education of Latin America and the Caribbean, Kingston, Jamaica, May 1996;

- The mid-decade Meeting of the International Consultative Forum on Education for All, Amman, Jordan, June, 1996;

- The Summit of the Americas on Sustainable Development, Santa Cruz de la Sierra, Bolivia, December 1996;

- The International Conference on Education, 45th Session, Geneva, Switzerland, September-October 1996.

- The International Conference on Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action, organized by UNESCO and the Government of Greece, Thessaloniki, Greece, December 1997.

- At the First meeting of the Ministers of Education of the Americas, the *Inter-American Education Program* was approved and a resolution was adopted to put forward the project of *Education for Citizenship and Sustainability in Multicultural Societies*, and for that purpose, the ministers recommended the coordination of the efforts of other organizations with similar experiences.

- In the United States, the President's Council on Sustainable Development has developed a national strategy for Sustainable Development Education.

The concept of sustainability has been accepted by thousands of teachers and other educators across Canada and reinforced by the endorsement of stakeholders from all sectors of society, including government, business, labour and parent groups. Sustainability is being incorporated into new curriculum guidelines. For example, the *Pan-Canadian Framework for Science Learning Outcomes*, and *Science, Technology, Society and Environment (STSE)* reflects this perspective, as does the Science foundation document of the Common Curriculum developed by the Atlantic provinces.

The response of Canadian education to this crucial global, national and community agenda has put Canada in the forefront of what is becoming a global movement to prepare present and future generations for participation in the processes needed to reverse current unsustainable trends and to contribute to changes that will shape a more sustainable 21st Century.

Learning for a Sustainable Future
1991-1999

Recognizing the important role of formal education systems in furthering sustainable development, the National Round Table on the Environment and the Economy created the non-profit organization Learning for a Sustainable Future (LSF) in 1991. LSF continues to work with educators from across Canada to integrate the concepts and principles of sustainable development into the curricula at all grade levels.

Educating for sustainability calls for different ways of thinking, different ways of making decisions, and different ways of doing things.

Recognizing the vital role curricula play in the process of teaching and learning, LSF has developed a framework (Appendix H) to support the integration of sustainable development education principles into provincial education policies, schools, curricula, teacher training and professional development. This framework was circulated to approximately 800 leading educators, government and non-governmental organizations, business leaders and others. The framework identifies a comprehensive list of the knowledge, skills and values which are relevant to sustainability of the environment, the economy, and the health and well-being of society. The framework also represents a consensus among Canadian educators about what is now needed to educate a citizen of the world for the 21st Century.

EARTH CHARTER

UNCED – The historic United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil, 3-14 June 1992, adopted the following:

PRINCIPLE 1 **Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.**

PRINCIPLE 2 **States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdictions or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.**

PRINCIPLE 3 **The right to develop must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.**

PRINCIPLE 4 **In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.**

PRINCIPLE 5 **All States and all people shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.**

PRINCIPLE 6 **The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.**

PRINCIPLE 7 **States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.**

PRINCIPLE 8 **To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.**

PRINCIPLE 9 **States should cooperate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.**

PRINCIPLE 10 **Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making**

processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

PRINCIPLE 11 **States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.**

PRINCIPLE 12 **States should cooperate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.**

PRINCIPLE 13 **States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.**

PRINCIPLE 14 **States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.**

PRINCIPLE 15 **In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.**

PRINCIPLE 16 **National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.**

PRINCIPLE 17 **Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.**

PRINCIPLE 18 **States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.**

PRINCIPLE 19 **States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse**

transboundary environmental effect and shall consult with those States at an early stage and in good faith.

PRINCIPLE 20 **Women have a vital role in environmental management and development. Their full participation is, therefore, essential to achieve sustainable development.**

PRINCIPLE 21 **The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.**

PRINCIPLE 22 **Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and fully support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.**

PRINCIPLE 23 **The environment and natural resources of people under oppression, domination and occupation shall be protected.**

PRINCIPLE 24 **Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.**

PRINCIPLE 25 **Peace, development and environmental protection are interdependent and indivisible.**

PRINCIPLE 26 **States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.**

PRINCIPLE 27 **States and people shall cooperate in good faith and in a spirit of partnership in the fulfillment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.**

Source: The United Nations Conference on Environment and Development, June 16, 1992.

APPENDIX B. UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION – EDUCATING FOR SUSTAINABILITY

Educating for a sustainable future
(Environment, population and development)

Regular budget	Scenario A
* Activities:	$1,700,000
* Decentralization:	75.0%
Extrabudgetary:	$9,920,000

The General Conference
Authorizes the Director-General
(b) to implement the intersectoral project "Educating for a sustainable future" in order to continue to promote concerted inter-agency action at country level to foster public awareness of and education for a sustainable future, in particular by enhancing Member States' capacities to integrate into educational programs at all levels, both formal and non-formal, relevant educational components; to develop appropriate population policies and programs; and, to that end, to promote the integrated follow-up to the United Nations conferences of the 1990s and post-Rio conventions; and, as Task Manager for Chapter 36 of Agenda 21, to intensify the implementation of the International Work Programme of the United Nations Commission on Sustainable Development in collaboration with all relevant international and national partners;
(c) to allocate for this purpose an amount of $1,700,000 for program costs, $6,100,500 for staff costs and $492,400 for indirect program costs (Scenario A)

Background. The new transdisciplinary concept "educating for a sustainable future" has been developed in the framework of this project together with UNESCO partners, to foster education as a key instrument for addressing interwoven issues of environment, population and development including poverty, health and wasteful consumption and production patterns. Emphasis has been placed on promoting the integrated follow-up to the relevant United Nations conferences (in particular UNCED and Cairo) and post-Rio conventions through concerted actions by all partners concerned at international, regional and national levels. Action during the past biennium has included, *inter alia*: the holding of an International Conference on Environment and Society (Thessaloniki, Greece, December 1997); the launch of a OAS/UNESCO cooperative framework on "Education for a sustainable future in the Americas"; the initiation of inter-agency pilot projects in three countries; preparations to launch subregional demonstration projects for community-level activities in French-speaking and East and Southern Africa; and technical and financial assistance, given mainly through field offices, to national and regional initiatives to reorient curricula and teacher education in some 35 countries.

Moreover, in the framework of ICPD follow-up and the UNESCO/UNFPA cooperation program, support was provided, through the inter-agency TSS-CST system, to over 100 Member States in developing population policies and programs, and to 60 projects on population education. In addition, UNESCO continues to implement global projects on population education at university level and on socio-cultural factors affecting demographic behaviour. As Task Manager for Chapter 36 of *Agenda 21*, UNESCO prepared the expanded International Work Program of the United Nations Commission on Sustainable Development and has taken an active role in its implementation.

Strategy. Actions will be geared to consolidating and expanding the ongoing activities aimed at renewing and enriching curricula, teaching/learning materials and teacher education. Emphasis will continue to be placed on reorienting education programs at all levels—both formal and non-formal—with special attention to the emerging open, distance and community learning systems. By working closely with all program sectors, including the intergovernmental scientific programs, efforts will be made, particularly through the field offices to enhance interdisciplinary action at national and local levels. Assistance to Member States will be provided to design policies and programs, build capacities and mobilize resources for further developing education for sustainable development, in particular through the innovative inter-agency cooperation and joint action initiatives at country level, which will be reinforced and expanded. Emphasis will be placed on ICPD+5 follow-up by continuing support for programs and policies in the field of population, in particular reproductive health, population education, family and community life, gender equality and women's empowerment, as well as preventive education through the inter-agency TSS-CST system. Support will be given for implementing the ongoing innovative demonstration activities, for initiating new projects at national and community levels and for launching public awareness campaigns in selected countries. UNESCO's action, which will be undertaken mainly through the field offices, will emphasize technical assistance, capacity-building through training and dissemination of prototype materials, and best practices and regional networking, in close cooperation with competent United Nations agencies, IGOs, NGOs as well as the media. UNESCO will continue to participate actively in inter-agency consultation mechanisms set up to promote the integrated follow-up to the United Nations conferences and conventions and reinforce inter-agency cooperation and joint action in implementing the project activities at regional, national and local levels.

Results expected at the end of the biennium

- The implementation of the ongoing innovative inter-agency initiatives in five Member States continued and new initiatives launched in some eight additional Member States;
- Reviews of national educational policies from the perspective of sustainable development undertaken in some 20 Member States;
- Some 200 innovative demonstration projects at national and local levels implemented or supported;
- Support extended to some five UNESCO Chairs in the area of education for sustainability;

- Policy guidelines, teacher education modules (including 30 "Self-Study Modules"), teaching/learning packages and other materials for use in both formal and non-formal contexts produced and diffused (print and CD-ROM versions); regional versions of the UNESCO map of the "Distribution of the World's Population", and accompanying educational materials published and distributed;
- Population education policies and programs at country level improved, in particular through continued participation in the inter-agency TSS-CST system and the implementation of the recommendations of the five-year review of the International Conference on Population and Development (ICPD+5) pursued;
- Sharing of best practices enhanced through the development of 20 national nodes within the International Registry of Innovative Practices in Education, Public Awareness and Training for Sustainability and through a wider distribution of the newsletter *CONNECT*;
- Key actors, particularly within the United Nations system mobilized to implement the International Work Program of the United Nations Commission on Sustainable Development and to develop joint actions in that regard; preparations for the RIO+10 review of Chapter 36 of *Agenda 21* undertaken; a joint implementation plan concerning education for the three post-Rio conventions developed.

APPENDIX C. PRINCIPLES AND GUIDELINES OF SUSTAINABLE DEVELOPMENT

The Principles of Sustainable Development:

1. **Integration of Environmental and Economic Decisions** means:
   [a] economic decisions should adequately reflect environmental and human health effects; and
   [b] environmental and health initiatives should adequately take into account economic consequences.

2. **Stewardship** means:
   [a] the environment, economy and community well-being should be managed for the benefits of present and future generations; and
   [b] recognizing Manitobans are caretakers of the environment, economy and community well-being for the benefit of present and future generations; and
   [c] balancing today's decisions and tomorrow's effects.

3. **Shared Responsibility** means Manitobans should acknowledge responsibility for sustaining the environment, economy and community well-being with each being accountable for decisions and actions, in a spirit of partnership and open cooperation.

4. **Prevention** means Manitobans should anticipate and prevent or mitigate significant adverse environmental, human health, community and economic effects of decisions and actions.

5. **Conservation** means Manitobans should:
   [a] maintain essential ecological processes, biological diversity and life-support systems of the environment;
   [b] harvest renewable resources on a sustainable yield basis; and
   [c] make wise and efficient use of renewable and non-renewable resources.

6. **Waste Minimization** means Manitobans should endeavour to reduce, reuse, recycle and recover the products of society.

7. **Enhancement** means Manitobans should enhance the long term productive capability, quality and capacity of natural ecosystems.

8. **Rehabilitation and Reclamation** means Manitobans should:
   [a] endeavour to restore damaged or degraded environments to beneficial uses;
   [b] ameliorate damage caused in the past; and
   [c] consider the need for rehabilitation and reclamation in future decisions and actions.

9. **Scientific and Technological Innovation** means Manitobans should research, develop, test and implement technologies essential to further environmental quality, human health and economic growth.

10. **Global Responsibility** means:
    [a] Manitobans should think globally when acting locally;
    [b] recognizing there are no boundaries to the environment and economy, and there is ecological and economic interdependence among provinces and nations; and
    [c] working cooperatively within Canada, and internationally to accelerate the merger of environmental, human health, community and economic factors in decision making and while developing comprehensive and equitable solutions to the problems.

The Guidelines of Sustainable Development:

1. **Efficient Use of Resources** means:
   [a] encouraging and facilitating development and application of systems for proper resource pricing, demand management, and resource allocation together with incentives to encourage efficient use of resources; and
   [b] working towards full cost accounting of decisions and actions.

2. **Public Participation** means:
   [a] establishing appropriate forums which encourage and provide opportunity for consultation and meaningful participation in decision making processes by Manitobans;
   [b] endeavouring to provide due process, prior notification and appropriate and timely redress for those adversely affected by decisions and actions.

3. **Understanding and Respect** means:
   [a] being aware that Manitobans share a common physical, social and economic environment;
   [b] having understanding and respect for differing social and economic views, values, tradition and aspirations; and
   [c] considering the aspirations, needs and views of various regions and groups in Manitoba to facilitate equitable management of Manitoba's common resources.

4. **Access to Adequate Information** means:
   [a] encouraging and facilitating the improvement and refinement of environmental, human health, community and economic information; and
   [b] promoting the opportunity for equal and timely access to information by all Manitobans.

5. **Integrated Decision Making and Planning** means encouraging and facilitating decision making and planning processes that are efficient, timely, open, cross-sectoral and which incorporate time horizons relevant to long-term implications.

6. **Substitution** means encouraging and promoting the development and use of substitutes for scarce resources where they are both environmentally sound and economically viable.

General Scope and Application:

The Principles and Guidelines of Sustainable Development are intended to promote and facilitate sustainable development in Manitoba.

The Principles and Guidelines are general in nature and must be interpreted with common sense and discretion and are not intended nor should they be interpreted or applied as a mandatory regulation or a rigid standard. Rather, their interpretation and application will vary depending upon the specific circumstances under consideration.

None of the Principles and Guidelines has precedence over the others. Rather, they should all be considered together as a whole within the overall context of economic and environmental sustainability, human health and community well-being.

Source: Government of Manitoba, *Sustainable Development and Consequential Amendments Act*. 1998.

APPENDIX D. NEW BRUNSWICK – LEARNING FOR A SUSTAINABLE FUTURE: A CONTEXT

Each generation should examine its educational system by asking:

Why are we teaching, what we are teaching, to these particular students, in this particular way, at this particular time?

Such a question suggests that we should examine the contemporary context or setting to determine whether there are certain imperatives therein, which might guide us in selecting appropriate content and in adopting a relevant pedagogy. Today, such an examination has led to a global awakening, a recognition of the growing interdependence which characterizes the planet and its inhabitants and the emerging challenges which must be addressed if we are to create a sustainable future. While it is not necessary to list the specific threats, there is as Jennifer Tuchmann Matthews has suggested a growing recognition that "Mankind is rapidly…altering the basic physiology of the planet" and that problems of poverty and environmental degradation are inextricably linked and cannot be resolved in isolation. We are in danger of crossing ecological thresholds.

Given this fundamental threat, what should be the response of education? What content and methods are appropriate, if as some have suggested, we are educating for survival? In 1987 the World Commission on Environment and Development (WCED) released its findings in a report entitled *Our Common Future*. The report initiated a world dialogue and debate on the concept of sustainable development, which it defined as "development which meets the needs of the present generation without jeopardizing the ability of future generations to meet their needs." Education is critical to realizing such a future.

Educating for Sustainability

While accepting that education is vital to addressing the problems facing the planet, critics have expressed concern about the concept of "educating for sustainability." Jickling (1992) argues that "educating for" suggests proselytizing rather than educating. Sustainable development, Jickling argues, should not be regarded as "an uncontested concept and education used for its advancement." Such an approach approximates training rather than education, the latter of which has as its aim to make people question and think. Jickling's argument has merit and it should be noted that sustainable development or educating "about" sustainability is intended here to indicate a process not an end, a conceptual framework in which to analyze issues. It requires that students recognize the interplay among the environment, the economy and the health of society. It encourages students to abandon the sometimes simplistic explanations offered by a linear approach to cause and effect in favour of a systems approach, which has as its goal to make students effective systems analysts. It helps students recognize the interdependence which characterizes our increasingly borderless world. The case study approach, which has become an effective vehicle for studying issues of sustainability, promotes skills of critical analysis and thinking, and requires that students examine their value system in developing their position on a given issue. Examination of such issues also provides a

forum in which creative thinking may be encouraged as students are asked to propose solutions to the problems presented. Issue analysis in this context also helps students to explore their particular perspective and the perspective of others, both of which are essential pre-conditions to effective consensus building. Finally, in examining issues of sustainability, students will recognize how their particular choices or actions have consequences both locally and globally, and may be expected to realize they are players in this drama. System analysis, critical and creative thinking, values clarification, informed action-these are all important goals of education and counter rather than promote propaganda.

Lucie Sauvie, in outlining a typology of sustainability has identified the following concepts of sustainable development:

a) Continuous development owing to technological innovation and free trade. This school of thought argues that economic growth resulting from a competitive, market-driven economy will solve social and environmental problems.
b) Development as dependent on a world order. This conception, while acknowledging that free market and technological innovation brings development, argues that the "new wealth" thus created must be better distributed through a restructuring of existing political, social, and economic organizations.
c) Autonomous or Indigenous Development. This concept assumes that development should reflect the particular culture, promote traditional knowledge and techniques and lead to a form of collective, subsistence economy.

If appropriate course content and classroom practices are adopted, students will recognize the different schools of thought outlined above and debate the merits of each. Such an approach guarantees that sustainable development becomes a framework for analysis and discussion, rather than a pre-packaged set of principles which students are expected to accept.

Implications for Content Selection and Methodology

In selecting content, curriculum developers and classroom teachers may be expected to choose topics which will allow students opportunities to develop a vision of what a sustainable future might be and to acquire the knowledge, skills, attitudes and experiences which will allow them to realize that sustainable future. Content which focuses on real phenomena, characterized by tension and debate may be expected to provide the entry into the larger issues of sustainability. The case-study approach is particularly effective in this regard.

In selecting content, curriculum developers may give consideration to topics which promote the following set of knowledge, skills and attitudes, which are critical to educating about sustainability.

The student will understand:

- The planet is a finite system and the elements which constitute the planetary environment.
- The resources of the earth, especially soil, water, minerals; their distribution and role in supporting living organisms.
- The impact on the environment, societies and cultures of particular philosophies/world views and patterns of economic activity.
- The dependence of humans on the resources of the environment for life and sustenance.
- The role of science and technology in the development of societies and the impact of these technologies on the environment.
- The interconnections of present world political, economic, environmental and social issues.
- Aspects of perspectives and philosophies concerning the ecological and human environments.
- Cooperative international and national efforts to find solutions to common global issues, and to implement strategies for a more sustainable future.
- The implications for the global community of the political, economic and socio-cultural changes needed for a more sustainable future.
- Processes of planning, policy-making and action for sustainability by governments, businesses, non-governmental organizations and public.

Skills

- Frame appropriate questions to guide relevant study and research.
- Use a range of resources and technologies in addressing questions.
- Assess the nature of perspective and evaluate different points of view.
- Develop hypotheses based on balanced information, critical analysis and careful synthesis, and test them against new information and personal experiences and beliefs.

- Communicate information and viewpoints effectively.

- Develop cooperative strategies for appropriate action to change present relations between ecological preservation and economic development.

- Work towards negotiated and cooperative resolution of conflict.

Attitudes and Values

- An appreciation of the resilience, fragility and beauty of nature and the interdependence and importance of all life forms.

- A sense of self-worth and rootedness in one's own culture and community.

- A respect for other cultures and recognition of the interdependence of the human community.

- A global perspective and loyalty to the world community.

- A concern for disparities and injustices, a commitment to human rights and to the peaceful resolution of conflict.

- Personal acceptance of a sustainable lifestyle and a commitment to participation in change.

- An appreciation of the urgency of the challenges facing the global community and the complexities that demand long-term planning for building a sustainable future.

- A sense of hope and a positive perspective on the future.

- An appreciation of the importance and worth of individual responsibility and action.

Since the goal defined herein is the search for a sustainable future, it rejects a teaching methodology that assumes the questions and answers have already been determined and the teacher's role is limited to a formal presentation, where students are required to demonstrate their understanding by memorizing a set of facts. Rather, it encourages a methodology which leads to critical construction of knowledge and the development of relevant actions. Such a methodology is inquiry based, emphasizes the competencies related to problem solving, adopts an interdisciplinary approach and recognizes the affective as well as the cognitive dimensions of learning.

The examination of relevant case-studies and the use of simulations and role-play have proved particularly effective strategies in incorporating the methodology as outlined.

Implications for Curriculum Integration

An examination of issues of sustainability may be expected to promote the type of curriculum integration which is currently being espoused. In examining the extent to which a given policy or strategy is sustainable, students will by definition be required to analyze the interplay between economic, environmental and social factors. As suggested earlier they need to become system analysts who recognize that a study which focuses exclusively on any one of these factors in isolation is not likely to yield the understanding essential to good policy-making. Only a study which recognizes the whole as against the parts, the economic issues and forces involved, the possible environmental consequences of particular strategies, the extent to which a policy may enhance or inhibit the health of society--will lead to necessary professional understanding. Such a study is likely to involve reference to mathematics, geography, biology, literature, history and a host of other disciplines, but particularly the sciences and the social studies.

Implications for Foundations Documents

If we accept the premise that we are engaged in education for survival, something of this mandate should emerge in the vision statement. While science and social studies literacy are noble ends it may be argued that these are means to a greater end. One might suggest that the greater end is the development of a responsible society and that science, social studies and other components of education contribute to this end. Sustainability thus becomes one of the outcomes of such a society.

Essential Graduation Learning

The essential graduation learnings as presently articulated provide ample opportunity to make sustainability an integral component of student learning. While each of the Essential Graduation Learnings offers a window of opportunity, the following are particularly rich in possibilities.

Citizenship: In exploring issues of sustainability students must grapple with the concept of the common good and individual responsibility, both of which are central to the idea of citizenship. They are asked to decide how a particular policy may promote or hinder the common good in terms of its economic, environmental and social impact. In making such a determination students must have reference to the values of the society and must explore how their own actions contribute to or detract from the required response. Such consideration must lead to a discussion of the relative responsibility of the state and the individual, the extent to which the state should legislate, and the obligation of the individual to accept or challenge that legislation.

Problem Solving: The most critical problem facing the planet and its inhabitants is survival. How do we build a future which is sustainable; which meets the needs of generations to follow? Exploration of this essential question and its many implications

will promote the critical and analytical skills education is expected to develop. Specific case studies will allow students to evaluate the merits of cooperative problem solving and consensus building. It may also be expected to have students grapple with the most basic issue – defining the problem. In trying to solve issues related to sustainability students are encouraged to develop the skills of effective system analysis, to recognize that everything "ramifies" and that we all live downstream. It avoids the linear thinking which ascribes a single cause to a simple effect and which often leads to compartmental thinking.

Technological Competence: Any consideration of issues of sustainability must of necessity involve a discussion of the role of technology. What is meant by a "technological fix"; what constitutes appropriate technology; is a massive global technological transfer required to save the planet and its inhabitants; how might technology be used to acquire the information and make projections necessary to build a sustainable world; to what extent does a given societies' world-view predispose it to embrace technology, what are the ethical implications of certain technological developments? These are essential questions which students must explore.

Issues of sustainability require the student not only to analyze the role of technology but to use technology in acquiring the information necessary to better ensure a meaningful analysis. The so called "information highway" becomes both a means for and an object of much analysis.

Personal Development: Personal development requires that we define for ourselves what constitutes the good life. What responsibilities do I have as a member of society, what are the core values which will direct my life? In addressing specific issues of sustainability the student will be required to struggle with these fundamental questions and begin to develop a personal ethic, a frame of reference, which may guide his or her relationship with others on the planet. In exploring the concept of sustainable development the student must first decide what constitutes development in society. Can development be equalled with economic growth, with the GNP; or does development imply something more profound and fundamental? Such considerations may be expected to encourage the student to also consider what constitutes development of the person.

Key Stage Outcomes

Although the concept of sustainable development may seem somewhat obtuse to a grade three student, the student is capable of recognizing examples of unsustainable developments such as the collapse of the cod fishery. The student may examine a local stream or ecosystem and identify the factors which threatens its sustained use; he or she may track the path of a particular good they consume from production to disposal and note the "cost" involved. These examples are suggested, merely to note the obvious, i.e. that it is possible to approach the topic of sustainability with varying degrees of concreteness and sophistication and this should be reflected in the key-stage outcomes. Indeed, at the early grades we may wish to satisfy ourselves by focusing on developing in the student an attitude towards nature which will better ensure the sense of appreciation and wonder which will favour support for a sustainable approach to the planet.

The key-stage outcomes should lead the students from a consideration of sustainability at the local level to the larger issue of global sustainability, while noting the connection between the two.

Unifying Ideas and Concepts

The science curriculum document has identified a number of unifying ideas and concepts and perhaps the social studies document will include such a list. Certain ideas or concepts are central to the larger issue of sustainability and include the following:

Interdependence: Environmental concerns first alerted us to the nature of our borderless world, but we have since come to recognize that same interdependence operates in the economic, cultural and political sphere, as we witness the growth of the global economy, the spread of AIDS, the threat of international terrorism and other evidence of our global village.

As suggested earlier, everything "ramifies" and we all live downstream. Such realities have profound implications for building a sustainable world.

Systems: An understanding of systems is linked to an appreciation of interdependence. Examples of systems may be found in the environmental or the economic sphere and may be studied at the local, national or global level. Such study will help develop the system-analyst thinkers required to build a sustainable future.

Scarcity: The idea that an imbalance exists between relatively unlimited wants and limited available resources necessitates the creation of systems for deciding what resources will be exploited, what goods will be produced and how they will be distributed. It implies a recognition that the planet is a closed system and that the planet's resources are finite and we must, therefore, exercise due caution in using the Earth's Capital.

Perspective: Students must appreciate they have a perspective, a world-view which is unique to their culture and that others may have a perspective quite different, emerging as it does from a particular environmental and historical tradition. Such a realization will help students recognize their perspective includes a way of looking at nature and our relationship with nature, a concept of progress, development and the good life, none of which may be universally shared. Such perspective consciousness may lead students to recognize the legitimacy of the views of others and the possibility of learning from others.

While not exhaustive, the above may have provided some direction in answering the question posed at the beginning and in exploring that fundamental question, suggested some considerations for those charged with developing the social studies and science curricula.

APPENDIX E. UNIT SUMMARIES OF SUBJECT MATTER RELATED TO A SUSTAINABILITY THEME (ALBERTA)

Note: The secondary science programs in Alberta are currently under revision. These unit summaries are based on the proposed revised programs which will be implemented according to the schedule on page 15.

Interactions and Ecosystems (Science 7)
This unit provides students with some conceptual tools for studying environments and for monitoring and assessing effects of human action. Students learn to recognize evidence for change and distinguish natural cycles of change from long-term and enduring trends.

Plants for Food and Fibre (Science 7)
This unit provides a focus on the culture of living things in managed environments to meet human needs for food and fibre. The sustainability of current practices is examined and impacts on the larger environments are considered.

Fresh and Saltwater Systems (Science 8)
The interaction of water and land is examined in this study of streams, drainage systems and ocean basins. Students consider the role of water bodies in life-supporting environments, and examine how variations in water characteristics can affect the distribution of living things.

Biological Diversity (Science 9)
This unit develops student awareness of the diversity of species found in local and global environments, and the subtle variations in characteristics found within individual species. Students examine trends towards loss of diversity, and consider related issues concerning environmental quality and impact of technologies.

Environmental Chemistry (Science 9)
In this unit, students become aware that chemical substances make up the underlying fabric of the world, and examine the role of different substances in natural cycles and changes. Students investigate ways that chemical substances enter and interact within environments and consider their affect on the distribution and abundance of living things.

Energy Flow in Global Systems (Science 10)
This unit examines processes that drive weather systems and that sustain life on earth. The transfer of energy through radiation, convection and conduction is examined from a global perspective and the factors that influence the transfer and transformation of energy are investigated. Evidence of climatic change is evaluated and the potential impacts of climate change

are assessed from environmental and socio-economic perspectives.

The Changing Earth (Science 20)
This unit examines changes in the Earth over time – including geological changes, environmental changes, and changes in life forms found in those environments. Evidence of interaction is studied, with a particular focus on factors leading to, and resulting from, climate change over the past 2 million years.

Changes in Living Systems (Science 20)
This unit examines factors that lead to cyclic and long-term change in ecosystems, and associated changes in species distribution and diversity. The evolution and extinction of species over time are examined, and are interpreted in terms of current scientific theory. The need to sustain a diversity of life-supporting environments is made evident in this unit.

Chemistry in the Environment (Science 30)
The chemistry of acids and bases and a variety of synthetic organic compounds is studied, and the role of these materials in environments is considered. Uses, benefits and hazards of different materials are examined, as well as methods used in their manufacture, safe handling and disposal.

Energy and the Environment (Science 30)
This unit examines different forms of energy and methods used in transforming and applying energy for human use. The sustainability of different resource use is examined, and the effectiveness and appropriateness of particular technologies are assessed.

Note: While science programs in Alberta place substantial emphasis on sustainability development, concepts related to sustainability also are addressed in several other school programs including the compulsory Social Studies program, the Career and Technology Studies courses for grades 7 to 12, the provincial junior high Environmental and Outdoor Education course and many locally developed outdoor education courses offered by schools throughout the province.

APPENDIX F. INTEGRATION PROCESS OF SUSTAINABLE DEVELOPMENT INTO CURRICULUM - MANITOBA

Renewing Education: New Directions, A Foundation for Excellence indicates that foundation skill areas and elements will be integrated into new curriculum documents, as appropriate. Integration is occurring within three types of curriculum documents for various subject areas:

- curriculum frameworks of outcomes and standards (define expectations for student achievement)
- foundation for implementation documents (provide suggestions for instruction, assessment, and learning resources)
- support documents (developed as necessary to provide a particular curricular focus)

New curriculum documents incorporate the following foundation skills and elements:

- foundation skill areas (literacy and communication, problem solving, human relations, and technology)
- resource-based learning
- differentiated instruction
- curriculum integration
- Aboriginal perspectives
- gender fairness
- appropriate age portrayals
- human diversity
- anti-racist/anti-bias education
- sustainable development

Processes for Integration

Project leaders draw on their own expertise related to foundation skill areas and elements, as well as following three main processes for integration:

- incorporating research from a variety of documents prepared by Manitoba Education and Training and/or external researchers
- appointing representatives with specialized expertise in the foundation skill areas and elements to development teams and/or contracting with experts who work with project teams in a consulting capacity to advise on inclusion of foundation skill areas and elements
- arranging for internal and external reviews by experts with specialized knowledge and experience related to the foundation skill areas and elements.

Approaches to Integration

Integration is intended to produce curriculum documents as inclusive as possible. However, not all foundation skill areas and elements will receive equal weight or similar treatment in every subject area or within every document for a given subject area. To a large extent, the nature of the discipline and the grade determines how integration occurs. Development teams use three main approaches:

- foundation skill areas and elements **underpin** the documents and are **reflected in the curriculum document's philosophical approach**, e.g., using an inquiry approach in science supports problem solving as a foundation skill area

- foundation skill areas and elements are **defined as actual learning outcomes** in curriculum frameworks of outcomes and standards documents

- foundation skill areas and elements are **addressed through suggested instructional and/or assessment strategies and/or student learning resources** in foundation for implementation and teacher support documents

The checklist summarized in Table 1 assists project leaders and reviewers with the integration process.

Table 1 Checklist for Integration of Foundation Skill Areas/Elements into Curriculum Documents

Project/Document_____ Project Leader_____

Foundation Skill Areas/ Elements	**Approach in Curriculum Documents**				**Process for Integration**		
	Included as outcomes (CF of O/S & F for I)	Reflected in strategies for instruction	Reflected in strategies for assessment	Reflected in learning resources	Input by project team member(s)	Feed-back from ME&T expert(s)	Feedback from external expert(s)
Literacy and communi-cation (fsa)							
Sustainable Development							
etc.							

A. Examples of Integration of Sustainable Development into New Curricular Documents

I Curriculum Frameworks of Outcomes and Standards

Science

A major focus of both the *Pan-Canadian Common Framework of Science Learning Outcomes* and Manitoba's curriculum frameworks for science is the inter-relationship among science, technology, society, and the environment (STSE). As outlined in the introduction to *Kindergarten to Grade 4 Science: Manitoba Curriculum Framework of Outcomes*, STSE understandings are an essential component of scientific literacy.

To achieve scientific literacy, students must develop an appreciation for the importance of sustainable development. To this end, the Science Framework integrates the Sustainable Development Strategy developed by the Province of Manitoba. Sustainable development is a decision-making model that considers the needs of both present and future generations, and integrates and balances the impact of economic activities, the environment, and the health and well-being of the community (p. 2.7).

Science: General Learning Outcomes Related to Sustainable Development

- B3. Identify the factors that affect health, and explain the relationships among personal habits, lifestyle choices, and human health, both individual and social
- B5. Identify and demonstrate actions that promote a sustainable environment, society, and economy, both locally and globally

Science: Specific Learning Outcomes Related to Sustainable Development

Grade 1	Grade 2	Grade 3	Grade 4
Characteristics and Needs of Living Things 1-1-13 Develop, implement, and evaluate personal and group action plans that contribute to a healthy environment for themselves and for other living things. Characteristics of Objects and Materials 1-3-11 Demonstrate ways to reduce, reuse, and recycle materials during classroom learning experiences	Properties of Solids, Liquids, and Gases 2-2-16 Describe ways humans dispose of solids and liquids to maintain a clean and healthy environment Air and Water in the Environment 2-4-11 Explain and appreciate the importance of clean air and water for humans, plants, and animals 2-4-12 Identify substances that	Growth and Changes in Plants 3-1-18 Explain how humans replenish the plants they use and the consequences if plants are not replenished. Soils in the Environment 3-4-10 Describe ways to return organic matter to the soil. 3-4-11 Use the design process to construct a simple composter that returns organic matter to the	Habitats and Communities 4-1-14 Investigate natural and human-caused changes to habitats, and identify resulting effects on plant and animal populations. 4-1-15 Describe how [students'] actions can help conserve plant and animal populations and their habitats. **Sound** 4-3-12 Describe harmful effects of high or

	pollute air and water, and describe ways of reducing such pollution. 2-4-13 Recognize that clean water is an increasingly scarce resource in many parts of the world, and describe consequences of a shortage of clean water. 2-4-14 Record personal use of water, and identify ways in which they can reduce water usage.	organic matter to the soil.	sustained sound levels and identify potential sound hazards at home or in the community. **Rocks, Minerals, and Erosion** 4-4-12 Investigate and describe ways in which soil erosion is controlled or minimized in [students'] community and in communities around the world. 4-4-13 Use the design process to determine an appropriate system for controlling soil erosion in a given situation. 1-4-15 Identify natural phenomena and human activities that cause significant changes in the landscape.

English Language Arts

No specific learning outcomes in new English Language Arts curricula address sustainable development. However, the emphasis on systematic research and inquiry in General Outcome 3, Manage Ideas and Information, helps students in problem-solving and decision-making. General Outcome 5, Celebrate and Build Community, includes a focus on skills and knowledge for working collaboratively in groups, and appreciating diverse viewpoints. The skills and understanding students develop in these contexts are directly applicable in dealing with sustainable development issues.

Physical Education/Health Education

A new Kindergarten to Senior 4 Physical Education/Health Education: Manitoba Framework of Outcomes is under development. Its rationale emphasizes the importance of the health of Manitoba children and youth, not only for their personal well-being at present, but also for the well-being of the province in the future. In view of the escalating costs of health care, and the impact of a work force with significant health risks on the general economy, it is essential that students develop physical and social behaviour skills to prevent health and social difficulties.

Accordingly, a significant number of the learning outcomes in strand 4 – Personal and Social Management Skills – address decision-making, problem-solving, and conflict resolution related to health and well-being. These skills are directly applicable to the sustainable development decision-making model.

II Foundation for Implementation Documents

Mathematics

Although the learning outcomes for mathematics do not include direct references to sustainable development, some suggested instructional and assessment strategies in the foundation for implementation documents focus on sustainable development concepts. For example, in the Kindergarten to Grade 4 and Grades 5 to 8 foundation for implementation documents, the data analysis unit lends itself to addressing topics in this area, as do learning activities related to percent, probability, ratio, and proportion.

Similarly, in Senior Years mathematics, where the emphasis is also on the application of mathematical skills and knowledge to solve everyday problems, some learning activities deal with topics related to sustainable development. An excerpt from *Senior 2 Consumer Mathematics: Half Course 1 Student Handbook* (p. 1-A-3) illustrates this focus.

> Facility Location
> A big controversy arose in a community in southern Manitoba because XYZ trucking company wanted to build a new terminal that was to be the biggest in the province. The residents of the area were fighting the new terminal because they felt it would create too much noise and air pollution. This is an example of one problem that many businesses face when they want to establish a new location.
>
> Many other factors must be considered when a company opens a new store or plant. One of the most important is where to locate the facility so that the distance travelled by customers and suppliers is kept to a minimum. A company can save thousands of dollars every year by properly locating its facility, since the cost of shipping products is so high.
>
> Specific Problem
> This type of problem requires geometry for its solution.. . .
>
> *Senior 2 Consumer Mathematics: Half Course 1 Student Handbook* (p. 1-A-3)

APPENDIX G. PRINCE EDWARD ISLAND – EDUCATING FOR SUSTAINABILITY IN K-12

Currently the following is happening across our curriculum at both the regional level as well as our local, provincial level.

Social Studies:

Please refer to **Social Studies Foundation Document for Atlantic Canada K - 12.** Outcomes have been identified by Nova Scotia.

In addition, specific courses at the grade 10 - 12 level that foster sustainability include:

Geography 421A - Canadian Geography
This course reflects a Canadian picture through the following units:
Physical Geography tectonic processes and existing structures;
Canada's weather and weather patterns;
Political & social geography;
Industry - Canadian & USA comparison;
Province by province study of Agriculture, lumbering, and mining;
Urban studies - selected Canadian cities;
Local geography - field trip;

Geography 431A - Canadian Geography
This course is designed to give students a better appreciation of their country and the people who live in it. The study includes not only the physical makeup of Canada with her natural resources and industries, but covers areas of water management, transportation, as well as energy supply and conservation. Other topics discuss migration, population distribution and the complex problems of our native people.

Geography 531A
This course emphasizes human geography in a world setting. The influence of land and water forms, climates and resources on people in various parts of the world are considered. The focus is on three units of study:
Unit 1 The View from Space, examines some of the physical features of planet earth;
Unit 2 The View from the Air, analysing the relationship of environment and people;
Unit 3 The View from the Ground, continental areas.

Geography 631A - Global Issues
The course content in this program includes physical geography, cultural geography, economic geography, environmental and future studies, mapping and field trips. Instructional Materials include **The Human World: A Changing Place, World Geography**

SCIENCE CURRICULUM

The Atlantic Provinces Education Foundation (APEF) has developed and is implementing a common curriculum for K - 12 Science. These documents are presently in various stages of development and piloting.

Science Grade K-3

Attitudinal Stewardship Outcomes
The APEF curriculum documents encourage students to be sensitive to the needs of other people, other living things, and the local environment.

Units and outcomes pertaining to sustainable futures include:

Grade 1

Materials Objects and Our Senses: Unit Overview
Our awareness of our environment - and the many materials found in it - are based on our sensory experiences. The materials and objects found around us have a wide variety of properties, representing the rich and diverse environments in which we live.

Students will be expected to:
- explore and describe ways to create useful objects by combining or joining different components or materials.
- identify objects used, how they are used, and for what purpose they are used.
- describe and demonstrate ways to use materials appropriately and efficiently to the benefit of themselves and others.

Needs and Characteristics of Living Things: Unit Overview
Through investigations students will become aware of the dynamic nature of life: all living things are interdependent, and must take an active role in obtaining the necessities of life.

Students will be expected to:
- describe ways that humans use their knowledge of living things in meeting their own needs and the needs of plants and animals.
- recognize that humans and other living things depend on their environment, and identify personal actions that can contribute to a healthy environment.

Daily and Seasonal Changes: Unit Overview
With guidance, students learn that changes often occur in cycles, including the relatively short cycle of day and night and the longer cycle of the seasons. Recognizing these patterns prepares students to discover relationships among events in their environment, and between the environment and themselves.
The context for this unit is one of cycles. Students will learn that many things in life occur in cycles, and knowing about these cycles help people make predictions and plan for the future.

Students will be expected to:

- investigate and describe changes that occur on a daily basis in the characteristics, behaviours, and location of living things.
- investigate and describe changes that occur in seasonal cycles in the characteristics, behaviours, and location of living things
- investigate and describe human preparations for seasonal changes.

Grade 2

Animal Growth and Changes: Unit Overview
Through observation students will become aware of the natural environment in which animals live.

Students will be expected to:

- describe features of natural and human-made environments that support the health and growth of some familiar animals.
- identify the basic food groups, and describe actions and decisions that support a healthy lifestyle.

Air and Water in the Environment: Unit Overview
Air and water form a major part of the physical environment and are essential materials for life.
Students will consider the characteristics of these important materials, how air and water are connected, and how weather can affect the form of water. They will gain an appreciation for having a clean water supply and investigate how water pollution can affect living things.

Students will be expected to:

- describe the effects of weather and ways to protect things under different conditions.
- identify examples of water in the environment and describe ways that water is obtained, distributed, and used.
- identify the importance of clean water for humans, and suggest ways they could conserve water.

Liquids and Solids: Unit Overview
Through examination of materials in our environment, students will become aware of a wide array of similarities and differences in properties and how they respond to environmental change.

Students will be expected to:

- describe and demonstrate ways we use our knowledge of solids and liquids to maintain a clean and healthy environment.

Grade 3

Plant Growth and Changes: Unit Overview
Through observation of the natural world , students will become aware of how plants respond to their natural environments and investigate how various conditions affect plant growth. The unit also introduces technological products and processes that have been developed that use plants to meet the needs of people.

Students will be expected to:

- describe ways in which plants are important to living things and the environment.
- identify parts of different plants that provide humans with useful products, and describe the preparation that is required to obtain these products and how our supply of useful plants is replenished.

Exploring Soils: Unit Overview
Students soon discover there is more to soil than just dirt. It is material for creatures to live in and for plants to grow in, and provides a base for gardens, forests, fields, and farms. By examining soils, students discover that soils are made up of more than one thing, and that the particular combination of materials in soil has a lot to do with the lives in it and on it. By focusing on the ways we can change soil - especially changes that occur as a result of water - students learn that soil is affected by humans and the environment. The importance of soils to living things, and how it can be used to make technological products, is emphasized as well.

Students will be exp ected to:

- compare the absorption of water by different soils, and describe the effect of moisture on characteristics of the soils**.**
- observe and describe the effects of moving water on different soils.
- investigate and describe how living things affect and are affected by soils.
- demonstrate and describe ways of using earth materials to make useful objects.
- investigate and describe recycling of biological materials in soils.

The APEF Science Curriculum Foundation documents K - 9 have recently completed the development stage. They are currently been piloted in some of the provinces in Atlantic Canada, with a full implementation within the next 2-5 years. In the interim, PEI has identified broad content topics. Each topic has a number of sub-topics and learner expectations specific to each grade. **Themes in Primary Science** attempts to manage this content by suggesting themes under which similar or related topics might be grouped. Some of these topics have been adapted by the APEF curriculum documents. At each grade level there will be opportunities for teachers to integrate science topics with themes, or individual titles in Language Arts. Some of the themes at the grade 1 - 3 level are as follows:

Grade 1
Water, Weather and Seasons
Our Senses
Needs of Plants and Animals

Grade 2
Hot and Cold
Communities
Fossils and Dinosaurs
Rocks and Minerals

Grade 3
Energy
Waste and Our World
Life Cycles
Our Changing Earth

Science 4 - 6

Attitudinal Stewardship Outcomes
The APEF curriculum documents at this grade level encourage students to be sensitive to and develop a sense of responsibility for the welfare of other people, other living things and the environment.

Units and Outcomes pertaining to sustainable futures include:

Grade 4

Habitats: Unit Overview
The investigation of the habitat and the discussion of the impact of humans on it can be used to create a meaningful context which drives this unit. Students' questions can be used as a catalyst for the investigation of the types of organisms, how these organisms meet their needs, and the relationships between them. In the end, they should be prepared to make decisions about the affect the development will have on the habitat and how best to make their concerns known so that action can be taken.

Students will be expected to:

- identify positive and negative effects of familiar technologies.
- describe how personal actions help conserve natural resources and care for living things and their habitats.
- identify their own and their family's impact on natural resources.
- predict how the removal of a plant or animal population affects the rest of the community.
- relate habitat loss to the endangerment or extinction of plants and animals.

Rocks, Minerals and Erosion: Unit Overview
Students can explore the changing landscape by examining the processes of erosion, transport, and deposit; and determine how wind, water, and ice reshape the landscape. An examination of these processes also leads to discussions of ways that humans prevent landscape from changing or adapt to a changing landscape.
There are opportunities to design: students can make and test construction materials, as well as design solutions to the problems of soil erosion.

Students will be expected to:

- describe effects of wind, water, and ice on the landscape.
- demonstrate a variety of methods of weathering and erosion.
- describe natural phenomena that cause rapid and significant changes to the landscape.

Grade 5

Meeting Basic Needs and Maintaining a Healthy Body: Unit Overview
Integrating with health/family living will facilitate a decision-making focus, and should be set in a context of making choices that lead toward living an active, healthy lifestyle. Students at this age will soon have to make many important decisions about smoking, drugs, and alcohol. This unit will provide them with opportunities to see how their body systems work together and how these systems can be adversely affected when the wrong choices are made.

Students will be expected to:

- describe nutritional and other requirements for maintaining a healthy body.

Grade 6

Electricity: Unit Overview
A basic understanding of how electricity works and affects our daily lives, help students recognize the need for safe practices when around electricity, the control they have over consumption, and the impact energy consumption has on electricity as a resource.

Students will be expected to:

- compare past and current needs, and describe some ways in which science and technology have changed the way people work, live, and interact with the environment.
- describe how personal actions help conserve natural resources and protect the environment in their region.
- describe the potential impact of the use by humans of regional natural resources.

From the text **Innovations in Science**, grades 4-6 , content includes in part:

Grade 4
Down Under, the soil beneath our feet
Waterworld
The Plant Project
Ponds and Polliwogs

Grade 5
Weather
Sky Science
Waste Not, Want Not
Microworlds

Grade 6
Let's Go Rocking
Switched On
Earth Team

Science 7-9

Attitudinal Stewardship Outcomes
The APEF curriculum documents at the 7-9 grade level encourage students to be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment. They are also encouraged to project beyond the personal consequences of proposed actions.
Units & Outcomes pertaining to sustainable environments include:

Grade 7

Interactions with Ecosystems: Unit Overview
Most students have been interacting with a variety of living organisms, but are not necessarily aware of the essential role every type of organism plays in large systems like ecosystems. Through this unit students will study the diversity of organisms, how they interact, the dependence of living organisms on their physical world, and the interrelationships between all components of healthy ecosystems. They will determine factors that threaten local wildlife habitats and find potential solutions to real life situations.

Students will be expected to:

- propose a course of action on social issues related to science and technology, taking into account personal needs.
- describe how matter is recycled in an ecosystem through interactions among plants, animals, fungi, and micro-organisms.

Earth's Crust: Unit Overview
Through this unit students develop an understanding of the dynamics of geological systems and events. They become better able to explain and make connections between the theories of Earth science and their own experiences and geology.

Students will be expected to:

- suggest solutions to problems that arise from applications of science and technology, taking into account potential advantages and disadvantages.
- examine some of the catastrophic events such as earthquakes or volcanic eruptions, that occur on or near the Earth's surface.
- classify various types of soil according to their characteristics and investigate ways to enrich soils

Unit summaries of subject matter from **SCIENCEPLUS Technology & Society 7,** related to sustainability include: Living Things, Temperature and Heat, Changes in the Land, Micro-organisms and Food

Grade 8

Cells Tissues Organs & Systems: Unit Overview
Through this unit students will begin to appreciate a correlation between healthful living and healthy systems. Here students will deal with the system as an integrated whole. They will be expected to describe examples of the interdependence of various systems of the human body.

Students will be expected to:

- make informed decisions about applications of science and technology, taking into account personal and social advantages and disadvantages.
- describe examples of the interdependence of various systems of the human body.

Optics: Unit Overview
Through this unit students will be provided with ample opportunity to investigate and study various technologies that are associated with electromagnetic radiation and to explore the positive and negative attributes and their impact on our way of life and our environment.

Students will be expected to:

- describe possible positive and negative effects of a particular scientific or technological development, and explain how different groups in society may have different needs and desires in relation to it.
- Analyse the design of a technology and the way it functions on the basis of identified criteria such as cost and impact on daily life and the community.

Water Systems on Earth: Unit Overview
Through this unit students will have an opportunity to investigate how the oceans and the shorelines interact, what relationships exist between ocean currents, winds and climates, and how these abiotic factors impact life in and around the oceans. Students will be introduced to and explore the effects of wind, water and ice on the landscape, and demonstrate a variety of methods of weathering and erosion.

Students will be expected to:

- apply the concepts of systems as a tool for interpreting the structure and interactions of natural and technological systems.
- explain how water and tides are generated and how they interact with shorelines.
- describe processes of erosion and deposition that result from wave action and water flow.
- analyse factors that affect productivity and species distribution in marine and freshwater environments.
- describe factors that affect glaciers and polar icecaps and describe their consequent effects on the environment.

Unit summaries from **SCIENCEPLUS Technology and Society 8** include: Interactions, Consumer Product Testing, Face-Lifting a Planet, Growing Plants.

Grade 9

Characteristics of Electricity: Unit Overview
Through this unit students will be given the opportunity to investigate the technologies that permit the use of electrical energy and evaluate both the technologies and their direct and indirect impacts on the environment and society in general.

Students will be expected to:

- provide examples of how science and technology affect their lives and their community.

- evaluate the design of a technology and the way it functions on the basis of identified criteria such as cost and the impact on daily life and the environment.
- make informed decisions about applications of science and technology, taking into account environmental and social advantages and disadvantages.
- propose a course of action on social issues related to science and technology, taking into account the human and environmental needs.

Unit summaries from **SCIENCEPLUS Technology and Society 9** include: Diversity of Living Things, Chemical Changes, Fluids, Electromagnetics, Environmental Quality.

Science: **10 - 12**

The APEF curriculum documents at the grade 10-12 level are at various stages of development and piloting.

As well, Prince Edward Island Department of Education is presently undertaking an initiative, **Senior High School Transitions - New Challenges: New Directions**, which will change the thrust of the non-university preparatory program to make it more meaningful and appropriate to the needs of the students who will choose to follow this course of studies. The revised program will emphasize academic, life, work and technology skills consistent with the Department's philosophy of Education and Essential Graduation Leanings developed by the Atlantic Provinces Education Foundation.
For this reason many of our programs at the high school level will go through major transition in the upcoming year/s.

Our academic courses are undergoing realignment with the Pan Canadian framework for curriculum outcomes. The following is a brief synopsis of what is presently addressed in the science curricula.

Attitudinal Stewardship Outcomes
The APEF curriculum documents at the 10 -12 grade level encourage students to:
have a sense of personal and shared responsibility for maintaining a sustainable environment;
project the personal, social, and environmental consequences of proposed action;
want to take action for maintaining a sustainable environment.

Oceanography 621
As developed in the Science Curriculum Foundation Document, this course aims at developing citizenship by studying marine environment and humans' impact on environment and sustainable development. Issues of a global nature such as warming, pollution and depletion of world fish stocks are examined to foster learning about critical environmental issues. Students examine local environmental issues such as erosion, waterfront flooding due to global warming, etc.

Chemistry
Through this curriculum students are encouraged to develop a sensitivity to the living and non-living environment.
Curriculum outcomes address the responsibility of society, through chemistry and technology, to protect the environment and use natural resources wisely.

Also addressed in this curriculum are issues such as radioactive materials, their effect on living systems, and necessary precautionary measures for both our living and non-living environment.
Students discuss such issues as ozone layer, formation of acid rain, and greenhouse gases which facilitates the students' understanding of society's responsibility to our environment. Relating oxidation-reduction reactions to global environmental issues such as acid rain, further enables the students to acknowledge the need to protect and sustain our environments.

Biology 511/ 611/ 521/631
This curriculum enables students to discuss the responsibility of society, through Biology and Technology, to protect the environment and our use of natural resources.

Students evaluate the societal benefits of using microbes to: clean up pollution and manufacture foods and chemicals.

Students will demonstrate an awareness of one's personal role and responsibility in ensuring continuation of equilibrium in the biosphere as part of a sustainable development program.
Students examine local ecosystems, the need to stabilize these systems, and ownership for achieving this.

Through discussion on such topics as greenhouse effects, composting, effects of compounds upon the respiration and photosynthetic activity of plants, animals and other organisms, the effects of food additives and public smoking, students recognize the need to take ownership for sustaining the environment.

Physics 511
This curriculum identifies: the risks associated with off-shore explorations, methods for harnessing power, the impact of radioactivity, and society's dependence on various energy resources and pollution control devices to promote the necessity for environmentally friendly inventions.

Agri-Science 531/ 631/831
PEI Land Use Commission Reports and other pertinent, current reports are used as examples of fostering sustainability on PEI.
Agri-science is the application of scientific principles and technology to the study of natural resource management and agriculture. Topics include: soil erosion, air pollution, water pollution, and effective forestry, farming, wildlife management, aquaculture, plant science, crop and pest management, home gardening, conservation practices, and indoor/outdoor plant scaping. Discussions provoke positive attitudes by students toward fostering sustainable environments.
The key concepts of the Agri-science curriculum: agriculture, wildlife, and plant life are all areas that encourage the teachings of positive, safe environmental practices.
Through partnerships with the PEI Agricultural Human Resources Development Council, students reap benefits from print resources, visual resources, and on-site visits.

Animal Science
Curriculum in this course addresses such areas as livestock enterprises, genetics, insects, parasites and economics of the livestock industry.

Agriculture 621A (AGR 621A - 2027)
This course is designed to develop appreciation and awareness of the animal science industry. In the introduction, topics such as careers, farm safety, and current events affecting the PEI industry are discussed. The course then deals with the anatomy, nutrition, breeding, diseases and management of the various types of farm animals. The dairy, beef, hog, sheep, horse and poultry industry will be studied. In the financial management part of the course, topics such as case studies, agricultural landing, pay rolls, cash flows and farm plans are studied. This course involves field trips.

Environmental Management 801
The course focuses on the student developing an awareness of the environment, as well as seeing the impact and responsibility he/she has in being part of the world community. Importance will be placed on student-directed discovery and group work. Individuals will have the opportunity to acquire both a theoretical and a practical appreciation for the wise management of our natural resources through the identification of solutions to environmental problems.

Environmental Studies 701
This course will introduce students to some of the problems facing the environment. Some topics will include: ecosystems, air, water, land, energy, waste disposal, rural and urban management. Films, lectures, assignments, guest speakers, etc., will be used during the semester. Where possible, students will become aware of the emp loyment opportunities available in this field.

Conservation 521
This course provides the students with the opportunity to develop an appreciation and awareness of the natural and human environment. Time is spent investigating both theoretical and practical aspects of many ecological principles and environmental issues which affect Islanders. The program includes a range of environmental topics such as forestry, waterfowl habitat, wildlife management, ecology, orienteering, and native plants and animals of this province. Skills that demonstrate the necessity of living in harmony with our outdoor environment are taught while conducting a portion of the course in the outdoors.

English Language Arts

The APEF curriculum documents outcomes do not specifically address sustainability. However, at each grade there will be opportunities for teachers to integrate science topics with themes, or individual titles in **Language Arts.**
Examples used include:

Grade 1
Reflections theme, **Water's Ways,** supports **water, weather and seasons** in Science and **Barbara Reid's** text set, connects with **Needs of Plants and Animals.**

Grade 2
Selections from **A Seed is a Promise** connect with the science theme **Communities**, while individual titles from **New Perspectives and Circular Tales** can be integrated with **Hot and Cold** and **Fossils and Dinosaurs**.

Grade 3
Individual titles in **Science**, **The Lobels**, **Geography**, and **Legends/Folktales** can enrich the science themes **Life Cycles** and **Our Changing Earth**.

The **Collections** program used at the grade 4-6 level utilize themes that can also be integrated very well with the 4-6 Science outcomes.

Health & Family Living Curriculum
This curriculum is currently under revision. The outcomes in this curriculum, while addressing the concepts of the curriculum, will also compliment the outcomes in each of the other curriculum areas by fostering sustainability where applicable.

Art & Music

Key stage outcomes in this curriculum area have been identified below. Teachers are encouraged to integrate where applicable to the other core curriculums.

By the end of grade 3
Students will be expected to:
- explore, recognize and discuss sounds made in natural and constructed environments.

By the end of grade 6
Students will be expected to:
- explore, recognize and discuss sounds made in natural and constructed environments.

Aesthetic Awareness
Students will be able to use their senses to perceive and appreciate their visual environment.

By the end of grade 3
Students will be expected to:
- identify patterns in the natural and constructed environment and in art work.
- identify examples of contrast in the natural and constructed environment, and in art works
- begin to explore the connections between the elements of art, materials and images.

By the end of grade 6
Students will be expected to:
- be increasingly aware of the vast amount of detail within the natural and environmental community

Art Expression
Students will be able to use art materials as a vehicle or medium for communicating something in a meaningful way.

By the end of grade 3:
Students will be able to:
- begin to understand that ideas for visual expressions come from many different sources.
- begin to understand that ideas for art works can come from memory, observation, information, imagination, or feelings.

By the end of grade 6
Students will be able to:
- generate ideas for art work from various sources.

Technique and Skill Development
By the end of grade 6
Students will be able to:
- create many different "real" textures.
- understand that the inclusion of details, enhancing depiction can be used to draw people and things.
- begin to understand that overlapping objects is a way to show their placement in space.
- begin to understand that closer objects that show more detail are lighter in colour than those that are further away.

Cultural and Environmental Awareness
Students will be able to recognize the value of art as part of our culture, heritage and environment.
Students will recognize the contributions of artists within the community.

By the end of Grade 3
Students will be able to:
- begin to understand that art plays a role in their daily life in the community.
- begin to understand that many different cultural groups contribute to a community's artistic make-up.
- explore the contributions of visual artists, past and present.
- begin to develop an awareness of the visual art of the aboriginal peoples of Canada.
- explore the relationships between objects, their functions and their environment (e.g., crafts).

By the end of grade 6
Students will be able to:
- continue to understand that art tells something about the society or community in which it was created.
- continue to explore the relationship between an object's physical appearance, its environment and its function (e.g., crafts)**.**

APPENDIX H. FRAMEWORK FOR CURRICULUM FOR EDUCATION FOR A SUSTAINABLE FUTURE

Knowledge needed:

- The planet earth as a finite system and the elements that constitute the planetary environment.
- The resources of the earth, particularly soil, water, minerals, etc., and their distribution and role in supporting living organisms.
- The nature of ecosystems and biomes, their health, and their interdependence within the biosphere.
- The dependence of humans on the environmental resources for life and sustenance.
- The sustainable relationship of native societies to the environment.
- The implications of resource distribution in determining the nature of societies and the rate and character of economic development.
- Characteristics of the development of human societies including nomadic, hunter gatherer, agricultural, industrial and post-industrial, and the impact of each on the natural environment.
- The role of science and technology in the development of societies and the impact of these technologies on the environment.
- Philosophies and patterns of economic activity and their different impacts on the environment, societies and cultures.
- The process of urbanization and the implications of de-ruralization.
- The interconnectedness of present world political, economic, environmental and social issues.
- Aspects of differing perspectives and philosophies concerning the ecological and human environments.
- Cooperative international and national efforts to find solutions to common global issues, and to implement strategies for a more sustainable future.
- The implications for the global community of the political, economic and socio-cultural changes needed for a more sustainable future.
- Processes of planning, policy-making and action for sustainability by governments, businesses, non-governmental organizations and the general public.

Skills needed:

- Frame appropriate questions to guide relevant study and research.
- Define such fundamental concepts as environment, community, development and technology, and apply definitions to local, national and global experience.
- Use a range of resources and technologies in addressing questions.
- Assess the nature of bias and evaluate different points of view.
- Develop hypotheses based on balanced information, critical analysis and careful synthesis, and test them against new information and personal experience and beliefs.
- Communicate information and viewpoints effectively.
- Work towards negotiated consensus and cooperative resolution of conflict.
- Develop cooperative strategies for appropriate action to change present relationships between ecological preservation and economic development.

Values needed:

- An appreciation of the resilience, fragility and beauty of nature and the interdependence and equal importance of all life forms.
- An appreciation of the dependence of human life on the resources of a finite planet.
- An appreciation of the role of human ingenuity and individual creativity in ensuring survival and the search for appropriate and sustainable progress.
- An appreciation of the power of human beings to modify the environment.
- A sense of self-worth and rootedness in one's own culture and community.
- A respect for other cultures and a recognition of the interdependence of the human community.
- A global perspective and loyalty to the world community.
- A concern for disparities and injustices, a commitment to human rights and to the peaceful resolution of conflict.
- An appreciation of the challenges faced by the human community in defining the processes needed for sustainability and in implementing the changes needed.
- A sense of balance in deciding among conflicting priorities.
- Personal acceptance of a sustainable lifestyle and a commitment to participation in change.
- A realistic appreciation of the urgency of the challenges facing the global community and the complexities that demand long-term planning for building a sustainable future.
- A sense of hope and a positive personal and social perspective on the future.
- An appreciation of the importance and worth of individual responsibility and action.

Source: Learning for a Sustainable Future

APPENDIX I. THE SUSTAINABLE COMMUNITIES INITIATIVE - ALBERTA

What is SCI?
The Sustainable Communities Initiative (SCI) represents a partnership between Alberta Environmental Protection, industry, and FEESA (a provincially-based environmental education society). The initiative is available to Alberta communities wishing to further environmental or sustainable development activities in their local community. The program's goal is to support community action to become healthy and sustainable through public education, participation and communication.

Why was this program developed?
The partners have an interest in promoting sustainable development at a local level, and decided to bring their resources together in one program. This program also offered the opportunity to promote sustainability and be involved in long-term action with a community.

History of SCI
The program began in the spring of 1994 with pilot projects in two communities. Now, several communities across the province are involved in SCI. Communities get involved at their request, by word of mouth, or based on the representation of the SCI partners.

The program bases its definition and some support materials on work done by the Alberta Round Table on the Environment and the Economy, which developed a vision of sustainable development for Alberta which was endorsed by the Alberta Legislature in 1992:

Alberta, a member of the global community, is a leader in sustainable development, ensuring a healthy environment, a healthy economy, and a high quality of life in the present and in the future.

How does SCI happen?
This program is community driven. However, there are certain steps the partners have taken to try to ensure the success of the program.

For local support of the program, it is important to have the support of local government. To ensure this, meetings are held with local government representatives from the Town and M.D. to discuss the program and get their endorsement.

The community is encouraged to form a local steering group, with representation from a range of interests and individuals. This group determines whether other agencies or organizations should be involved, what's currently being done, what they would like to see happen in their community, and what action they will take. Partners help to facilitate this process, and assist with the development of a community "inventory" of sustainable development activities (linked to the indicators identified below). From this point on, the community leads the process, and the partners act as resources for education, facilitation or communications. Measurable indicators of success and specific action plans are agreed to by the community representatives.

SCI has selected twelve indicators from the more than 50 indicators that were developed by the Alberta Round Table on the Environment and the Economy in 1993. These twelve are intended to be a starting point for communities:

- air quality

- number and size of recreational, cultural and spiritual sites
- percent of parks and playgrounds in urban areas
- waste per capita
- quality of water in local lakes and rivers
- level of sewage treatment
- water consumption per person
- energy consumption per person
- use of different modes of transportation
- public understanding level of sustainable development
- frequency of sustainable development in school curricula
- percent of recyclable products actually recycled

SCI facilitates a general public involvement process that provides the community with a forum for discussing local sustainability, and a platform to identify priorities and actions to be taken. Communities form multi-stakeholder committees to further the goals of SCI.

Services offered by the partners include organizing community workshops, providing consulting services and producing a quarterly newsletter highlighting provincial projects. Community resources, including a partner's *Resource Guide*, and *Starter Kits* on activities, such as waste minimization (focus on composting) and green space conservation, are also available.

Why is the Department involved and what is our role?
Alberta Environmental Protection is committed to this program for several reasons:

Legislation
As mentioned earlier, a vision of sustainable development was endorsed by the Alberta Legislature. The *Environmental Protection and Enhancement Act* also recognizes the principle of sustainable development.

Mandate
This program also helps the Department to follow through on its commitment to implementing sustainable development strategies in the province. This was outlined in a report commissioned by our Minister, called *Ensuring Prosperity – Implementing Sustainable Development.* Sustainable development is also one of the guiding principles of AEP. SCI has been endorsed by our Minister. SCI helps us promote our programs (e.g. Action on Waste commitment to reducing solid waste going to landfills).

Community Level Service
Restructuring within our Department has placed more staff in communities throughout the province. SCI provides a face-to-face link for staff in the community, an opportunity to promote our programs, and an avenue to address local environmental concerns.

Partnerships
This program provides an opportunity to team up with other organizations and individuals to achieve a common goal.

APPENDIX J. THE HURLEY ISLAND PROJECT

The Hurley Island Project supports the following Canadian Millennium Themes:

- The Project will show Canadians and people from around the world a Canadian model of sustainable development education (SDE) that has obtained concrete results in the field in Canada with support from the Federal Government, Ministries of Education, teachers' federations, school boards, faculties of education, the private sector, and non-governmental organizations.

- Encouraging Canadian students, and students from other countries, to explore Canada's natural and cultural diversity through the sharing of information and experiences through Internet learning.

- The project will permit educators and students from Canada and around the world to exchange ideas on sustainable development education and share the experiences of their respective countries related to that issue, and give Canada the visibility that will enable it to show what is done in the field of SDE on a national and international scale. Students and teachers from around the world will be able to access the Hurley Island Project.

- The project will be undertaken in partnership with teachers' federations, school boards, faculties of education, the private sector, and non-governmental organizations that support Learning for a Sustainable Future (LSF) activities. In addition, the following groups will take an active role in the project:

- the Ontario Ministry of Education and Training is providing project management, course accreditation, student registration, course delivery and marking, and curriculum expertise;

- LSF is providing project management, sustainability content research, course content development, on-line mentoring, a national infrastructure for identifying students to participate, and access to the LSF project at EXPO 2000;

- Simon Fraser University, through the Virtual University, has been approached to provide web access and maintenance, and administration of student, teacher, and mentor accounts;

- an Internet service provider will be providing connectivity to students in the 1999 pan-Canadian delivery and to teachers/moderators for the international EXPO delivery;

- mentors from various private-sector, public-sector and non-governmental organizations will share expert advice and information, on-line, with students.

Electronic Components:

A key component of the course is the effective use of technology. The current software being considered is the Virtual University Software developed by Simon Fraser University, British Columbia. On-line services will include:

- on-line registration for Canadian students;
- on-line registration for international teachers and students;

- e-mail accounts;
- moderated conferences;
- Internet access;
- Student web page creation;
- “resume posting” area;
- on-line expert mentors;
- on-line group work;
- on-line presentations;
- web chat rooms.

Project Approaches:

- A grade 12 two-credit, interdisciplinary studies course for Canadian students based on the Ontario secondary school guidelines for Canadian and World Issues, and Technology. Transfer of credits arranged through the Independent Learning Centre (ILC);

- The course will provide “real world” sustainability and Internet applications tied to the secondary school guidelines;

- The course delivery and assessment will be through the Internet;

- The course will use Internet information tools to allow students to obtain state-of-the-art information from a variety of sectors and perspectives, both locally and globally, and for students to create their own on-line inquiries;

- A CD-ROM version of the course will also be produced and will be in operation in the year 2000.