

**Assessment
of
Education for Sustainable Development
in
New Brunswick**

October 2006

1. Introduction

The New Brunswick Education for Sustainable Development Working Group was formed in September 2006 with the vision of creating a culture of education for sustainable development in the province to support the overall goal of the United Nations Decade of Education for Sustainable Development, 2005-2014. One of the priorities of the Working Group is to assess education for sustainable development in the formal, non-formal, and informal education sectors in New Brunswick to assist in the development of curricula and educational resources.

This assessment has found that, while a number of key sustainable development themes are addressed in the formal, non-formal, and informal sectors, many gaps exist. It is recommended that the concepts identified herein be incorporated into the formal, non-formal, and informal sectors as soon as possible. The decisions as to which sustainable development themes and which sectors (formal, non-formal, informal) should be focused on first will be left to the Working Group.

2. Methodology

2.1 Sustainable Development Themes: Twenty-five key sustainable development themes were identified. These themes were based on the “Broad Environmental Topics” of the New Brunswick Environmental Network’s Earth Ed database (http://www.nben.ca/tools/dbase/earthed/earth_ed.htm) and the sustainable development themes identified by the UNECE Strategy for Education for Sustainable Development. Additional themes of particular relevance to New Brunswick were added to the list. The 25 sustainable development themes used in this assessment are:

- Sustainable Development - General
- Environment - General
- Energy
- Water
- Air
- Soil
- Natural Resources – General
- Natural Resources – Fisheries
- Natural Resources – Forests
- Natural Resources – Mining
- Climate Change
- Agriculture

- Transportation
- Ecosystems, Biodiversity, Wildlife
- Waste & Toxics
- Society - General
- Consumerism
- Urbanization
- Health
- Poverty
- Equality
- Law & Politics
- Globalization
- Economics
- Business & Entrepreneurship

In addition to the themes listed above, the theme of Peace, War, and Conflict was identified as a sustainable development theme relevant to New Brunswick. However, this theme has not been included in this assessment and should be assessed in the future.

2.2. Formal Education Sector: Provincial curriculum documents for those subjects available on the NB Department of Education's website (see <http://www.gnb.ca/0000/anglophone-e.asp> and <http://www.gnb.ca/0000/francophone-e.asp>) were reviewed and Specific Curriculum Outcomes relevant to the 25 sustainable development themes were assembled in a summary table. Please note that sustainable development themes may be taught in schools even though they are not addressed in the Specific Curriculum Outcomes.

2.3. Post-secondary Education Sector: Programs at all New Brunswick's universities and community colleges were reviewed. The programs relevant to the 25 sustainable development themes were assembled in a summary table.

2.4. Informal and Non-formal Education Sector: Non-formal and informal education for sustainable development resources were compiled from the NBEN's Earth Ed database and from Internet searches. Resources relevant to the 25 sustainable development themes were assembled in a summary table. Educational programs for school children that have been developed outside the formal curriculum were considered to be non-formal educational resources; educational resources related to day-to-day work, family, or leisure activities and additional available information were considered to be informal educational resources.

The resulting summary table was available at the first meeting of the New Brunswick Education for Sustainable Development Working Group on September 25th, 2006. Additional education for sustainable development resources in New Brunswick were identified by participants and these resources were added to the summary table.

Due to oversights inherent in conducting Internet research, the summary table may not constitute an exhaustive compilation of all education for sustainable development

Specific Curriculum Outcomes and resources in New Brunswick. However, this assessment provides a reasonably accurate overall representation of education for sustainable development in New Brunswick.

3. Results & Discussion

Complete details of the assessment can be found Appendix 1. Sections 3.1 to 3.3 summarize the findings in Appendix 1.

3.1. Formal Education Sector¹

Sustainable Development – General – Overall concepts scattered throughout the Anglophone curriculum; addressed only briefly in Grade 10 Science and Grade 11 Science in the Francophone curriculum.

Environment – General – Addressed quite well at most grade levels in both the Francophone and the Anglophone curriculum (concepts include sensitivity to other living things and the environment, a sense of responsibility, linking personal choices and actions to the environment, the effects of science and technology on the environment, and the limitations of science and technology to solve problems).

Energy – Addressed more completely in the Francophone curriculum than the Anglophone curriculum. In the Francophone curriculum, concepts about energy can be found in almost all of the grades, including sources of energy, renewable versus non-renewable energy, reducing consumption, the effect of energy consumption on the environment, energy efficiency, and methods of production and transportation of energy. Very poorly addressed in the Anglophone curriculum, only in Grade 6 (methods to generate energy, reducing consumption, renewable vs. non-renewable) and Grade 9 (transportation of energy).

Water – Poorly addressed in the Anglophone curriculum – only mentioned in Grade 2 (how air and water interact) and Grade 12 (protection of water resources under a legal framework). Addressed sporadically in the Francophone curriculum (water cycle in Elementary years, conservation is touched on in Grade 4, the importance of water for all life is in Grade 10 Biology).

Air – Poorly addressed in both curricula. In the Francophone curriculum, air pollution is touched on in Grade 12 Environmental Science. In the Anglophone curriculum, it is only mentioned in Grade 2 (how air and water interact) and Grade 12 (protection of air under a legal framework).

Soil – Addressed sporadically in Anglophone and Francophone curricula. Anglophone: Grade 3 (soil types & properties, interactions with living things), Grade 7 (soil

¹ The assessment of the formal education sector focuses on Specific Curriculum Outcomes and does not take into account any teachers' resources/teaching aids that may be available within the formal education system. It also does not take into account sustainable development themes that may be taught in schools even though they are not addressed in the Specific Curriculum Outcomes

formation), Grade 12 (protection of soil under a legal framework). Francophone: Kindergarten to Grade 2 (link to agriculture), Grade 4 (soil types & properties, interactions with living things), Grade 6 (soil formation), Grade 7 (soil formation, soil types, soil enrichment), Grade 12 (erosion, acid rain's effects on soil).

Natural Resources: General – Issues of sustainability of natural resources are fairly well addressed in both curricula and at varying grade levels. Anglophone: Grades 4 & 6 (linking personal actions to resource use, analyzing family's impact on resources), Grade 8 (sustainability of resources, renewable vs. non-renewable), Grade 12 Law (how laws and policies affect natural resources, how governments manage them). Francophone: Grades 5 & 6 (how humans impact natural resources and how personal actions can lead to conservation), Grades 8, 10-12 (reduction, re-use, and recycling of resources, carrying capacity).

Natural Resources: Fisheries – Not addressed in the Francophone curriculum. Only addressed in Anglophone curriculum in Grade 8 (importance of fishing for economy in Atlantic Canada).

Natural Resources: Forests – Poorly addressed in both curricula. Anglophone: Grade 3 (obtaining useful products from plants and how those products are replenished), Grade 8 (importance of forestry for economy in Atlantic Canada). Francophone: Grades 3 & 4 (linking society's needs to land use, obtaining useful products from plants and how those products are replenished), Grade 7 & 8 (linking human activities and land use), Grade 10/11 Carpentry (wood products), Grade 12 Environmental Science (economic impact of forestry, impact of forestry on soil).

Natural Resources: Mining – Not addressed in Francophone curriculum and only mentioned in Anglophone curriculum once, in Grade 8 (importance of mining for economy in Atlantic Canada).

Climate Change – Only explicitly mentioned in Francophone Grade 12 Environmental Science. Related issues are discussed in other grades in both curricula; weather, heat transfer, natural disasters, ocean currents, ice caps are all mentioned but never tied to climate change.

Agriculture – Addressed sporadically in both curricula. Francophone: Kindergarten to Grade 2 (ability to cultivate soil), Grade 4 (obtaining useful products from plants and how those products are replenished), Grades 3-4 & 7-8 (link society's needs to land use), Grade 12 (effects of agriculture on environment, alternative methods of agriculture). Anglophone: Grade 3 (obtaining useful products from plants and how those products are replenished), Grade 8 (importance of agriculture for economy in Atlantic Canada), Grade 12 Nutrition for Healthy Living (GMOs versus organic versus natural foods).

Transportation – Minimally addressed. Anglophone: Grade 8 (design, development, operation of transportation systems, impacts of cars and transportation on the environment, factors in efficient and effective transportation). Francophone: Grade 6 (changes in transportation systems over time).

Ecosystems, Biodiversity, Wildlife – Very well addressed in the Francophone curriculum at every grade level. Concepts of individual plants and animals are addressed in earlier years, moving to ecosystem-thinking in later years. These concepts are also addressed in the Anglophone curriculum, but not at every grade level.

Waste & Toxics – In the Anglophone curriculum, this issue is only covered in Kindergarten, where recycling is discussed, and in Grade 4, where pollution is discussed. Otherwise, the issue is not addressed. In the Francophone curriculum, recycling is featured at various grade levels (Kindergarten, Grades 1, 2, 8, 10-12). The entire issue of Waste & Toxics is well-addressed in Francophone Grade 12 Environmental Science. Otherwise, the issue is not addressed.

Society – General – In the Francophone curriculum, civic responsibility is featured prominently from Grade 3 to Grade 12. The effects of science and technology on society are discussed in Grades 7 & 8. In the Anglophone curriculum, civic responsibility is only addressed in Grade 6. The effects of personal actions on society are addressed in Grades 7 to 12 and the effects of science and technology on society are addressed in Grades 8 to 10.

Consumerism – Very well addressed in Francophone curriculum. Concepts include consumer choices, effects of consumption on environment, natural resources, habitat, and quality of life. Sporadically addressed in Anglophone curriculum, focusing on needs and wants, purchasing choices, economic consequences of consumerism.

Urbanization – Addressed briefly in Anglophone Grade 12 Canadian History (how urbanization has transformed Canada).

Health – Extremely well and completely addressed in both curricula (Anglophone Grades K-8 and 12 and Francophone all grades). Concepts include healthy lifestyles, and the effects of tobacco, alcohol, and drugs, physical activity, personal hygiene, nutrition, rest, stress on health, and also environmental sensitivities and disease prevention.

Poverty – Not addressed.

Equality – Well addressed in both curricula, although slightly better addressed in the Anglophone curriculum. Both curricula include concepts of ethnic and cultural diversity, gender equality, and Canada's multicultural nature, and respect for diversity. The Anglophone curriculum also includes concepts of prejudice and stereotypes. The Francophone curriculum has an emphasis on valuing francophone culture.

Law & Politics – Addressed at various levels in both curricula. Anglophone curriculum includes effects of laws on lives, decision-making at the federal level, political activism, political empowerment, lobbying, citizens' rights and freedoms. Francophone curriculum includes government structure at the provincial, regional, and federal levels, democracy, and the consequences of criminal acts.

Globalization – Concepts surrounding globalization are scattered throughout both curricula. Anglophone: Kindergarten (connections between communities), Grade 1

(interdependence of communities), Grade 6 (global economy), Grade 8 (global economy, global marketplace, global environmental concerns, trade agreements, interdependence), 9 (interdependence), Grade 12 (globalization in Canada, international law, interdependence). Francophone: Grades 2 to 5 (connections between communities), Grade 6 (human migration), Grades 7 to 9 (networks and communication).

Economics – Concepts throughout both curricula. Anglophone curriculum includes concepts of economic decisions, money, supply & demand, economic systems, production of goods & services, income & lifestyle, global economy, economic empowerment, GDP, primary regional industries, demographic & economic trends, public debt, labour market, trade, mixed economy, distribution of wealth. Francophone curriculum includes principal economic activities in New Brunswick/Atlantic Canada, the importance of work, mixed economy, market, financial institutions, and free trade.

Business & Entrepreneurship – Not addressed.

3.2. Post-Secondary Education Sector

Post-secondary programs in New Brunswick address nearly all of the 25 sustainable development themes, in both English and French. The extent to which these programs promote sustainable development, however, has not been assessed in this report.

3.3 Informal and Non-formal Education Sector

Informal and non-formal education resources in New Brunswick address nearly all of the 25 sustainable development themes, in both English and French. The extent to which these programs promote sustainable development, however, has not been assessed in this report.

4. Gaps

4.1. Formal Education Sector²

Table 1		
Sustainable Development Theme	Anglophone Sector Gaps	Francophone Sector Gaps
Sustainable Development – General	-	Overall concept not integrated into early years (K-9).
Environment - General	-	-

² The gaps identified in the formal education sector are gaps within the Specific Curriculum Outcomes only. Whether the formal education system provides teachers with the resources/teaching aids necessary to teach to the sustainable development themes that *are* addressed in the curriculum has not been assessed. Furthermore, this assessment does not take into account sustainable development topics that may be taught in schools even though they are not addressed in the Specific Curriculum Outcomes.

Energy	Concepts not addressed include sources of energy, renewable versus non-renewable energy, reducing consumption, effects on the environment, energy efficiency (all grades).	Concepts not addressed include sources of energy, renewable versus non-renewable energy, reducing consumption, effects on the environment, energy efficiency (Grades 3 to 5).
Water	Concepts not addressed include water cycle, necessity of water for life, water conservation, issues of water quality and quantity (all grades).	Concepts not addressed include water conservation, issues of water quality and quantity (all grades).
Air	Concepts not addressed include air quality, effects of air quality on human health and ecosystems, air pollution (all grades).	Concepts not addressed include air quality, effects of air quality on human health and ecosystems, air pollution (all grades).
Soil	-	-
Natural Resources: General	-	-
Natural Resources: Fisheries	Concepts not addressed include sustainability of the fishery, importance of fish to ecosystems, environmental impacts of aquaculture, importance to Atlantic Canadian culture and economy (all grades).	Concepts not addressed include sustainability of the fishery, importance of fish to ecosystems, environmental impacts of aquaculture, importance to Atlantic Canadian culture and economy (all grades).
Natural Resources: Forests	Concepts not addressed include sustainable forestry practices, the importance of forests economically, culturally and ecologically (wildlife, soil, water purification, air purification) (all grades).	Concepts not addressed include sustainable forestry practices, the importance of forests economically, culturally and ecologically (wildlife, soil, water purification, air purification) (all grades).
Natural Resources: Mining	Concepts not addressed include the effects of mining on the environment and human health, the economic	Concepts not addressed include the effects of mining on the environment and human health, the economic

	importance of mining (all grades).	importance of mining (all grades).
Climate Change	Subject not explicitly discussed. Concepts not addressed include human impacts on the climate, solutions to climate change, effects of climate change on New Brunswick (economy, society, environment) (all grades).	Subject not explicitly discussed. Concepts not addressed include human impacts on the climate, solutions to climate change, effects of climate change on New Brunswick (economy, society, environment) (all grades).
Agriculture	Concepts not addressed include alternatives to conventional agriculture, effects of conventional agriculture on the environment and human health, link agriculture to food and food choices (all grades).	Concepts not addressed include linking agriculture to food and food choices (all grades).
Transportation	Concepts not addressed include the effects of transportation (goods and people) on air pollution and climate change, sustainable/active transportation, the importance of local products (all grades).	Concepts not addressed include the effects of transportation (goods and people) on air pollution and climate change, sustainable/active transportation, the importance of local products (all grades).
Ecosystems, Biodiversity, Wildlife	Concepts not addressed consistently (elementary and middle grades).	-
Waste & Toxics	Emphasis on reducing and re-using before recycling no addressed, concepts not addressed include composting and the effects of toxic waste on human health and the environment (all grades).	Emphasis on reducing and re-using before recycling no addressed, concepts not addressed include composting and the effects of toxic waste on human health and the environment (all grades).
Society – General	Concepts not addressed include civic responsibility (elementary and middle grades).	-

Consumerism	Concepts not addressed include the effects of consumption on the environment, natural resources, wildlife habitat, quality of life (all grades).	-
Urbanization	Concepts not addressed include sustainable urban and rural growth (e.g., “smart growth”) (all grades).	Concepts not addressed include sustainable urban and rural growth (e.g., “smart growth”) (all grades).
Health	-	-
Poverty	Concepts not addressed include the gap between rich and poor (locally and globally), poverty reduction, socio-economic disadvantages caused by poverty, socio-political reasons that poverty exists (all grades).	Concepts not addressed include the gap between rich and poor (locally and globally), poverty reduction, socio-economic disadvantages caused by poverty, socio-political reasons that poverty exists (all grades).
Equality	-	Concepts not addressed include prejudice and stereotypes (all grades).
Law & Politics	Concepts not addressed include democracy and the role of individual citizens in the political process, democracy; expand concepts of political activism (all grades).	Concepts not addressed include political activism and the role of individual citizens in the political process, political empowerment, lobbying (all grades).
Globalization	Concept of globalization not made explicit earlier than Grade 12. Concepts not addressed include the effects of globalization on local communities and the environment (all grades).	Concept of globalization not made explicit. Concepts not addressed include interdependence, the effects of globalization on local communities and the environment (all grades).
Economics	A critical look at our economic systems and the effects these systems have on communities and the environment is not included (all grades).	A critical look at our economic systems and the effects these systems have on communities and the environment is not included (all grades).

	Concepts not addressed include economic disempowerment, indices of well-being besides GDP (all grades).	Concepts not addressed include economic disempowerment, indices of well-being besides GDP, distribution of wealth (all grades).
Business & Entrepreneurship	Concepts not addressed include sustainable business, corporate responsibility, importance of local businesses, global economy (all grades).	Concepts not addressed include sustainable business, corporate responsibility, importance of local businesses, global economy (all grades).

4.2. Post-Secondary Education Sector

Post-secondary programs currently do not exist in the following areas:

Table 2

Anglophone Gaps	Francophone Gaps
Transportation	Energy
Consumerism	Natural Resources: Mining
Urbanization	Consumerism
Poverty	Urbanization
	Poverty
	Globalization

4.3. Non-formal and Informal Education Sector

Non-formal/informal education resources currently do not exist in the following areas:

Table 3

Anglophone Gaps	Francophone Gaps
Sustainable Development – General*	Sustainable Development – General
Natural Resources – General *	Environment – General *
Natural Resources – Fisheries	Natural Resources – General*
Society – General	Natural Resources: Mining
Consumerism	Society – General*
Urbanization	Consumerism *
Poverty	Urbanization
Business	Poverty
	Economy
	Business

* These gaps in the informal/non-formal sectors need not necessarily be filled because these topics are adequately addressed in the formal education sector.

5. Conclusion

It is clear from this initial assessment of education for sustainable development in New Brunswick that some sustainable development themes are more adequately addressed than others.

Based on this assessment, the formal education sector has a great deal of gaps in its Specific Curriculum Outcomes; therefore it is recommended that the concepts identified herein be incorporated into both the Anglophone and the Francophone Specific Curriculum Outcomes as soon as possible.

Further research is necessary to determine whether individual teachers/schools/districts teach sustainable development topics that *are not* addressed in the Specific Curriculum Outcomes. If so, these teachers/schools/districts may represent role models for other teachers/schools/districts.

Further research is necessary to determine whether the formal education sector provides teachers with the resources/teaching aids necessary to teach to the sustainable development themes that *are* addressed in the Learning Outcomes. If lacking, these resources should also be developed to support the curricula. Because a formal curriculum review and the development of new resources are lengthy processes, non-formal and informal educational programs should be integrated into the formal education sector to address the gaps therein while new curricula and teachers' resources are developed.

Non-formal and informal educational resources can play a valuable role in addressing gaps in the formal sector curriculum. Therefore, non-formal and/or informal educational resources should be developed to address themes that are currently not addressed in either the formal or the non-formal/informal sectors (i.e., those without asterisks in Table 3).

Further assessment is needed at the post-secondary level to determine whether concepts are being taught under the framework of sustainable development and whether the gaps in post-secondary education are actually included in other courses and/or programs.