

# Environment

## Required Components for the SHSM–Environment

1. A bundle of nine Grade 11 and Grade 12 credits that comprises:
  - four environment major credits
  - three other required credits from the Ontario curriculum, in English and mathematics
  - two cooperative education credits tied to the sector.
2. Seven sector-recognized certifications and/or training courses/programs (four compulsory and a choice of three electives)
3. Experiential learning and career exploration activities within the sector
4. Reach ahead experiences connected with the student’s postsecondary plans
5. Development of Essential Skills and work habits required in the sector, and documentation of them using the OSP

## Profile of the Environment Sector

Employment in the environment sector has boomed in recent years, and, according to industry experts, existing labour shortages in this sector are expected to increase as regulations to meet Canada’s goals regarding climate change come into effect. On the numbers of workers in this sector, Grant Trump, president of Environmental Careers Organization Canada (ECO Canada), said the following in a May 29, 2007 news release:

### INSIGHT

The requirements of this SHSM are unique and are geared to the environment sector. However, the design of all SHSM programs follows a consistent model, described in **Section A: Policy**.

The scope of the environment industry is very broad and is a component, to varying degrees, of every industry in Canada. There are approximately 530,400 environmental employees within major industry groups across Canada. This number represents 3.2% of Canada’s workforce.<sup>1</sup>

<sup>1</sup> ECO Canada, “Environmental Employees Required Across All Industries of Canadian Economy,” news release, May 29, 2007, [www.eco.ca/Portal/mediaroom.aspx?display=1037](http://www.eco.ca/Portal/mediaroom.aspx?display=1037).

ECO Canada's *Profile of Canadian Environmental Employment 2007* defines environmental employment as work in at least one of these sectors of the economy:<sup>2</sup>

- environmental protection – work related to air quality, water quality, land quality, waste management, restoration and reclamation, human and environmental health and safety, environmental protection management
- conservation and preservation of natural resources – work related to fisheries and wildlife, forestry, agriculture, mining, energy, parks and natural reserves, natural resources management
- environmental sustainability – work related to education, research and development, policy and legislation, communications and policy awareness, management for sustainable development.

The SHSM–Environment enables students to build a foundation of sector-focused knowledge and skills before graduating and entering apprenticeship training, college, university, or an entry-level position in the workplace. Depending on local circumstances, this SHSM may be designed to have a particular focus – for example, on environmental science or environmental studies. Where a choice of focus areas is offered, students may select one.

## Occupations in the Environment Sector

The following table provides examples of occupations in the environment sector, with corresponding NOCs, sorted according to the type of postsecondary education or training the occupations would normally require.

### FIND IT!

See **Section A1.6** for more on occupations and NOCs.

Apprenticeship Training	College
<ul style="list-style-type: none"> <li>• Arborist 2225</li> </ul>	<ul style="list-style-type: none"> <li>• Aquaculture Operator and Manager 8257</li> <li>• Biological Technologist or Biological Technician 2221</li> <li>• Conservation Officer or Fishery Officer 2224</li> <li>• Environmental Technician 2231</li> <li>• Field Technician – Air Pollution 2231</li> <li>• Forest Ecologist 2121</li> <li>• Forestry Technologist/Technician 2223</li> </ul>

<sup>2</sup> ECO Canada, *Profile of Canadian Environmental Employment 2007*, [www.eco.ca/pdf/LMI\\_Industry\\_Final\\_2007\\_EN.pdf](http://www.eco.ca/pdf/LMI_Industry_Final_2007_EN.pdf).

	<p><b>College</b> (<i>continued</i>)</p> <ul style="list-style-type: none"> <li>• Geological and Mineral Technologist/Technician 2212</li> <li>• Habitat Management Technician 2221</li> <li>• Hatchery or Fisheries Technician 2221</li> <li>• Mapping and Related Technologist/Technician 2255</li> <li>• Quality Control – Chemical Engineering Technologist 2211</li> <li>• Silviculture and Forestry Workers 8422</li> <li>• Soil Testing Technologist 2231</li> <li>• Technician – Pollution Control 2231</li> </ul>
<b>University</b>	<b>Workplace</b>
<ul style="list-style-type: none"> <li>• Air Quality Meteorologist 2114</li> <li>• Chemical Engineer 2134</li> <li>• Climatologist 2114</li> <li>• Environmental and Occupational Toxicologist 2121</li> <li>• Environmental Biologist 2121</li> <li>• Environmental Engineer 2131</li> <li>• Environmental Impact Analyst 4161</li> <li>• Environmental Planner 2153</li> <li>• Environmental Program Coordinator 4161</li> <li>• Forestry Professional 2122</li> <li>• Geological Engineer 2144</li> <li>• Geologist and Geochemist 2113</li> <li>• Interpretive Naturalist 2121</li> <li>• Landscape Architects 2152</li> <li>• Meteorologist 2114</li> <li>• Urban and Land Use Planners 2153</li> <li>• Waste Diversion Consultant 4161</li> </ul>	<ul style="list-style-type: none"> <li>• Canoeing Guide 6442</li> <li>• Fishing Guide 6442</li> <li>• Hunting Guide 6442</li> <li>• Landscaping and Grounds Maintenance Workers 8612</li> <li>• Outdoor Sport and Recreation Guide 6442</li> <li>• Outfitter 6442</li> <li>• Recreation Program Leader 5254</li> <li>• Recycled Paper Handler 7452</li> <li>• Silviculture and Forestry Workers 8422</li> <li>• Wastewater Treatment Plant Operator 9424</li> </ul>

*Note:* Some of the names of occupations in this table may differ slightly from the names given in the National Occupation Classification system. The names listed here reflect common usage by institutions and organizations in this sector in Ontario.

## Postsecondary Programs and Training in the Environment Sector

The following are examples of programs and training related to careers in the environment sector and the accreditations associated with each.

### *Apprenticeship Training*

Arborist	Certificate of apprenticeship/ certificate of qualification
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### *College*

Chemical Engineering Technology – Environmental	Advanced diploma
Ecosystem Management Technology	Diploma/advanced diploma
Environmental and Civil Engineering Technology	Diploma
Environmental and Natural Resource Studies	Diploma
Environmental Health and Safety	Bachelor's degree
Environmental Landscape Management	Diploma
Environmental Science and Technology	Bachelor's degree
Environmental Technology	Diploma/advanced diploma
Fish and Wildlife Technician/Technology	Diploma/advanced diploma
Geographic Information Systems – Applications	Diploma
Geographic Information Systems – Cartography	Diploma
Earth Resources Technology	Diploma
Geomatics Technology	Diploma
Integrated Environmental Site Remediation	Bachelor's degree
Natural Resources – Law Enforcement	Diploma
Outdoor Adventure Skills	Diploma
Park Operations and Outdoor Recreation	Diploma

### *University*

Agricultural and Environmental Science	Bachelor's degree
Conservation and Restoration Ecology	Bachelor's degree
Earth Science (Geology and Geomorphology)	Bachelor's degree
Ecology	Bachelor's degree
Engineering (Environmental, Water Resources, Biological, Geological, Civil)	Bachelor's degree
Environment and Business	Bachelor's degree

Environment and Resource Studies	Bachelor's degree
Environmental Biology	Bachelor's degree
Environmental Chemistry	Bachelor's degree
Environmental Design	Bachelor's degree
Environmental Geography	Bachelor's degree
Environmental Science	Bachelor's degree
Environmental Studies	Bachelor's degree
Environmental Toxicology	Bachelor's degree
Geomatics and Geographic Information Systems	Bachelor's degree
Land Resource and Soil Science	Bachelor's degree
Natural Resources Management	Bachelor's degree
Outdoor Recreation	Bachelor's degree
Renewable Resources	Bachelor's degree

### *Training for the Workplace*

Campground Operator	Certificate
Canoe/Hiking Guide	Certificate
Customer Service – Environmental Sector	Certificate
Ecotourism and Adventure Tourism	Certificate
Freshwater Angling Guide	Certificate
Hunting Guide	Certificate
Municipal Grounds Person	Certificate
Outdoor Adventure Skills	Certificate
Tour Guide	Certificate

## Required Components for the SHSM–Environment

The SHSM–Environment has the following five required components:

### 1. A bundle of nine Grade 11 and Grade 12 credits

These credits make up the bundle:

- four environment major credits that provide sector-specific knowledge and skills
- three other required credits from the Ontario curriculum, in English and mathematics, in which some expectations are met through learning activities contextualized to the environment sector
- two cooperative education credits that provide authentic learning experiences in a workplace setting, enabling students to refine, extend, apply, and practise sector-specific knowledge and skills.

#### FIND IT!

See **Section A1.2** for more on SHSM credits.

Credits		Apprenticeship Training		College		University		Workplace	
		Gr. 11	Gr. 12	Gr. 11	Gr. 12	Gr. 11	Gr. 12	Gr. 11	Gr. 12
<b>Environment Major</b>		2	2	2	2	2	2	2	2
includes content delivered in the sector's context	<b>English</b>	1	1	1	1	1	1	1	1
	<b>Mathematics</b>	1		1		1		1	
<b>Cooperative Education</b>		2		2		2		2	
<b>Total number of credits</b>		<b>9</b>		<b>9</b>		<b>9</b>		<b>9</b>	

### 2. Seven sector-recognized certifications and/or training courses/programs

The SHSM in environment requires students to complete seven sector-recognized certifications and/or training courses/programs.

Of these, four are compulsory and the remaining three are electives that must be chosen from the list in the following table. Note that items in the table that are capitalized are the proper names of specific certifications or training courses/programs that are appropriate for the SHSM. Items that are lowercased are names of the areas or categories within which specific certifications or training courses/programs should be selected by the school or board. The requirements are summarized in the table below.

#### FIND IT!

See **Section A1.3** for more on SHSM certifications and training.

Four compulsory			
Cardiopulmonary Resuscitation (CPR) Level A	generic (i.e., not site-specific) instructions about the Workplace Hazardous Materials Information System (WHMIS)	global positioning system (GPS)	Standard First Aid
Three electives from the list below			
animal and plant management	automated external defibrillation (AED)	chainsaw safety	geographic information system (GIS)
habitat restoration	Hike Ontario	knots technique	leadership
Leave No Trace	life-saving	map and compass use	Ontario Hunter Education
paddling techniques	Pleasure Craft Operator	Project Wild	radio operator
search and rescue	species (e.g., fish, birds, plants, trees, small mammals) identification	stream assessment protocol	water/ice safety
watershed management	wilderness first aid		

### 3. Experiential learning and career exploration activities

Experiential learning and career exploration opportunities relevant to the sector might include:

- one-on-one observation of a cooperative education student at a placement in the environmental sector (example of job twinning)
- a day-long observation of an environmental sector employer or employee (example of job shadowing)
- a one- or two-week work experience with a member of an environmental non-governmental organization (NGO) or an employee in the environmental sector (example of work experience)
- attendance at a trade show (e.g., Toronto Sportsmen's Show, Outdoor Adventure Show), conference, or workshop focusing on the environmental sector
- assisting with trail maintenance, trail cleanup
- participating in Envirothon.

#### FIND IT!

See **Section A1.4** for more on experiential learning and career exploration activities.

#### POLICY

Note that volunteer activities in an SHSM cannot be counted towards the hours of community involvement required to earn the OSSD.

#### 4. Reach ahead experiences

Students are provided one or more reach ahead experiences – opportunities to take the next steps along their chosen pathway – as shown in the following examples:

- Apprenticeship: visiting an approved apprenticeship delivery agent in the sector
- College: interviewing a college student enrolled in a sector-specific program
- University: observing a university class in a sector-related program
- Workplace: interviewing an employee in the sector.

#### FIND IT!

See **Section A1.5** for more on reach ahead experiences.

#### 5. Essential Skills and work habits and the OSP

Students will develop Essential Skills and work habits required in the sector and document them using the OSP, a component of the SHSM.

#### FIND IT!

See **Section A1.6** for more on Essential Skills and work habits.

### Pathways for the SHSM–Environment

A table illustrating the four pathways and required credits leading to completion of this SHSM is provided below. You will also find tables illustrating sample bundles of credits, and other useful resources, on the ministry's SHSM website.

#### **Awareness building (Grades 7 and 8)**

*Shaping Our Schools, Shaping Our Future*, published in June 2007, is the report of the Working Group on Environmental Education, appointed by the Ontario government to make recommendations about environmental education in Ontario. The report states that environmental education should be “highly visible within, and reflected across, the Ontario curriculum” (page 13). With the implementation of this recommendation, students will have opportunities to learn about the environment in every elementary and secondary school grade.

The SHSM–Environment provides a focus for students in the elementary and junior high school grades who become sufficiently interested in the environment to want to pursue a career in this area. See **Section 5.5** for information on building awareness of SHSM programs among students in Grades 7 and 8.

#### **Exploration (Grades 9 and 10)**

See **Section 5.5** for more information on providing Grade 9 and 10 students with opportunities for exploration of SHSM programs. Teachers who want to encourage students interested in enrolling in the SHSM–Environment program can make sure that these students are better informed about this sector by developing activities that both address curriculum

#### TOOLS AND RESOURCES

Visit the ministry's SHSM website at [www.edu.gov.on.ca/eng/teachers/studentsuccess/specialist.html](http://www.edu.gov.on.ca/eng/teachers/studentsuccess/specialist.html) for:

- sample bundles of credits specific to this SHSM
- a list of organizations and resources specific to this SHSM.



expectations in geography and science courses and letting students explore environmental issues. In addition, students considering this SHSM can be encouraged to enrol in the following courses to become better informed about careers and postsecondary options in this sector:

- Career Studies (compulsory) and Discovering the Workplace: Some of the expectations in these Grade 10 courses provide opportunities for students to explore occupations and other postsecondary options in the sector and to participate in experiential learning activities.
- Civics (compulsory): This Grade 10 course enables students to explore what it means to be an informed, participating citizen in a democratic society. Students learn about the elements of democracy in local, national, and global contexts, about political reactions to social change, and about political decision-making processes in Canada.

### ***Specialization (Grades 11 and 12)***

Students acquire the sector-specific knowledge and technical skills required to earn their OSSD with an SHSM–Environment by completing its five required components. Students and their parents/guardians are encouraged to consult with guidance counsellors and teachers to select the courses that will enable students to pursue their goals.

The environment is a very wide field of study that includes various career pathways and employment opportunities. Two areas of focus in this sector are environmental science and environmental studies.

An environmental science focus is geared towards students interested in careers in sciences, engineering, technology, and research. In the college and university pathway, students with an environmental science focus are advised to take additional math credits in Grade 12 (Advanced Functions [MHF4U] and/or Mathematics of Data Management [MDM4U]).

An environmental studies focus is for students more interested in recreation, tourism, and environmental policy.

Students pursuing an apprenticeship pathway should consider OYAP, which enables them to start an apprenticeship while earning their OSSD.

Students pursuing a university pathway are advised to complete their required cooperative education credits in Grade 11, in order to allow room in their timetables in Grade 12 for credits needed to meet university entrance requirements.

Students may want to consider the Ministry of Natural Resources Ontario Ranger Program as a summer cooperative education placement.

When helping students plan their SHSMs, particularly with respect to the selection of courses to fulfil the requirement for credits in the major, teachers should bear in mind that technological education courses can be offered as single-credit or multiple-credit courses.

### Program pathways: SHSM – Environment

• Shaded boxes – required credits in the bundle for the SHSM – The Environment • (C) – compulsory credit for the OSSD

Grade 9 Exploration	Grade 10 Exploration	Apprenticeship Training Pathway Specialization		College Pathway Specialization		University Pathway Specialization		Workplace Pathway Specialization	
		Grade 11	Grade 12	Grade 11	Grade 12	Grade 11	Grade 12	Grade 11	Grade 12
An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit
(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English	(C) English
(C) Mathematics	(C) Mathematics	(C) Mathematics	Mathematics	(C) Mathematics	Mathematics	(C) Mathematics	Mathematics	(C) Mathematics	An optional or a compulsory credit
(C) Science	(C) Science	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit
(C) Geography of Canada	(C) Canadian History	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major
(C) Core French	(C) Career Studies/ Civics	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major	Environment Major
(C) Healthy Active Living Education	(C) The Arts	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12	May be used as a (C) Cooperative education (2 credits), related to the sector, in either Gr. 11 or Gr. 12
An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit	An optional or a compulsory credit