

# Manitoba Envirothon

## Water and Aquatic Systems

### Provincial Curriculum Connections

Code	Outcome	Grade 10 Science	Grade 10 Geography	Grade 12 Biology
A6	Describe factors affecting water, and aquatic ecosystems, including biodiversity, non-native species, habitat reduction, pollution, climate change, and human activity.	S2-1-09: Explain how the biodiversity of an ecosystem contributes to its sustainability.		B12-5-01: Discuss a variety of reasons for maintaining biodiversity.
A27	Describe the nitrogen cycle, phosphorus cycle, and carbon cycle in aquatic ecosystems.	S2-1-01: Illustrate and explain how carbon, nitrogen, and oxygen are cycled through an ecosystem.		
A34	Explain the concept of carrying capacity within an aquatic ecosystem.	S2-1-04: Describe the carrying capacity of an ecosystem.		
A37	Give examples of invasive species present or anticipated in Manitoba.	S2-1-07: Discuss the potential consequences of introducing new species and of species extinction to an ecosystem.		
A38	Describe characteristics of invasive species that contribute to their success over native species.	S2-1-07: Discuss the potential consequences of introducing new species and of species extinction to an ecosystem.		
A39	Discuss the relationship between sustainable development and management of aquatic ecosystems.	S2-1-10: Investigate how human activities affect an ecosystem and use the decision-making model to propose a course of action to enhance its sustainability.		
A40	Explain why management of water, fisheries and other aquatic resources is important in addressing issues such as conservation of biodiversity, non-			B12-4-01: Define the concept of biodiversity in terms of ecosystem, species, and genetic diversity. B12-5-01: Discuss a variety of reasons for maintaining

	native species habitat reduction, pollution, climate change and human activity.			biodiversity.
A42	Describe laws and other methods used to protect water quality, aquatic ecosystems and fisheries from pollution, non-native species and other human impacts.		S2-KL-018: Explain the importance of stewardship in the preservation of the Earth's complex environment.	B12-5-02: Describe strategies used to conserve biodiversity. B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area. B12-5-04: Investigate an issue related to the conservation of biodiversity.
A43	Discuss the interaction of competing uses of water, including industry, hydropower, irrigation, agriculture, transportation, navigation, recreation/sport, wildlife and fisheries.	S2-1-10: Investigate how human activities affect an ecosystem and use the decision-making model to propose a course of action to enhance its sustainability.		
A44	Discuss the impact of competing water uses on the ability of an ecosystem to sustain wildlife, forestry, fisheries and other human needs.	S2-1-10: Investigate how human activities affect an ecosystem and use the decision-making model to propose a course of action to enhance its sustainability.		
A46	Describe different methods of conserving water.			B12-5-04: Investigate an issue related to the conservation of biodiversity.
A47	Describe role of physical, chemical and biological tests in assessing and managing aquatic ecosystems.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
A48	Describe how to manage a riparian zone for ecosystem health.			B12-5-02: Describe strategies used to conserve biodiversity.
A55	Describe how GIS are used in the management of water resources.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.

**Manitoba Envirothon**  
**Native Plants and Forestry**  
**Provincial Curriculum Connections**

<b>Code</b>	<b>Outcome</b>	<b>Grade 10 Science</b>	<b>Grade 10 Geography</b>	<b>Grade 12 Biology</b>
F1	Describe the ecological, economic and social benefits of native plants, horticultural trees and forests.			B12-5-01: Discuss a variety of reasons for maintaining biodiversity.
F2	Describe the ecosystem services provided by native plants, horticultural trees and forests.	S2-1-08: Observe and document a range of organisms that illustrate the biodiversity within a local or regional ecosystem. S2-1-09: Explain how the biodiversity of an ecosystem contributes to its sustainability.		B12-5-01: Discuss a variety of reasons for maintaining biodiversity.
F4	Give examples of how native plants have been used traditionally.		S2-V1-003: Be willing to consider diverse views regarding the use of natural resources.	
F5	Describe factors affecting health and survival of native plants, horticultural trees and forests, including biodiversity, non-native species, habitat reduction, pollution, climate change, fire and human activity.	S2-1-08: Observe and document a range of organisms that illustrate the biodiversity within a local or regional ecosystem.		
F13	Identify other trees and shrubs by scientific and common names using a key or field guide.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
F14	Identify distinctive indicator plant species using a key.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
F16	Identify common invasive forest pests present or anticipated in Manitoba.	S2-1-07: Discuss the potential consequences of introducing new		

		species and of species extinction to an ecosystem.		
F27	List the eco-regions of Manitoba.		S2-KL-019: Identify major natural resources on a map of the world, map of North America, and a map of Canada. S2-KL-016: Locate on a map of Manitoba global environmental types found in Manitoba.	
F28	Describe the eco-regions of Manitoba including their geographical location.		S2-KL-019: Identify major natural resources on a map of the world, map of North America, and a map of Canada. S2-KL-016: Locate on a map of Manitoba global environmental types found in Manitoba.	
F32	Discuss the relationship between sustainable development and forest management.			B12-5-02: Describe strategies used to conserve biodiversity.
F33	Explain why forest management is important in addressing issues such as conservation of biodiversity, non-native species habitat reduction, pollution, climate change, fire and aesthetics.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
F41	Give examples of Traditional Ecological Knowledge (TEK).		S2-V1-003: Be willing to consider diverse views regarding the use of natural resources. S2-KL-004: identify Aboriginal perspectives and rights regarding natural resources and their use.	
F42	Explain the role TEK plays in sustainable forest management.		S2-V1-003: Be willing to consider diverse views regarding the use of natural resources. S2-KL-004: identify Aboriginal perspectives and rights regarding natural resources and their use.	
F43	Describe BMPs (best/better			B12-5-02: Describe strategies used

	management practices) for forestry, including those for riparian zones, water quality, fire and aesthetics.			to conserve biodiversity. B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
F44	Describe management practices used in urban forestry.		S2-KL-030: Describe urban environmental and economic issues. S2-KL-031: Describe the role of urban planning and use examples to illustrate its importance.	
F45	Describe the use of forest surveys, including silviculture surveys, inventories, wood supply analysis and pre-harvest surveys.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
F56	Describe how GIS are used in forest management.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.

# Manitoba Envirothon

## Soils and Land Use

### Provincial Curriculum Connections

Code	Outcome	Grade 10 Science	Grade 10 Geography	Grade 12 Biology
S9	Describe the physical, chemical and biological properties of the major soil orders found in Manitoba.		S2-KL-16: Locate on a map of Manitoba global environmental types found in Manitoba.	
S24	Explain why biodiversity in the soil ecosystem is important for plant, environmental and human health.	S2-1-08: Observe and document a range of organisms that illustrate the biodiversity within local or regional ecosystem.		B12-5-01: Discuss a variety of reasons for maintaining biodiversity.
S32	Indicate the geographic and ecosystem distribution of the major soil orders in Manitoba.		S2-KL-16: Locate on a map of Manitoba global environmental types found in Manitoba.	
S33	Discuss the relationship between sustainable development and soil management.		S2-KC-002: Describe sustainability issues related to natural resource extraction and consumption.	
S34	Explain why soil management is important to agriculture and in addressing issues such as conservation of biodiversity, non-native species, pollution and climate change.			B12-5-04: Investigate an issue related to the conservation of biodiversity.
S42	Describe how GIS are used by agricultural and land use resource managers.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
S45	Interpret data from a variety of sources of soil data, including soil survey reports, soil capability maps and ortho photos.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.

## Manitoba Envirothon

### Wildlife and Wildlife Management

#### Provincial Curriculum Connections

Code	Outcome	Grade 10 Science	Grade 10 Geography	Grade 12 Biology
W3	Describe factors affecting wildlife and wildlife habitat, including biodiversity, non-native species, habitat reduction, pollution, climate change and human activity.	S2-1-05: Investigate and discuss various limiting factors that influence population dynamics.		
W13	Identify common bird, mammal, and herp species using a field guide or key from specimens, dental formulae, pictures, decoys, scat or tracks.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
W14	Describe common characteristics of common animal phyla.			B12-4-03: Describe the dynamic nature of classification.
W15	Identify common invasive species that affect wildlife present or anticipated in Manitoba.	S2-1-07: Discuss the potential consequences of introducing new species and of species extinction to an ecosystem.		
W19	Describe the role of a particular species in the ecosystem.			B12-4-01: Define the concepts of biodiversity in terms of ecosystem, species, and genetic diversity.
W27	Explain how carrying capacity affects wildlife populations.	S2-1-04: Describe the carrying capacity of an ecosystem.		
W28	Give examples of limiting factors for wildlife populations.	S2-1-05: Investigate and discuss various limiting factors that influence population dynamics.		
W29	Describe how birth, mortality, age structure, sex ration, and mating systems affect wildlife populations.	S2-1-06: Construct and interpret graphs of population dynamics.		

W33	Describe characteristics of invasive species that affect wildlife present or anticipated in Manitoba	S2-1-07: Discuss the potential consequences of introducing new species and of species extinction to an ecosystem.		
W35	Discuss the relationship between sustainable development and wildlife management.		S2-KC-002: Describe sustainability issues related to natural resource extraction and consumption.	
W36	Explain the importance of wildlife management in addressing issues such as conservation of biodiversity, non-native species, habitat reduction, pollution, climate change and human activity.			B12-5-04: Investigate an issue related to the conservation of biodiversity.
W44	Describe strategies used to manage issues involving wildlife in Manitoba, including non-native species, problem wildlife, wildlife pathogens and disease, and species at risk.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.
W50	Describe how GIS are used in wildlife management.			B12-5-03: Select and use appropriate tools or procedures to determine and monitor biodiversity in an area.