

For markers' use only				
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

GROOVY GARDEN TRAIL

STOP 1

AQUATICS (2 points) EQUIPMENT

2

Refer to the photos on display to answer the following questions. (1 pt each)

A) Which of the three (3) organisms (B, C, or D) pictured here would most likely be responsible for the condition pictured in photo A? _____

B) Which plant nutrient is usually the key to formation of the condition shown in photo A?

ANSWER

- A) B
- B) phosphorus or phosphate

REFERENCE

April Workshop - Aquatics Training and handouts; Aquatics Resource Guide (A16)

FORESTRY (10 points) EQUIPMENT

10

A) With regards to forest industry certification, what does the term "chain of custody" mean? (2 pts)

2

B) Explain the role of an auditor in the forest certification process. (2 pts)

Pa	_____
	2

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 1 - FORESTRY (10 points) - Cont'd.

C) Circle the best responses. (2 pts)

Which of the following are features of a forest certification standard?

- a. scientifically supported
- b. is based on an open process
- c. produces repeatable and consistent independent audits
- d. includes continual improvement
- e. all of the above

2

D) Why do forest managers and forest management companies seek forest certification? (3 pts)

3

E) Refer to the piece of wood provided at this stop. How can you tell if this piece of wood is certified? (1 pt)

1

ANSWER

- A) The ability to track wood products cuts from their place of harvest to the point of sale.
- B) Auditor (or certifier) is the accredited body that is qualified to inspect and verify that a company's practices conform to the certification standards.
- C) e
- D) To provide evidence of sustainable forest management that maintains forest health and biodiversity, and meets social and community expectations.
- E) Certified lumber is stamped with a logo.

REFERENCE

April Workshop - Forestry handouts; Forest Certification Resource Center; FPAC websites

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 1 - Cont'd.

SOILS (2 points)

2

A) True or False. Circle the best response. (1 pt)

Hydraulic conductivity is the rate of water movement through a soil.

T F

B) Fill in the blank. (1 pt)

The rate of water movement through a soil is largely determined by the soil _____.

ANSWER

- A) True
- B) Texture

REFERENCE

Soil Management Guide (Page 46)

WILDLIFE (2 points)

2

Describe two (2) features that are characteristic of compiling a breeding bird atlas. (1 pt each)

1. _____

2. _____

ANSWER

Any 2 of the following:

- o project of fixed length (usually 5 years) that documents the distribution and abundance of all breeding birds;
- o uses volunteers or "citizen science" and professionals;
- o within in a given jurisdiction, e.g. a province & divides the jurisdiction (province) into a grid (e.g. 10x10km);
- o can be repeated, e.g. every 20 years, to document changes

REFERENCE

April Workshop - Wildlife Training

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 1 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

EQUIPMENT

2

A) Refer to the sample macrophyte provided. What is the significance of this macrophyte to climate change? (1 pt)

B) Circle the best responses from the choices provided in the parentheses. (1 pt - 0.5 pt each)

This macrophyte occupies only **(3 / 7)** % of the Earth's land area, yet its total biomass contains **(twice / three times)** as much carbon as all global forest biomass.

ANSWER

A) Peatlands are the most efficient terrestrial ecosystems in storing carbon.

B) 3%; twice

REFERENCE

Theme Resource Guide (Page 43)

Page Total

STOP 2

AQUATICS (2 points)

2

List two (2) ways that water quality may very likely be adversely affected by climate change. (1 pt each)

1. _____

2. _____

ANSWER

- Increasing Concentration - Increasing temperatures result in increasing evaporation and reduced water volume. As water volume decreases, the relative concentration of pollutants increases;
- Increased spring flooding/ rainfall will flush greater quantities of contaminants into water systems .

REFERENCE

Aquatics Resource Guide (A19)

FORESTRY (2 points)

2

Name four (4) of the most significant introduced pests to North American forests. (0.5 pt each)

1. _____

2. _____

3. _____

4. _____

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 2 - FORESTRY (2 points) - Cont'd.

ANSWER

Any 4 of the following:

- o Gypsy moth,
- o dutch elm disease,
- o white pine blister rust,
- o European elm bark beetle,
- o sawflyies,
- o balsam wooly adelgid,
- o chestnut blight
- o etc. (see Glenn for other acceptable answers)

REFERENCE

Forestry Resource Guide - Alien Forest Pests, NRCan

SOILS (10 points)
EQUIPMENT

_____ 10

Refer to the copy of the Soil Survey Report for Rolette County, North Dakota provided to answer the following questions:

A) Assume you find soil polygon #1571 on one of the maps. What soil does this code correspond with? (2 pts)

2

B) What is the issue associated with the 'moderate' limitation in reference to the hypothetical development of a sewage lagoon within soil polygon #1571? (2 pts)

2

C) What is the reported range of slopes for the soil identified within polygon #1571? (2 pts)

2

D) What is the expected yield of spring wheat being grown under a high level of management on a Gardena soil (polygon #768). Be sure to include units. (2 pts)

2

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 2 - SOILS (10 points) - Cont'd.

E) How many acres of soil polygon #1571 are noted within this report? (2 pts)

2

ANSWER

- A) Rolla
- B) slope
- C) 0-6%
- D) 40 bu/ac
- E) 17,600 acres

REFERENCE

Soil Survey Report for Rolette County, North Dakota

WILDLIFE (2 points)

A) The International Peace Gardens is part of which terrestrial ecozone? (1 pt)

<u> </u> 2

B) Circle the best response. (1 pt)

How many square kilometres does this ecozone span?

- a. 5,200,000 square kilometres
- b. 520,000 square kilometres
- c. 5,200 square kilometres
- d. 5.2 square kilometres

ANSWER

- A) Prairie
- B) b

REFERENCE

Wildlife Resource Guide - Environment Canada - An Introduction to Ecozones (Page 52)

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 2 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

<hr/>
2

A) What does UTM stand for? (0.5 pt)

B) What does GPS stand for? (0.5 pt)

C) Your GPS unit gives you the coordinates 14U 0423050 5427750. How many kilometres are you from the equator? (1 pt)

ANSWER

- A) Universal Transverse Mercator (UTM)
- B) Global Positioning System (GPS)
- C) 5427.75 km

REFERENCE

April Workshop - GPS/GIS Training

Page Total

Team #

STOP 3

AQUATICS (2 points)
EQUIPMENT

Refer to the samples provided at this stop to answer the following questions.

<hr/>
2

A) Identify the mouth orientation on the following samples as either inferior, subterminal, terminal or superior. (1 pt - 0.5 pt each)

Sample A _____

Sample B _____

B) Name the anatomical features identified in the following samples. (1 pt - 0.5 pt each)

Sample C _____

Sample D _____

ANSWER

A) A - terminal; B - inferior

B) C - adipose fin; D - lateral line

REFERENCE

Aquatics Resource Guide - Fish Anatomy

Page Total

Team #

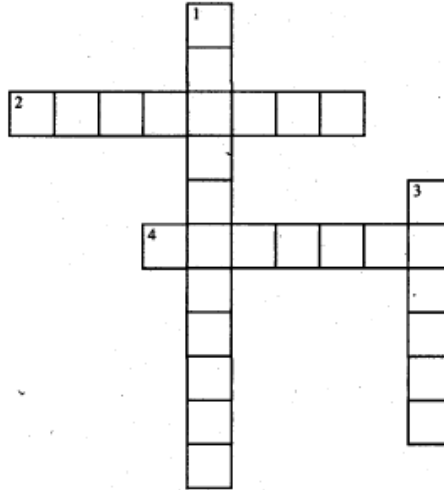
STOP 3 - Cont'd.

FORESTRY (2 points)

Complete the crossword puzzle below using terms that match the definitions provided.

<hr/>
2

Forestry Definitions



ACROSS

- 2 Stripping or gnawing a section of bark around the trunk of a tree or shrub; may kill the plant.
- 4 A plant that bears its seeds in cones.

DOWN

- 1 A group of pigments that produce the green hue of plants; essential to photosynthesis.
- 3 To eat the twigs and leaves of woody plants.

ANSWER

Down: 1. CHLOROPHYLL 3. BROWSE Across: 2. GIRDLING 4. CONIFER

REFERENCE

Forestry Resource Guide - Glossary (Pages 23-25)

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 3 - Cont'd.

SOILS (2 points)
EQUIPMENT

Using the Soil Capability for Agriculture (Canada Land Inventory) Brandon map sheet (62G), locate SW¹/₄ 33-09-07WPM on the map.

What is the soil capability for agriculture rating (provide both the rating and the limitation)?

ANSWER

3s

REFERENCE

April Workshop - Soils Training; Soil Capability for Agriculture (Canada Land Inventory) Brandon map sheet (62G)

WILDLIFE (2 points)

Residents of Winnipeg have an average human footprint of 7.2 ha/person. What is meant by the term human footprint?

ANSWER

Human Footprint: the amount of land and shallow sea appropriated by each person for food, water, housing, energy, transportation, commerce and waste – or, more simply, the amount of land and water each person needs to live.

REFERENCE

April Workshop - Wildlife PowerPoint Presentation

2

2

Page Total

STOP 3 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (10 points)

EQUIPMENT

10

One of the threats to the biodiversity of freshwater ecosystems is the introduction of invasive alien species.

A) Fill in the blanks. (2 pts - 1 pt each)

The tapeworm in the photo provided at this stop is called the _____ . It has recently been found in _____ shiners (specify type of shiner) in Lake Winnipeg and the Red River. The effects of this tapeworm on shiners include intestinal dysfunction, reduction in growth and reproduction and secondary infections.

2

B) What is one (1) possible overall effect to the aquatic ecosystem of Lake Winnipeg with the introduction of this tapeworm? (1 pt)

1

C) A virus has recently been tested positive in carp found in Lake Manitoba. What is the name of the virus? (1 pt)

1

D) What one (1) factor of water quality is required for this virus to cause disease and death in carp? (0.5 pt)

0.5

E) In addition to carp, this virus is specific to two (2) other fish, and it is through these fish that it is thought the wild carp became infected. What is the name of the one (1) fish that is NOT included in the name of the virus? (1 pt)

1

F) Can this virus be transmitted to humans? (0.5 pt)

0.5

G) What are two (2) things that you can do to prevent the spread of this virus? (2 pts - 1 pt each)

1. _____

2. _____

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

STOP 3 - THEME (10 points) - Cont'd.

H) Of the two (2) samples provided, identify the rusty crayfish by circling the correct response below. (0.5 pt)

0.5

Sample A

Sample B

I) List three (3) of the five (5) distinguishing anatomical features belonging to the rusty crayfish. (1.5 pts - 0.5 pt each)

1. _____

2. _____

3. _____

1.5

ANSWER

A) Asian Carp Tapeworm; emerald shiners

B) Emerald shiners are one of the single important prey species for many commercial and sport fish species - a reduction in their numbers could lead to a reduction in the species that rely on them.

C) koi herpes virus

D) high water temperature

E) goldfish

F) no

G) do not transfer fish from infected areas to uninfected areas; do not flush dead or diseased koi or goldfish down the toilet - humanely destroy and bury

H) Sample B

I) Any 3 of the following:

- o claws greyish-green to reddish-brown;
- o S-shaped movable claw;
- o tips of claws with black bands;
- o oval gap when claws are closed;
- o carapace with pair of dark rust-coloured spots

REFERENCE

April Workshop handouts

STOP 4

AQUATICS (2 points)

A) Fill in the blanks with the best responses from the list provided below. (1 pt - 0.5 pt each)

2

In 1909, the _____ Treaty established the _____ Commission and set the basic principles for guiding boundary water relations between Canada and the United States.

- Lake of the Woods
- Boundary Waters
- Rainy Lake Convention
- International Joint
- Columbia River
- Skagit River
- St. Lawrence Seaway

B) The commission helps anticipate, prevent and resolve disputes between the two countries in an independent and impartial manner. It provides a mechanism for cooperation and coordination in managing shared waterways and investigating environmental issues of mutual interest.

Name two (2) water management issues that Manitoba could have environmental concerns over. (1 pt - 0.5 pt each)

1. _____
2. _____

ANSWER

- A) Boundary Waters Treaty; International Joint Commission
- B) Any 2 of the following:
 - o levels and flows of water (water use, diversion, obstructions);
 - o invasive species;
 - o water quality

REFERENCE

Aquatics Resource Guide - International Document

Team #

STOP 4 - Cont'd.

FORESTRY (10 points)
EQUIPMENT

<hr/> 10

A) Trees can be aged using the piece of forestry equipment imbedded in the nearby tree. What is this piece of equipment called? (2 pts)

B) The samples provided are from a tree recently harvested in the Peace Gardens. Please determine the tree's age. (Use either sample and the hand lens if necessary.) (2 pts)

_____ years old

<hr/> 2

C) Circle the best response. (2 pts - 1 pt each)

i. Dendrochronology refers to:

- a. the time of year that leaves form on trees
- b. the study of plant evolution
- c. the analysis of tree growth ring patterns in science
- d. the difference in plant growth from one area to another

<hr/> 1

ii. Dendrochronological timelines can be used by researchers to:

- a. calculate the age of buildings or structures
- b. calculate the age of archeological sites
- c. study the effects of climatic factors on tree growth
- d. all of the above

<hr/> 1

D) True or False. Circle the best response. (1 pt)

Tree ring width can be affected by both biotic and abiotic factors.

T F

<hr/> 1

E) What does PSP stand for? (2 pts)

<hr/> 2

F) One of the unintended benefits of forestry plots and research trials is that the long-term information collected can also be utilized to study what current area of concern? (1 pt)

<hr/> 1

Pa <hr/> 2

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

STOP 4 - FORESTRY (10 points) - Cont'd.

ANSWER

- A) increment borer
- B) TBD on site**
- C) i. c ii. d
- D) true
- E) Permanent Sample Plot
- F) climate change

REFERENCE

April Workshop - Forestry Training and handouts; Henri D. Grissino-Mayer's Ultimate Tree-Ring website

SOILS (2 points)

List two (2) things farm producers can do to protect biodiversity on their farms. (1 pt each)

1. _____
2. _____

2

ANSWER

Any 2 of the following:

- o Maintain diverse habitats for wildlife, including a diversity of native plants, heights and patterns;
- o Find out how to manage your woodlands for profit and environmental benefits;
- o Convert marginal or sensitive land from active agricultural production to permanent cover, especially if the area is affecting water quality or is costing you money to maintain production;
- o Protect wetland areas by leaving a buffer strip between the wetland and any cropland, with larger buffers being used on sloping land;
- o Maintain travel corridors for wildlife between natural areas;
- o Harvest renewable resources (plants and animals) in a sustainable way to ensure that healthy populations are maintained;
- o Before draining a wetland consider the impact on fish and wildlife;
- o Provide off stream watering for livestock, to keep them out of the water;
- o Use an environmental farm plan worksheet or comparable guide to see how well your wildlife habitat areas are managed;
- o Consult the appropriate agricultural, wildlife or woodlot extension specialist for additional information and support.

REFERENCE

Environmental Farm Plan handout from April Workshop (Page B16.3)

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 4 - Cont'd.

WILDLIFE (2 points)
EQUIPMENT

Using the Plants of the Western Boreal Forest and Aspen Parkland Field Guide provided at this stop, identify the following two (2) plants. (1 pt each)

2

PLANT A (Hint: it can be found under the Aster family): _____

PLANT B (Hint: it can be found under the Grass family): _____

ANSWER

- A - Philadelphia Fleebane
- B - Timothy

REFERENCE

Plants of the Western Boreal Forest and Aspen Parkland

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

Describe two (2) key characteristics of an invasive species. (1 pt each)

2

1. _____

2. _____

ANSWER

An invasive species is defined as a species that is 1) non-native to the ecosystem under consideration, and 2) whose introduction causes or is likely to cause economic or environmental harm, or to cause harm to human health.

REFERENCE

Canon Envirothon Website - Alien Species (Page 1)

Page Total

STOP 5

AQUATICS (2 points)

Improved water quality can be attributed to aquatic plant or macrophyte establishment. List two (2) ways in which this vegetation can benefit water quality. (1 pt each)

2

1. _____

2. _____

ANSWER

Any 2 of the following:

- o aquatic plants absorb phosphorus, nitrogen, and other nutrients from the water that would otherwise be available to promote algal growth;
- o foliage acts as a filtering system that traps sediment particles entering the water from runoff;
- o the roots of aquatic plants can trap sediment that might otherwise become resuspended.

REFERENCE

Aquatics Resource Guide - Through the Looking Glass: A field guide to aquatic plants (Page 11)

FORESTRY (2 points)

Below is a list of primary and secondary forest products that can be found in Manitoba. Secondary forest products mean that value has been added to the wood products. Circle only the products that are considered secondary forest products. (2 pts)

2

- | | |
|------------------|-----------------------------|
| doors | paper |
| windows | oriented strand board (OSB) |
| lumber | plywood |
| kitchen cabinets | furniture |

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 5 - FORESTRY (2 points) - Cont'd.

ANSWER

doors, windows, kitchen cabinets, furniture (0.5 pt each)

REFERENCE

Forestry Resource Guide - Manitoba Forestry: Growing Opportunities for a Sustainable, Inclusive Forest Industry (Page 3)

SOILS (2 points)

Fill in the blanks. (0.5 pt each)

Soil texture is the relative proportion of _____, _____,
and _____ particles measuring less than _____ mm in diameter.

2

ANSWER

Sand, silt, clay, 2.0

REFERENCE

Soil Management Guide (Page 11); April Workshop - Soils Training

Page Total

Team #

STOP 5 - Cont'd.

WILDLIFE (10 points)
EQUIPMENT

Estimates of the background rate of extinction have been derived from the fossil record.

10

A) What is meant by the term background extinction rate? (2 pts)

2

B) Why are scientists interested in studying the background extinction rate? (2 pts)

2

C) Refer to the graph provided. It has five (5) labeled peaks.

i. What is the general name for these periods of increased extinction rates? (1 pt)

1

ii. What caused the extinction peak labeled KT? (1 pt)

1

D) i. Is the current extinction rate less than, greater than or about the same as, the background extinction rate? (1 pt)

1

ii. With respect to extinction rates, what name have scientists given the era we live in? (1 pt)

1

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 5 - WILDLIFE (10 points) - Cont'd.

E) Sound management has brought several Manitoba species back from the brink of extinction or extirpation. Name two (2) of these species. (2 pts - 1 pt each)

1. _____

2. _____

2

ANSWER

A) The background rate of extinction is the number of extinctions that would be occurring naturally in the absence of human influence.

B) The background rate of extinctions establishes a baseline to compare with the current rate of extinction to determine how severe it is and what impact humans are having.

C) i. Mass extinction events ii. Asteroid/comet/meteorite impact

D) i. much greater than ii. Sixth Mass Extinction

E) Any 2 of the following:

- o beaver,
- o bison,
- o pelicans,
- o trumpeter swan, etc.

REFERENCE

April Workshop - Wildlife Training

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

A) Define traditional knowledge and describe how it is developed. (1 pt - 0.5 pt each)

2

B) How is traditional knowledge shared between generations? (1 pt)

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 5 - THEME (2 points) - Cont'd.

ANSWER

A) Traditional knowledge refers to the knowledge, innovations and practices of indigenous and local communities around the world. It is developed from experience gained over the centuries and adapted to the local culture and environment.

B) Transmitted orally from generation to generation and tends to be collectively owned, taking the form of stories, songs, cultural beliefs, community laws and production practices.

REFERENCE

Theme Resource Guide (Page 48)

Page Total

STOP 6

AQUATICS (10 points)
EQUIPMENT

10

Determining the physical parameters of a water body assists in determining the health of an aquatic ecosystem. As a fisheries biologist you are here to determine some of the channel and flow characteristics of this man-made channel. Please show your work and the correct units where appropriate.

A) Use the survey level and rod provided at this stop to measure the slope of this channel. **NOTE: do not physically move the tripod or the tape measure that runs along the bank.** The upstream and downstream positions for the rod are flagged. Indicate which set of equipment you used by circling the appropriate letter below. (4.5 pts)

Equipment A

Equipment B

Upstream reading (1.5 pts) : _____

Downstream reading (1.5 pts) : _____

4.5

Distance (0.5 pt) : _____

Slope (*show calculations*) (1 pt) =

B) For each site listed below, use the equipment provided to fill in the blanks. A "hypothetical" water surface is provided. Depths are to be taken where noted on the measuring tape.

Looking Upstream (3.5 pts - 0.5 pt each)

Left Bank:	Width = 0 m	Depth = _____ m
	Width = _____ m	Depth = _____ m
	Width = _____ m	Depth = _____ m
Right Bank:	Total Width = _____ m	Depth = _____ m

3.5

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 6 - AQUATICS (10 points) - Cont'd.

C) What is the area of the channel? Show your work. (1 pt)

—
1

D) On April 21st, 2009, the velocity at this site was 0.172 m/s. Assuming the area of the channel is the value determined in (C), what was the discharge (Q) on this day? (1 pt)

—
1

ANSWER

TBD

REFERENCE

April Workshop - Aquatics Training and handouts

Page Total

Team #

STOP 6 - Cont'd.

FORESTRY (2 points)

A common teaching when harvesting rare medicinal plants is "don't take the first one you see". How is this traditional knowledge statement related to maintaining genetic biological diversity?

2

ANSWER

Answer to refer to the idea that: Species diversity is maintained by not taking the "only" or "last" one. The first one seen could also be the only one! This answer is supported by the definition of Genetic Biodiversity: the range of diversity within a single species. It is the variation within the individual genes. This variation is important because it allows organisms to adapt to their ever-changing environment. The more genetic variation there is the better the chance that a species can adapt to change. Reduced genetic variability leaves them with a weakened capacity to deal with new diseases, pests, and other changes in environmental conditions.

REFERENCE

Applied knowledge; Theme Resource Guide - Species Biodiversity Defining (Page 2)

SOILS (2 points)

Fill in the blanks. (1 pt each)

2

Upon weathering, granite breaks down into _____ particles,

whereas shale breaks down into _____ particles.

ANSWER

Sand, clay

REFERENCE

April Workshop - Soils Training; Soil Management Guide (Page 4)

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 6 - Cont'd.

WILDLIFE (2 points)
EQUIPMENT

2

Using the Mammal Tracks of Manitoba book provided, identify these two (2) species by the tracks they left behind. (1 pt each)

A - _____

B - _____

ANSWER

A - raccoon
B - grey wolf

REFERENCE

Wildlife Resource Guide - Identifying and Preserving Wildlife Tracks - PDF

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

2

Circle the best response. (1 pt each)

A) Which of the following demonstrates the steps in the correct order for determining an Ecoregion Plan?

- a. Identify Biodiversity Targets > Assess Threats & viability > Set conservation goals
- b. Set conservation goals > Identify biodiversity targets > Assess threats & viability
- c. Set conservation goals > Assess threats & viability > Identify biodiversity goals
- d. Assess threats & viability > Set conservation goals > Identify biodiversity goals
- e. Identify biodiversity targets > Set conservation goals > Assess threats & viability

B) As Canadians, we are stewards of _____ of the Earth's wilderness.

45% 10% 2% 5% 20%

ANSWER

A) a. B) 20%

REFERENCE

April Workshop - Biodiversity Training

Page Total

STOP 7

AQUATICS (2 points)
EQUIPMENT

A) Circle the best response. Refer to the photo of the Souris River taken April 9, 2008. Using the table provided, how would you rate the channel flow condition of this river? (0.5 pt)

- a. poor
- b. marginal
- c. suboptimal
- d. optimal

B) Circle the best response. The visual-based habitat assessment that measures the extent to which rocks and snags are covered or sunken in the silt, sand or mud of a stream bottom is called: (0.5 pt)

- a. epifaunal substrate
- b. sinuosity
- c. embeddedness
- d. frequency of riffles

C) List two (2) of the four (4) components of stream flow that species living within streams have adapted to. (1 pt - 0.5 pt each)

1. _____
2. _____

ANSWER

- A) a. poor
B) c. embeddedness
C) Any 2 of the following:
o timing,
o frequency,
o magnitude,
o duration

REFERENCE

April Workshop - Aquatics handouts

2

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 7 - Cont'd.

FORESTRY (2 points)

2

A) List two (2) similar impacts of clearcutting and fire on a forest. (1 pt - 0.5 pt each)

1. _____

2. _____

B) List two (2) different impacts of clearcutting and fire on a forest. (1 pt - 0.5 pt each)

1. _____

2. _____

ANSWER

A) Any 2 of the following:

- o Increased sunlight reaches ground,
- o both can result in some level of erosion & runoff,
- o both will generally regenerate a new, in most cases even-aged forest.

B) Any 2 of the following:

- o generally numerous dead standing trees after a fire;
- o amount of above ground material differs - more on a burn left as ash (harvested material is removed from cutover);
- o logging leaves more soil material on the site than fire;
- o heat from fire contributes to the breakdown of rock into soil;
- o fires often remove or reduce insect and fungi - including pathogens;
- o logging generally requires roads which result in other impacts.

REFERENCE

Forestry Resource Guide - Fire Ecology, Clearcutting

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 7 - WILDLIFE (10 points) - Cont'd.

A - Type of Biodiversity	B - Definition OR Example

6

B) How do wolves provide an example of genetic diversity? Why is genetic diversity important to them? (2 pts - 1 pt each)

2

C) Give one (1) reason why we might NOT want to spend a lot of time and money to prevent one type of predator from taking over the range of a threatened one? (1 pt)

1

D) In Column A, provide one (1) type of biodiversity to which the beaver contributes. In Column B, indicate how it does so. (1 pt - 0.5 pt each)

A - Type of biodiversity that beaver contributes to	B - How the beaver contributes

1

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

STOP 7 - WILDLIFE (10 points) - Cont'd.

ANSWER

A) **Genetic** - possible definitions: The diversity within a single species; examples: does an animal have red hair or white hair OR Dark wolves vs. white wolves

Species - possible definitions: The variety of species on earth; diversity between species; the many different species of animals on the earth or in a community or in an ecosystem; examples: different species of insects, vertebrates, predators, in an ecosystem OR the different types of predators in an ecosystem

Ecosystem - possible definitions: Community or ecological diversity; How many different communities or ecosystems exist on earth or in a large landscape: examples: combinations of wetlands and forests and prairies in a landscape

B) Wolves have a variety of colours. (1 pt) These colours help them adapt/live to a wide variety of ecosystems. (1 pt) (0.5 pt for just "for camouflage")

C) Either of the following:

- o It might be more important to have any predator species filling that role in an ecosystem;
- o Species diversity may be as important as genetic diversity.

D) Any of the following:

- o Genetic - Beaver produce many young which disperse far and wide and create new populations with other dispersing beavers
- o Species - Beavers contribute by just being in the ecosystem OR The beaver creates new aquatic habitats, thereby adding new species to the environment
- o Ecosystem - The beaver creates new aquatic habitats, thereby adding a new biological community to the environment

REFERENCE

April Workshop - Wildlife Training; Theme Resource Guide [Page 2 (1.2)]

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)
EQUIPMENT

Use the GPS unit to determine the UTM coordinates of the flagged post at this site.

2

ANSWER

14U 0422297 5427981

REFERENCE

April Workshop - GPS/GIS Training

Team #

STOP 8

AQUATICS (2 points)
EQUIPMENT

2

The graph displayed at this stop shows two (2) different vertical profiles of water temperature in a 10-metre deep Manitoba lake at two (2) different seasons (spring, summer, fall, winter) of the year.

- A) Which season of the year is Season A? _____ (0.5 pt)
- B) Which season of the year is Season B? _____ (0.5 pt)
- C) During a strong wind event, what can happen in the entire water column during Season B that would not happen during Season A? (1 pt)

ANSWER

- A) summer
- B) spring or fall
- C) The water column can mix from top to bottom.

REFERENCE

Aquatics Resource Guide (A1)

FORESTRY (2 points)
EQUIPMENT

2

Using the Field Guide to the Native Trees of Manitoba, please identify the four (4) marked trees or samples. (0.5 pt each)

- A - _____
- B - _____
- C - _____
- D - _____

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 8 - FORESTRY (2 points) - Cont'd.

ANSWER

TBD

REFERENCE

Forestry Resource Guide - Native Tree Guide

SOILS (2 points)

A) What is the soil horizon designation for an organic horizon developed from leaves, twigs and woody materials? (1 pt)

2

B) Of the organic horizons, which organic horizon is comprised of the most highly decomposed material? (1 pt)

ANSWER

- A) LFH
- B) Oh

REFERENCE

Soil Management Guide (Page 13)

WILDLIFE (2 points)

What does the term "carrying capacity" mean with respect to wildlife species?

2

ANSWER

The number of animals that an area will support without damage to the habitat or the species.

REFERENCE

April Workshop - Wildlife PowerPoint Presentation; Wildlife Resource Guide - Ecology and Wildlife Management (Page 13)

Page Total

Team #

STOP 8 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (10 points)

EQUIPMENT

<hr/> 10

Two (2) sample areas are located at this stop for your review; one in a managed state and the other in a more natural state. Assume the managed sample receives fertilizer, pesticides, adequate water, and mowing at all times.

A) Which sample area (managed or non-managed) has higher levels of biodiversity?
(1 pt)

<hr/> 1

B) Which is considered a healthier ecosystem and why? (3 pts)

<hr/> 3

C) Would your answer to (B) change during a drought situation? Why or why not?
(2 pts)

<hr/> 2

D) Of these two (2) sample areas, which would you expect to change over time and why? (2 pts)

<hr/> 2

E) What improvements can be made to the managed area to increase biodiversity? (2 pts)

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 8 - THEME (10 points) - Cont'd.

ANSWER

2

- A) non-managed area
- B) The non-managed site has greater genetic diversity which allows organisms to better adapt to their changing surroundings. More species diversity, which creates better opportunities for species to coexist and interact, making a complex and robust web. The non-managed site provides more services.
- C) No, the non-managed site has diverse vegetation, some of which could be drought-tolerant. A healthy ecosystem would also be able to adapt to the conditions.
- D) The unmanaged site would change over time due to ecosystem changes.
- E) Reduce the use of pesticides that impact the soil organisms, introduce more diversity into the ecosystem (different plant varieties), reduce soil compaction.

REFERENCE

Theme Resource Guide; April Workshop - Biodiversity Training

Page Total

STOP 9

AQUATICS (2 points)

Look at the surrounding landscape. Assume that it is underlain by an **unconsolidated porous aquifer**.

2

A) What does this mean? (1 pt)

B) If the aquifer were **consolidated porous**, what would be different? (1 pt)

ANSWER

A) The groundwater occurs in material that is composed of **individual particles** that are **not attached** to each other and permit the groundwater to move through freely.

B) The individual particles would be **cemented together**.

REFERENCE

Aquatics Resource Guide (A4)

FORESTRY (2 points)

In Manitoba, 1 in 25 people have jobs related to the forest industry. List four (4) examples of jobs that these 1 in 25 people may have. (0.5 pt each)

2

1. _____
2. _____
3. _____
4. _____

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

STOP 9 - FORESTRY (2 points) - Cont'd.

ANSWER

Any 4 of the following:

- a feller-buncher operator out in the bush,
- the receptionist who does word processing at a lumber brokerage,
- a shift worker at the local planer mill,
- the purchasing agent ordering supplies needed by a furniture manufacturer,
- etc. (check other possible answers with Rebecca)

REFERENCE

Forestry Resource Guide - Manitoba's Forests (Jobs section)

SOILS (2 points)

Name two (2) soil conditions or constituents that can impact characteristic colours of the soil profile. (1 pt each)

1. _____

2. _____

2

ANSWER

Any 2 of the following:

- drainage,
- salinity,
- organic matter,
- iron,
- carbonates

REFERENCE

Soil Management Guide (Page 10)

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 9 - Cont'd.

WILDLIFE (2 points)

A) What does the term extirpated mean? (1 pt)

<hr/> 2

B) Provide one (1) example of a bird species that is extirpated in Manitoba. (1 pt)

ANSWER

A) locally extinct or no longer occurring in a specified area

B) Any of the following:

- o Long-billed Curlew,
- o Greater Prairie Chicken
- o Whooping Crane (though Whooping Crane may occur in Manitoba as an accidental on migration)

REFERENCE

April Workshop - Wildlife Training

Page Total

Team #

STOP 9 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (10 points)

<hr/> 10

The Canadian Biodiversity Strategy provides a framework for action to ensure the productivity, diversity and the integrity of Canada's natural systems and its ability to develop sustainably. The strategy promotes the conservation of biodiversity and the sustainable use of Canada's biological resources.

What are the five (5) goals of the strategy? (2 pts each)

1. _____

2

2. _____

2

3. _____

2

4. _____

2

5. _____

2

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 9 - THEME (10 points) - Cont'd.

ANSWER

- To conserve biodiversity and use biological resources sustainably;
- To enhance both our understanding of ecosystems and our resource management capability;
- To promote an understanding of the need to conserve biodiversity and use biological resources sustainably;
- To provide incentives and legislation that support the conservation of biodiversity and the sustainable use of biological resources;
- To work with other countries to conserve biodiversity, use biological resources sustainably and share equitably the benefits that arise from the utilization of genetic resources.

REFERENCE

Theme Resource Guide (Page 4); April Workshop - Biodiversity Training

Page Total

STOP 10

AQUATICS (2 points)
EQUIPMENT

Refer to the aerial photo of the lake (on display). Note that bathymetric (or morphometric) contour lines, at one-metre (1 m) intervals, have been drawn on this photo. Based on your knowledge of contour mapping, answer the following questions.

2

- A) What is special about the location designated as Point A? (0.5 pt)
- B) What is the approximate depth at Point A? (0.5 pt)
- C) What is morphologically special about the location indicated on the map as Point B? (1 pt)

ANSWER

- A) Point A is at the deepest place in the lake
B) 3.5 m (3.1 - 3.9 m also acceptable)
C) Point B is on a shallow ridge or underwater saddle (at a narrows is also an acceptable answer for 0.5 pt).

REFERENCE

Aquatics Resource Guide (A5)

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 10 - SOILS (10 points) - Cont'd.

B) True or False. Circle the best response. (5 pts - 1 pt each)

Standing stubble is 1.6 times less effective at controlling wind erosion than flat stubble. T F

Saltation is a term which refers to increased soil salinity. T F

Soils most susceptible to wind erosion are clay > loams > sand. T F

Tillage erosion is the main cause of severe soil loss and crop yield loss on hilltops. T F

The harvesting of root crops, like potatoes, can cause more tillage erosion loss than plowing. T F

5

ANSWER

- A) range of 40 - 60%, unless work was shown
- B) F,F,F,T,T

REFERENCE

Soil Management Guide; April Workshop - Soils Training

WILDLIFE (2 points)

Name two (2) of the three (3) ways hunters play an important role in helping wildlife managers determine wildlife populations. (1 pt each)

<u>2</u>

1. _____
2. _____

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 10 - WILDLIFE (2 points) - Cont'd.

ANSWER

Any 2 of the following:

- hunter surveys;
- providing biological data;
- submitting parts of wildlife species

REFERENCE

Wildlife Resource Guide - Hunter's Role (Page 24)

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

A) How many previous mass extinction periods have been documented? (1 pt)

2

B) What was the cause of the first mass extinction period that occurred approximately 440 million years ago? (1 pt)

ANSWER

- A) 5 documented mass extinctions (440, 370, 245, 210, & 65 million years ago)
B) Climate change

REFERENCE

Theme Resource Guide (Page 30)

Page Total

Team #

STOP 11

AQUATICS (10 points)
EQUIPMENT

<hr/> 10

A) The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has identified a number of fish species in Manitoba which are at risk. Match the four (4) fish species listed below with their designation (or in the case of sturgeon the *recommended* designation) by writing the appropriate letter (a, b, or c) in the space provided. (2 pts - 0.5 pt each)

- | | |
|------------------------------|--------------------|
| _____ carmine shiner | a. special concern |
| _____ bigmouth buffalo | b. endangered |
| _____ northern brook lamprey | c. threatened |
| _____ sturgeon | |

2

B) What does the designation "threatened" mean? (1 pt)

1

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

STOP 11 - AQUATICS (10 points) - Cont'd.

C) Fish become at risk when their habitat is altered. For each of the four (4) habitat alterations listed in the left hand column below, correctly identify its effect/impact on habitat from the right hand column by entering the letter (a, b, c, or d) in the space provided. (2 pts - 0.5 pt each)

_____ Heated effluent from mines, pulp and paper mills, thermal generating stations

a. reduces access to spawning, feeding, and overwintering habitats.

b. smothers eggs and hampers reproductive success; clogs fish gills; impairs feeding.

_____ Water control structures (poorly set culverts, dams, low level weirs)

c. releases warmer water which not only contains less oxygen but increases the fishes' need for more oxygen; can create lethal upper temperature ranges; can cause thermal shock if release is turned on or off quickly.

2

_____ Nutrient Pollution (addition of fertilizers, manure, detergent, human waste)

d. causes excessive algal blooms - decomposition of dead algae uses up oxygen, essentially suffocating fish and other aquatic life.

_____ Erosion and Siltation (deposited through erosion process)

D) Channelization, although designed to get water out of the channel as fast as possible, particularly during spring and other high precipitation events, can be a great threat to stream biodiversity. List two (2) reasons why channelization, as illustrated in the photo provided at this stop, is such a great threat to stream biodiversity. (2 pts - 1 pt each)

1. _____

2. _____

2

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

STOP 11 - AQUATICS (10 points) - Cont'd.

E) Define non-point source pollution. (1 pt)

1

F) What are the two (2) most common non-point source pollutants? (0.5 pt each)

1. _____

1

2. _____

G) The Index of Biotic Integrity looks at a number of fish indicator variables within some key metrics that are used to assess the health of aquatic ecosystems (e.g. the numbers of native species present). List two (2) other variables that are used for these assessments. (1 pt - 0.5 pt each)

1

1. _____

2. _____

ANSWER

A) C, A, A, B

B) The species is likely to become endangered if limiting factors are not reversed.

C) C,A, D, B

D) Any 2 of the following:

- it removes all habitat;
- alters the hydrology by increasing velocity;
- minimizes the duration of peak flows;
- increases sediment and pollutants in the water

E) NPS pollution occurs when rainfall, snowmelt, or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes, or introduces them into ground water.

F) sediment; nutrients

G) Any 2 of the following:

- Species Richness and Composition:
 - numbers of intolerant species present;
 - numbers of tolerant species present;
 - numbers of simple lithophilous spawners present;
- Trophic Composition Metrics:
 - proportion of omnivores;
 - individuals as insectivorous cyprinids;
 - individuals as top carnivores

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 11 - AQUATICS (10 points) - Cont'd.

REFERENCE

Aquatics Resource Guide - US Environmental Protection Agency Non Point Source Pollution website
- Non Point Source Pollution: The Nation's largest water quality problem; Species at Risk Brochure;
April Workshop - Aquatics handout; Theme Resource Guide

FORESTRY (2 points)

A) Circle the best response. (1 pt)

What percentage of Manitoba's harvested lands receive silvicultural treatment?

- a. 25 %
- b. 50 %
- c. 75 %

B) True or False. Circle the best response. (1 pt)

All Forestry companies operating on public land have the option to seek public input on their long-term forest management plans.

T F

ANSWER

- A) c. 75%
- B) F

REFERENCE

- A) Forestry Resource Guide - Manitoba's Forests
- B) Forestry Resource Guide - CFL (Page 20)

2

Page Total

2009 Manitoba Envirothon
GROOVY GARDEN TRAIL

Team #

STOP 11 - Cont'd.

SOILS (2 points)
EQUIPMENT

<hr/>
2

Refer to the textural triangle provided at this stop.

A soil contains 45% clay and 10% sand.

A) How much silt does it contain? (1 pt)

B) What is the texture of the soil? (1 pt)

ANSWER

- A) 45% silt
- B) silty clay

REFERENCE

Soil Management Guide (Page 12); Soils Resource Guide (Page 23); April Workshop - Soils Training

WILDLIFE (2 points)

<hr/>
2

A) Which portion of Manitoba has the greatest number of species at risk? (1 pt)

B) Why is this? (1 pt)

ANSWER

- A) Southern Manitoba OR the prairies
- B) This is due in large part to the impact that human settlement has had on habitat for these plants and animals.

REFERENCE

April Workshop - Wildlife Training

Page Total

Team #

STOP 11 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

<hr/> 2

A) Fill in the blanks.

The decline in biodiversity is considered one of the most serious environmental issues facing humanity. It has inspired the global community to create the _____ on Biological Diversity. (1 pt)

B) What year did Canada sign on to this? _____ (1 pt)

ANSWER

- A) United Nations Convention
- B) 1992

REFERENCE

April Workshop - Biodiversity Training

Page Total

For markers' use only				
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Team #

FUNKY FUNGUS TRAIL

STOP 12

AQUATICS (2 points)

Metamorphosis is the change that occurs during an aquatic insect's development from egg to adult.

Fill in the blanks below to name the two (2) types of metamorphosis that aquatic insects can undergo and how many stages of development occur in each. (0.5 pt each)

1. _____ metamorphosis has ____ stages of development.
2. _____ metamorphosis has ____ stages of development.

ANSWER

complete = 4; incomplete = 3

REFERENCE

Aquatics Resource Guide - Benthic macroinvertebrates in our waters - Life cycle of aquatic insects;
April Workshop - Aquatics Training and handouts

FORESTRY (2 points)

Name four (4) common uses/purposes of a private woodlot. (0.5 pt each)

1. _____
2. _____
3. _____
4. _____

<hr style="width: 20px; margin: 0 auto;"/> 2

<hr style="width: 20px; margin: 0 auto;"/> 2

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

Page Total

2009 Manitoba Envirothon
 FUNKY FUNGUS TRAIL

STOP 12 - FORESTRY (2 points) - Cont'd.
ANSWER

Any combination of the following:
 Woodlots are a source of:

- o income, providing lumber, pulpwood or other products for sale;
- o woodlots can also be managed for wildlife habitat, recreation, non-timber forest products such as maple syrup or specialty mushrooms, firewood;
- o or simply a place to relax and unwind.

REFERENCE

Forestry Resource Guide - http://www.mbforestryassoc.ca/woodlot_program.htm

SOILS (10 points)
EQUIPMENT

A) i. What are the three (3) master mineral horizons found in soil? (1.5 pts - 0.5 pt each)

10

1.

2.

1.5

3.

ii. What does the lower case suffix 'h' stand for when describing a mineral horizon? (0.5 pt)

0.5

iii. How many horizons do you see in the soil profile shown in the soil pit at this stop? (1 pt)

1

iv. How thick is the A horizon in this soil? (1 pt)

1

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

v. What is the drainage class of the soil in the soil pit at this stop? (1 pt)

1

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

STOP 12 - SOILS (10 points) - Cont'd.

B) i. Fill in the blanks.

_____ (two words) is the name given to the loose mineral and organic material from which soil develops. (1 pt)

1

ii. List two (2) modes of deposition related to soil formation. (1 pt - 0.5 pt each)

1.

1

2.

C) Fill in the blanks. (3 pts)

i. Glacier-deposited material is described as _____. (1 pt)

ii. Lacustrine is a term used to describe material deposited by a _____.

3

In Manitoba, the _____ (two words) Valley is an example of a region characterized by lacustrine deposits. (2 pts - 1 pt each)

ANSWER

A) i. A, B and C

ii. Horizon enriched with organic matter

iii. TBD

iv. TBD

v. TBD

B) i. Parent material

ii. Any 2 of the following:

- o till/morainal,
- o lacustrine,
- o fluvial,
- o alluvial,
- o outwash,
- o Aeolian,
- o organic

C) i. Till/morainial

ii. Lake; Red River Valley

REFERENCE

A) Soil Management Guide, (Page 18); Canadian System of Soil Classification

2009 Manitoba Envirothon FUNKY FUNGUS TRAIL

B & C) Soils Resource Guide (Page 18); Soil Management Guide (Page 8); April Workshop - Soils Training

STOP 12 - Cont'd.

WILDLIFE (2 points)

List two (2) reasons why endangered wildlife species are especially vulnerable to climate change impacts. (1 pt each)

—
2

1.

—

2.

—

ANSWER

Any 2 of the following:

- Endangered species are often geographically restricted. As climate change alters temperatures, humidity, soil and vegetation, it can render all or part of already-limited habitats unsuitable;
- endangered species tend to have lowered genetic diversity because of their small numbers, which limits their ability to adapt to different climates;
- endangered species are often specialists that depend on the survival of one or a few species for food, some of which are also vulnerable to climate change;
- endangered species may possess other traits that place them at risk, such as wintering in the Arctic, where large climate changes are expected, or living/nesting in coastal habitats that could be subject to sea-level rise.

REFERENCE

Wildlife Resource Guide - Nature in Trouble - Threats to Wildlife (Page 2)

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

What are four (4) of the five (5) characteristics used to determine an ecological boundary or Ecozone? (0.5 pt each)

—
2

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

1.

2.

3.

4.

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 12 - THEME (2 points) - Cont'd.

ANSWER

climate, vegetation, soil, geology, and topography

REFERENCE

April Workshop - Biodiversity Training

STOP 13

AQUATICS (2 points)
EQUIPMENT

 2

Refer to the two (2) pieces (A and B) of sampling equipment on display at this stop to answer the following questions. (1 pt each)

A) Which of these two (2) samplers (A or B) is used to sample for benthic organisms?

B) What is the other sampler designed to sample?

ANSWER

- A) A
- B) water

REFERENCE

April Workshop - Aquatics Training and handouts

FORESTRY (10 points)
EQUIPMENT

 10

A) What is Manitoba's provincial tree? (1 pt)

 1

B) Using the table below, list what parts of the tree have been used to make the items displayed at this stop and the uses of the these items. (6 pts - 1 pt each)

	What part of the tree is this from?	How is this item used?
A		
B		
C		

 6

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

--	--	--

STOP 13 - FORESTRY (10 points) - Cont'd.

C) These items are referred to as NTFPs. What does NTFP stand for? (1 pt)

1

D) List four (4) other examples of NTFPs that are not displayed at this site. (2 pts - 0.5 pt each)

1.

2

2.

3.

4.

ANSWER

A) White Spruce

B) As follows:

- o A: tea - needles and sap/resin used for vitamin C and other nutrients used for treating tuberculosis, scurvy, and coughs
- o B: rope - roots used for sewing birch bark canoes
- o C: snowshoe - young trees used for snowshoes and bows, for walking on snow and hunting

C) Non timber/traditional forest products

D) Acceptable answers include:

- o Edible berries,
- o wild mushrooms,
- o medicinal plants,
- o maple products,
- o Christmas trees,
- o Syrup
- o Jams, jellies, ciders
- o Furniture
- o Wood crafts
- o etc. (See Rebecca for other possible answers)

REFERENCE

April Workshop - Forestry Training and handouts; Forestry Resource Guide - Forestry Stats and Trends; Model Forest Link: <http://www.modelforest.net/cmfn/en/>

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 13 - Cont'd.

SOILS (2 points)

A) Fill in the blanks. (1 pt - 0.5 pt each)

_____ is the entry of water into the soil, while
_____ (two words) is the rate at which
water can pass through a soil material, usually measured in saturated conditions.

B) Define permanent wilting point. (1 pt)

ANSWER

- A) Infiltration, hydraulic conductivity
- B) The soil water content at which water is no longer available to plants, which causes them to wilt. It is the point of no recovery from low moisture content.

REFERENCE

Soil Management Guide (Page 41)

WILDLIFE (2 points)
EQUIPMENT

Use the 2009 Manitoba Hunting Guide provided at this stop to answer the following questions. (1 pt each)

A) Which game hunting area (GHA) is the Turtle Mountain Provincial Park located in?

B) What is the date for the rifle draw moose season in this area?

ANSWER

- A) GHA 29A
- B) Nov. 30 - Dec. 6

REFERENCE

April Workshop - 2009 Manitoba Hunting Guide handout

2

2

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 13 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)
EQUIPMENT

$\frac{\quad}{2}$

Determine the UTM coordinates for the location (dot) displayed on the map provided.

ANSWER

14U 5435000 Northing 041700 Easting

REFERENCE

April Workshop - GPS/GIS Training

Page Total

STOP 14

AQUATICS (2 points)

2

A) Name two (2) processes of the carbon cycle that result in carbon being released into the atmosphere. (1 pt - 0.5 pt each)

1.

2.

B) Is the phosphorus cycle a true cycle? _____ Why or why not? (1 pt - 0.5 pt each)

ANSWER

A) respiration; combustion of fossil fuels

B) No. Because most phosphorus ends up at the bottom of the ocean. A great amount of phosphorus is lost.

REFERENCE

Aquatics Resource Guide - The Carbon Cycle & The Phosphorus Cycle

FORESTRY (2 points)

2

Place in the correct order from 1 to 4 the highest growing stock volume to the lowest for the following native tree species. (0.5 pt each)

Trembling Aspen _____

White Spruce _____

Jack Pine _____

Black Spruce _____

ANSWER

Trembling Aspen = 1, White Spruce = 4, Jack Pine = 3, Black Spruce = 2

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

REFERENCE

Forestry Resource Guide - Manitoba's Forests (Pages 2 and 3)

STOP 14 - Cont'd.

SOILS (2 points)

Prime agriculture land, for provincial land use planning purposes, includes which Dryland Agricultural Capability rating groups?

<u> </u> 2

ANSWER

Class 1, 2, and 3.

REFERENCE

April Workshop - Source Land Use Planning handout

WILDLIFE (10 points)

EQUIPMENT

A) Refer to the map provided at this stop. The ranges of three (3) hypothetical bird species are indicated: 1) range in yellow, 2) range in red, and 3) range in blue.

<u> </u> 10

What type of habitat do each of these species like? (3 pts - 1 pt each)

1. _____

2. _____

3. _____

<u> </u> 3

B) In Column A, name three (3) "listed" (threatened or endangered) species of bird that has a breeding range similar to one of the three ranges from the map in part (A). In Column B, list which of the ranges they belong to (1, 2 or 3). In Column C, indicate their status (threatened or endangered). (6 pts - 0.5 pt each)

Page Total

2009 Manitoba Envirothon
 FUNKY FUNGUS TRAIL

STOP 14 - Cont'd.

A - bird species	B - Range	C - Status

6

C) Refer to the map provided at this stop. Circle one (1) of the three (3) ranges below where many bird species have suffered from a large reduction in their range. (1 pt)

- 1 2 3

1

ANSWER

- A) 1. prairie or grassland species
 2. aspen parkland species
 3. boreal forest species

B) Any 2 of the following: (note: not fussy about whether a provincial listing or federal listing as this was not covered in the presentation)

Range - Species - Status:

- o 1 - Burrowing Owl - Endangered
- o 1 - Baird's Sparrow - Endangered (in Manitoba but not federally)
- o 1 - Sprague's Pipit - Threatened
- o 2 - Ferruginous Hawk - Threatened
- o 2 - Red-headed Woodpecker - Threatened
- o 2 - Golden-winged Warbler - Threatened
- o 3 - Common Nighthawk - Threatened (COSEWIC)
- o 3 - Olive-sided Flycatcher - Threatened (COSEWIC)

Other listed birds not mentioned in the talk include: Peregrine Falcon (Threatened - general), Piping Plover (Endangered - shoreline), which can be accepted. Can also accept Loggerhead Shrike which has a more complicated answer being Endangered in Manitoba and federally Threatened and is a bird of grasslands and parkland. Don't accept Whooping Crane (Endangered, marsh & grasslands) as it does NOT breed in Manitoba anymore nor Long-billed Curlew (Special Concern - grassland) which is extirpated from Manitoba.

C) 3

REFERENCE

April Workshop - Wildlife Training

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 14 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

Name two (2) different plant sampling techniques. (1 pt each)

<hr/> 2

1.

2.

ANSWER

Any 2 of the following:

- o random
- o gradient
- o quadrant

REFERENCE

April Workshop - Biodiversity Training

Page Total

*****STOP 15 and STOP 16*****

NOTE: You will notice that the following five questions are all 10 point questions. To answer these questions you will have to apply your knowledge about Pre Harvest Surveys. You will have 24 minutes at STOP 15 and STOP 16 combined to answer the following five questions.

At this and the next stop you will be performing an actual PreHarvest Survey.

At this stop you will concentrate on **Soils, Forestry and Theme (Biodiversity)** topics in the plot outlined by **red** flagging tape.

You have 12 minutes to complete the required activities using the equipment and materials provided and record your answers on the test and tally sheets provided.

You will then proceed to Stop #16 (outlined in **yellow** tape) where you will have another 12 minutes to complete the **Aquatics and Wildlife** topics using the equipment and materials provided.

*Remember you will have competing teams at this stop and the neighbouring stop so please respect each others efforts!

STOP 15: PHS Part 1

FORESTRY (10 points)

EQUIPMENT

Measure diameters by species of the marked trees in this plot and determine the height of the marked trees. Record the information on the tally sheet provided.

10

ANSWER

TBD, Glenn to determine marking ranges

REFERENCE

April Workshop - Forestry Training

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 15 - Cont'd.

SOILS (10 points)
EQUIPMENT

<hr/> 10

A) Locate this stop on the soil capability for forestry map. What is the soil capability for forestry in this area? Provide both the rating and the limitation. (2 pts)

2

B) Using the hand texturing flowchart provided, what is the texture of the A horizon? (2 pts)

2

C) Using the Munsell colour chart provided, what is the colour of the A horizon? (2 pts)

2

D) Are carbonates found within the B horizon? ____ What does this indicate in terms of drainage? (2 pts - 1 pt each)

2

E) In addition to testing for carbonates, are there additional signs of poor or very poor drainage within the profile? ____ Why or why not? (2 pts - 1 pt each)

ANSWER

TBD

REFERENCE

April Workshop - Soils Training; Soil Management Guide

Pa	<hr/> 2
----	---------

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 15 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (10 points)

10

A) How do foresters collect, input, and use the Pre Harvest Survey location information in the GIS? (3 pts)

3

B) GIS is a System. What are its five (5) components? (5 pts - 1 pt each)

1. _____

-

2. _____

-

3. _____

-

4. _____

-

5. _____

-

5

C) Name four (4) of the six (6) Basic GIS Functions. (2 pts - 0.5 pt each)

1. _____

-

2. _____

-

3. _____

-

4. _____

-

2

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

ANSWER

- A) Foresters collect the location of the Pre Harvest Surveys using a GPS. This is downloaded into a GIS. They are able to view their locations so they can create Sustainable Forest Management Plans.
B) People/ Users; Software; Data/ Knowledge; Approaches/ Methods; Hardware/ Computers
C) Input/Capture; Store/Storage; Retrieval/Query; Manipulation; Analyze;
Visualization/Display/Map Output

REFERENCE

April Workshop - GPS/GIS Training

Page Total

Team #

STOP 16: PHS Part 2

As noted at Stop #15, at this stop you will concentrate on **Aquatics and Wildlife** topics in the plot outlined by **yellow** flagging tape.

You have 12 minutes to complete the required activities using the equipment and materials provided.

*Remember you will have competing teams at this stop and the neighbouring stop so please respect each others' efforts!

AQUATICS (10 points)
EQUIPMENT

<hr/> 10

A) As part of your pre-harvest forestry inventory you are to identify water features. From the aerial maps you know there is a lake to the north of this plot. You have brought along equipment and sampled the lake for fish presence.

Using the key provided at this stop, identify the three (3) fish collected to species (common name). For one of them, you may have to use the *Freshwater Fishes of Manitoba* book provided at this stop. (6 pts - 2 pts each)

A

B

6

C

B) Now that you know which fish are found in this lake, use the Fish Key from the Riparian Management Guidebook provided at this stop to determine the recommended amount of riparian zone that should be left around the lake. (1 pt)

1

Page Total

2009 Manitoba Envirothon
 FUNKY FUNGUS TRAIL

STOP 16 - AQUATICS (10 points) - Cont'd.

C) As you continue your field investigation you notice there is a slight depression (marked by a stake and flagging tape) in the ground that looks like it carried runoff to the lake. The Conservation Officer provided a photo (marked C) of what this feature looked like when he was in the area in April. Based on the photo and the current appearance of this feature, which of the following terms best describes this water feature? (Please check the appropriate answer.) (0.5 pt)

0.5

___ ephemeral ___ perennial ___ intermittent

D) Using the Water Quality Key from the Riparian Management Guidebook provided at this stop, which management approach would you recommend when harvesting near the water feature mentioned in (C)? (0.5 pt)

0.5

E) List four (4) benefits of healthy riparian areas to aquatic ecosystems. (2 pts - 0.5 pt each)

1.

2.

2

3.

4.

ANSWER

A) A = freshwater drum; B = white sucker; C = yellow perch

B) 30 m RZ

C) ephemeral

D) MFZ (machine free zone)

E) Any 4 of the following:

- o provides shade (temperature regulation);
- o provides litter debris;
- o large woody debris for instream habitat diversity;
- o stabilizes shoreline;

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

- filters sediment and other pollutants from overland runoff.

REFERENCE

April Workshop - Aquatics handouts; Aquatics Resource Guide

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

STOP 16 - Cont'd.

WILDLIFE (10 points)
EQUIPMENT

Manitoba has a wide variety of wildlife species. Some have wandered by and left their tracks. Please identify the tracks you see here, using the Animal Tracks of Manitoba provided. (1 pt each)

—
10

TRACKS			
A		F	
B		G	
C		H	
D		I	
E		J	

ANSWER

- a) Beaver
- b) Black Bear
- c) Red Fox
- d) Muskrat
- e) White-tailed Deer
- f) Moose
- g) Great Blue Heron
- h) Mallard
- i) Canada Goose
- j) Mink

REFERENCE

Wildlife Resource Guide - Identifying and Preserving Wildlife Tracks PDF

Team #

STOP 17

AQUATICS (2 points)

A) Calculate the total number of EPTs from the following list of benthic macroinvertebrates. (1 pt)

<hr/> 2

- damselflies - 13
- stoneflies - 8
- fishflies - 3
- alderflies - 5
- caddisflies - 6
- mayflies - 19

Total EPTs = _____

B) What type of biological metric is this? (1 pt) _____ measure

ANSWER

- A) 33
- B) abundance measure

REFERENCE

Aquatics Resource Guide; April Workshop - Aquatics Training and handouts

FORESTRY (2 points)

A) Approximately what percentage of a tree's dry biomass is assumed to be carbon? (1 pt)

<hr/> 2

B) Approximately, what percentage of human-induced CO₂ emissions result from deforestation and other land use changes? (1 pt)

ANSWER

- 1) 50%
- 2) 20%

REFERENCE

Forestry Resource Guide - What trees can do to reduce CO₂ (Page 8 & 5)

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 17 - Cont'd.

SOILS (10 points)
EQUIPMENT

<u>10</u>

A) Using the leaf color chart and instructions provided, indicate if additional fertilizer is required during the growing season. (2 pts)

2

B) True or False. Circle the best response. All statements are related to primary activities of nutrients in plants. (4 pts - 1 pt each)

Sulfur is needed for transfer of food. T F

Nitrogen, sulfur, and potassium are components of proteins. T F

Potassium helps to protect plants from environmental stress. T F

Phosphorus is required for energy transfer. T F

4

C) List two (2) benefits of organic fertilizer (manure) which are different from commercially prepared chemical fertilizers. (2 pts - 1 pt each)

1. _____

2. _____

2

D) i. Define nitrogen fixation. (1 pt)

1

ii. Name a type of plant that commonly uses this method of nitrogen capture. (1 pt)

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 17 - SOILS (10 points) - Cont'd.

ANSWER

A) TBD

B) F,F,T,T

C) Any 2 of the following:

- o Organic fertilizer provides organic carbon;
- o Organic fertilizer can help improve soil structure and water holding capacity;
- o Organic fertilizer is slowly released, making it available over a longer period of time

D) i. Nitrogen fixation is a biological process by which elemental nitrogen from the air is converted to organic or available nitrogen by bacteria.

ii. These rhizobia bacteria are located in nodules associated with legume roots (e.g. alfalfa, beans, peas).

1

REFERENCE

A) Leaf Color Chart for fertilizer N Management in Rice (Soils Resource Guide and April Workshop - Soils Training)

B - D) Nourishing the Planet from the 21st Century (April Workshop - Soils Training)

WILDLIFE (2 points)

Name two (2) invasive plant or animal species that have been found in Manitoba. (1 pt each)

2

1. _____

2. _____

ANSWER

Any 2 of the following:

- o purple loosestrife,
- o leafy spurge,
- o rusty crayfish,
- o carp,
- o etc.

REFERENCE

April Workshop - Wildlife PowerPoint Presentation; Wildlife Resource Guide - Non-Native Species (Page 127)

Page Total

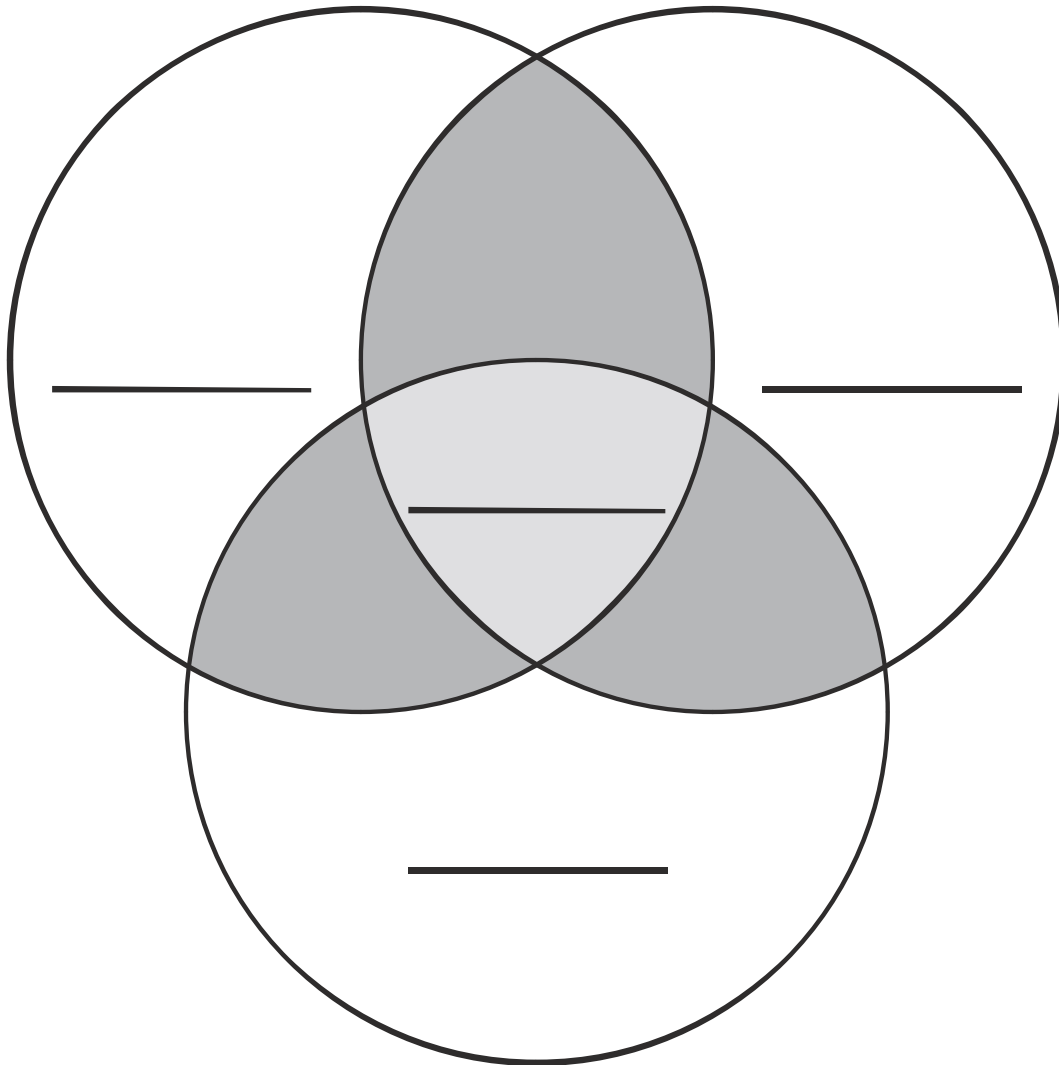
Team #

STOP 17 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

2

Label the sustainable development diagram below. (0.5 pt each)



ANSWER

Sustainable Development (centre), Economic Prosperity, Social Equity, Ecological Integrity

REFERENCE

Project Learning Tree Biodiversity Module (Page 4)

Page Total

STOP 18

AQUATICS (10 points)
EQUIPMENT

Using the jar provided, obtain a sample of lake water from the bucket (which was filled earlier from the lake). Using the filtration apparatus provided, filter approximately 100-ml of the lake water through a clean filter, then carefully remove your filter from the apparatus and visually compare it to the filter on display, through which has been filtered 100 ml of Red River water. Complete the exercises below.

10

A) Beside each of the following six statements (i. through vi.), enter the letter (a through l) of the phrase from the list of choices provided that most correctly completes that statement. *Note that more than six possible answers are listed, but only six of these will be correct.* (6 pts - 1 pt each)

i. The primary purpose of this filtration procedure is to... _____

a. nutrients, such as carbon, nitrogen and phosphorus.

ii. After filtration, substances dissolved in the lake water are contained in... _____

b. secondary consumers.

c. primary production in the lake.

d. make the lake water pure.

iii. After filtration, algal cells and other suspended particles are components of... _____

e. angling pressure.

f. cool weather and increased precipitation.

iv. Chemical analyses of the filtrate can measure concentrations of... _____

g. separate particulate contaminants from contaminants dissolved in the lake water.

v. Dissolved nutrient concentrations in the water are important indicators of the potential for... _____

h. fish kills.

i. phosphorus in suspended particles.

vi. Fish populations in lakes with greater primary productivity can usually withstand greater... _____

j. the filtrate.

k. periods of sunshine and warm water.

l. the residue on the filter.

6

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 18 - AQUATICS (10 points) - Cont'd.

B) i. Comparing your filter to the display filter (provided) from the Red River, which filter contains the greater amount of residue? (1 pt)

—
1

ii. In which of the two water systems would you expect the greater turbidity? (1 pt)

—
1

iii. What single physical difference between the two water systems would best explain this turbidity difference? (1 pt)

—
1

iv. What specific material would you expect to be most abundant on the Red River filter? (1 pt)

—
1

ANSWER

- A) i. G, ii. J, iii. L, iv. A, v. C, vi. E
- B) i. Red River filter
- ii. Red River
- iii. water velocity or flow rate (lotic vs. lentic)
- iv. clay particles (soil, silt)

REFERENCE

April Workshop - Aquatics Training and handouts; Aquatics Resource Guide (A1, A12, A16)

FORESTRY (2 points)

A) Circle the best response. (0.5 pt)

— 2

The Canadian Model Forest Network (CMFN) is a network of _____ model forest sites across Canada.

- a. 4
- b. 14
- c. 40
- d. 44

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 18 - FORESTRY (2 points) - Cont'd.

B) Each local site involves numerous partners who all work towards sustainable landscape management. List (3) types of partners that are involved with the CMFN. (0.5 pt each)

1. _____

2. _____

3. _____

ANSWER

A) b. 14

B) Any 3 of the following:

- o forest companies,
- o Aboriginal communities,
- o private citizens,
- o parks,
- o environmental groups,
- o governments,
- o universities

REFERENCE

Forestry Resource Guide - <http://www.modelforest.net/cmfn/en/>

SOILS (2 points)

List four (4) practices that farmers can use to slow carbon loss in their croplands. (0.5 pt each)

$\frac{\quad}{2}$

1. _____

2. _____

3. _____

4. _____

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 18 - SOILS (2 points) - Cont'd.

ANSWER

- Conservation tillage or no-till farming (reduces soil disturbance and fossil fuel emissions from farm machinery);
- Re-growth of native/perennial vegetation or planting of shelterbelts (increases SOC in previously cultivated soils. Converted marginal croplands can also act as shelterbelts and oases of natural habitat.);
- Summer fallowing (continuous cropping leaves soils with a lower SOC and more prone to erosion than those that are fallowed regularly);
- Including perennial forages (they have longer growing seasons than annual crops. Regularly including perennial forages in crop rotations increases SOC.)

REFERENCE

Soils Resource Guide (Page 46)

WILDLIFE (2 points)
EQUIPMENT

A) Refer to the skull provided at this stop. What term is used to describe the food habits of this animal (in other words, what this animal eats)? (1 pt)

2

B) How can you tell? (1 pt)

ANSWER

- A) herbivore
- B) molars for grinding, no incisors, no canines

REFERENCE

Wildlife Resource Guide - Skulls in Education (Page 41)

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 18 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

A) Circle the best response. (1 pt)

How many ecozones are there in Canada?

- a. 5 b. 53 c. 153 d. 42 e. 15

B) What is the largest ecozone in Canada? (1 pt)

ANSWER

- A) e. 15
B) boreal forest (35%)

REFERENCE

Theme Resource Guide (Page 3)

2

Page Total

Team #

STOP 19

AQUATICS (2 points)

<hr/> 2

Through the Government of Manitoba's Water Strategy, the province is committed to the development of watershed-based management plans. This will help to ensure the protection of the province's water resources now and in the future.

Name four (4) of the six (6) different policy areas that are addressed in Manitoba's Water Strategy. Hint: Each of these policy areas would need to be incorporated into a watershed management plan. (0.5 pt each)

1. _____
2. _____
3. _____
4. _____

ANSWER

Any 4 of the following:

- water quality;
- water conservation;
- use & allocation of water;
- water supply;
- flooding;
- drainage

REFERENCE

Aquatics Resource Guide - Manitoba Water Strategy (Page 9)

FORESTRY (2 points)

<hr/> 2

Manitoba Conservation provides the opportunity to harvest timber from provincial Crown land through the allocation of timber harvesting rights. One way that Crown timber is allocated in the province is through long-term Forest Management License Agreements (FMLA) which represent long-term agreements with large forestry companies.

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 19 - FORESTRY (2 points) - Cont'd.

A) Name the three (3) companies that hold Forest Management Licence Agreements in the Province of Manitoba. (0.5 pt each)

1. _____
2. _____
3. _____

B) Fill in the blank. (0.5 pt)

These Forest Management License Agreements are granted for a period of not more than _____ years, and can be renewed.

ANSWER

- A) Tembec, Tolko, Louisiana Pacific (LP) Ltd.
- B) 20 years

REFERENCE

Forestry Resource Guide - Five Year Report on the status of Forestry (Page 27); Sustainable Forestry Unit (Page 5)

SOILS (2 points)

Gleying is a process which occurs under poorly drained soil conditions. What are two (2) indications of gleying in soil? (1 pt each)

2

1. _____
2. _____

ANSWER

Dull/gray color, presence of mottles

REFERENCE

April Workshop - Soils Training; Soil Management Guide (Page 15)

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 19 - Cont'd.

WILDLIFE (2 points)

There are three (3) types of ecosystem services that are important to biodiversity. Using the beaver as an example:

— 2

A) Give one (1) example of an ecosystem service that beavers provide. (1 pt)

B) How does this service benefit humans? (1 pt)

ANSWER

Any combination of the following or other examples from manual:

- Provisioning services - including maintain soil moisture, and food and water for aquatic species, many which are important to people (eg. ducks);
- Regulating services - since wetlands help regulate floods, and water quality;
- Cultural services - such as recreational, aesthetic and spiritual benefits; etc.

REFERENCE

April Workshop; Theme Resource Guide (Page 5)

THEME - BIODIVERSITY IN A CHANGING WORLD (10 points)
EQUIPMENT

— 10

A) Determine the percentage cover of the flagged plant in the marked area. (8 pts)

B) Identify the flagged plant using the Plants of the Western Boreal Forest and Aspen Parkland book provided. (2 pts)

— 8

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 19 - THEME (10 points) - Cont'd.

ANSWER

- A) 5-10% for 8 points, 10-15% for 4 points
- B) Woodland Strawberry

REFERENCE

April Workshop - Biodiversity Training

Team #

STOP 20

AQUATICS (10 points)
EQUIPMENT

<hr/> 10

A) What type of equipment would you use to sample the benthic community at this location? (1 pt)

1

B) Name four (4) habitat characteristics you would have to evaluate to complete a benthic habitat assessment of this site. (2 pts - 0.5 pt each)

1. _____
2. _____
3. _____
4. _____

2

C) Using the key provided, identify the following macroinvertebrates. Please provide both the common name and the Order that it belongs to. (4 pts - 0.5 each)

	Common Name	Order
A		
B		
C		
D		

4

D) What type of tolerance to environmental conditions do specimens A and B have? (2 pts - 1 pt each)

Specimen A: _____

2

Specimen B: _____

Page Total

Team #

STOP 20 - AQUATICS (10 points) - Cont'd.

E) Name the anatomical features identified in the diagram of the mayfly. (1 pt - 0.5 pt each)

1. _____

1

2. _____

ANSWER

A) dipnet

B) Any 4 of the following:

- o riparian vegetation
- o canopy cover
- o aquatic macrophytes
- o dominant substrate class
- o maximum depth

C) mayfly - Order Ephemeroptera

scud - Order Amphipoda

water beetle - Order Coleoptera

true bugs (Order Hemiptera)

D) A - very intolerant of pollution; B - moderately tolerant of pollution

E) mesothorax, abdominal gills

REFERENCE

Aquatics Resource Guide - Taxonomic Key to Benthic Macroinvertebrates; April Workshop - Aquatics handout

FORESTRY (2 points)

A) Indicate in which order the following surveys are done in forest stands from youngest (1) to oldest (3). (1.5 pts - 0.5 pt each)

2

PreHarvest _____

Regeneration _____

Free To Grow _____

B) True or False. Circle the best response. (0.5 pt)

Identical ecological information is collected during all the above noted surveys.

T F

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 20 - FORESTRY (2 points) - Cont'd.

ANSWER

- A) Regen = 1, FTG = 2, PHS = 3
- B) False

REFERENCE

April Workshop - Forestry Training; Manitoba Conservation website

SOILS (2 points)

Nitrogen is a major source of greenhouse gas emissions for agriculture. List two (2) methods to decrease loss of this nutrient to the atmosphere. (1 pt each)

<hr/> 2

- 1. _____

- 2. _____

ANSWER

Any 2 of the following:

- o Incorporate fertilizer or manure when applied to soil;
- o Apply nitrogen source in spring to increase efficiency of plant uptake, and to avoid flooded soils;
- o Cover liquid manure lagoons;
- o Soil test and apply fertilizer at recommended rates (not greater than);
- o Use split application techniques to match the needs of the crop to the plants during the season

REFERENCE

Soil Management Guide; Nourishing the Planet for the 21st Century

WILDLIFE (2 points)

What two (2) things do the grizzly bear, swift fox and pronghorn have in common in Manitoba? (1 pt each)

<hr/> 2

- 1. _____
- 2. _____

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 20 - WILDLIFE (2 points) - Cont'd.

ANSWER

They are all extirpated species; they all lived on the prairies.

REFERENCE

April Workshop - Wildlife PowerPoint Presentation

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

EQUIPMENT

Using the GPS provided, input the following coordinates:

14U 0423000 5453500

With this information, determine the distance from your current position (next to the flag) to the inputted coordinates.

ANSWER

23.91 km

REFERENCE

April Workshop - GPS/GIS Training

2

Page Total

Team #

STOP 21

AQUATICS (2 points)
EQUIPMENT

$\frac{\quad}{2}$

Refer to the device on display. Suppose that it was used in a nearby lake and a Secchi depth of 1.25 metres was recorded.

A) What serves as a light sensor in conjunction with this device to determine the Secchi depth? (1 pt)

B) What is the depth above which photosynthesis could be expected to occur in this lake? (1 pt)

ANSWER

- A) the human (observer's) eye
- B) twice the Secchi depth or 2.5 metres

REFERENCE

April Workshop - Aquatics Training and handouts; Aquatics Resource Guide (A16)

FORESTRY (10 points)

A) List four (4) signs of forest maturity (old age) that you can find as you look about this stand. (2 pts - 0.5 pt each)

$\frac{\quad}{10}$

1. _____
2. _____
3. _____
4. _____

$\frac{\quad}{2}$

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 21 - FORESTRY (10 points) - Cont'd.

B) The acronyms below signify the three (3) forest certification systems in Canada. Beside each acronym, provide the full name of the forest certification system. (3 pts - 1 pt each)

i. CSA = _____

ii. FSC = _____

iii. SFI = _____

3

C) What percentage of Canada's managed forests are certified? (1 pt)

1

D) What are the differences between a Forest Stewardship Plan (FSP) and an Annual Operating Plan (AOP)? (4 pts)

4

ANSWER

A) TBD on site; will include conks, snags, woodpecker feeding, dense understory, deadfall

B) As follows:

- o CSA = Canadian Standards Association
- o FSC = Forest Stewardship Council
- o SFI = Sustainable Forestry Initiative

C) 98.3%

D) Forest Stewardship Plans are strategic long-term (20 year) landscape level plans. Annual Operating Plans are short-term (1 year) very specific detailed plans at stand level.

REFERENCE

April Workshop - Forestry Training, Pre Harvest Survey Info and Forest Management Handout (Pages 11, 37, 44-47)

Page Total

Team #

STOP 21 - Cont'd.

SOILS (2 points)

<hr/> 2

Fill in the blanks. (1 pt each)

Luvisolic soils are formed under _____ vegetation and are characteristic of the Turtle Mountain area.

_____ of the A horizon is a distinguishing feature of these soils, as indicated by a lower case suffix 'e'.

ANSWER

Forest; Eluviation

REFERENCE

Soil Management Guide (Page 18-19)

WILDLIFE (2 points)

<hr/> 2

Mixed grass prairie and many of its plants and animals have been and continue to be lost.

What two (2) management methods are used to maintain high quality native mixed grass prairie? (1 pt each)

1. _____

2. _____

ANSWER

- rotational or managed grazing and controlled burning (half point for just grazing, will accept haying and mowing for one point);
- biological or chemical control of invasive species (for one point)

REFERENCE

April Workshop - Wildlife PowerPoint Presentation

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 21 - Cont'd.

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

A) Define genetic diversity. (1 pt)

2

B) Define species diversity. (1 pt)

ANSWER

- A) Genetic diversity is the heritable variation within and between populations of organisms.
- B) Species diversity is the number of species in different taxonomic groups.

REFERENCE

Canon Envirothon Website - Biodiversity: An Overview (Page 2); Theme Resource Guide (Page 2)

Page Total

Team #

STOP 22

AQUATICS (2 points)
EQUIPMENT

<hr/> 2

Name the water cycle processes identified by the numbers in the diagram provided at this stop. (0.5 pt each)

1. _____ 3. _____
2. _____ 4. _____

ANSWER

1) evaporation 2) transpiration 3) condensation 4) precipitation

REFERENCE

Aquatics Resource Guide – The Water Cycle

FORESTRY (2 points)

<hr/> 2

A) Provide three (3) reasons that forests and trees are measured. (1.5 pts - 0.5 pt each)

1. _____
2. _____
3. _____

B) Tree diameters are measured at what standard height above the ground? (0.5 pt)

ANSWER

- A) Any 3 of the following:
- Calculate volume/ AAC,
 - calculate growth rates,
 - determine site productivity,
 - document forest health,
 - predict future development.
- B) Diameter at Breast Height or dbh, (1.3 meters, 4.5 ft)

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 22 - FORESTRY (2 points) - Cont'd.

REFERENCE

Forestry Equipment at April Workshop

SOILS (2 points)

EQUIPMENT

Name the two (2) soil structure samples provided. (1 pt each)

Sample A _____

Sample B _____

2

ANSWER

- A) Columnar
- B) Blocky

REFERENCE

April Workshop - Soils Training

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 22 - Cont'd.

WILDLIFE (10 points)

Match the following Species at Risk listed in the left hand column below with the cause of decline (listed in the right hand column) by entering the correct number in the space provided. *Note: only one species per answer.* (1 pt each)

10

- | | |
|---|---|
| _____ a. Piping Plover | 1. Illegal collection of plants and hybridization with a closely related species |
| _____ b. Peregrine falcon | 2. Loss of habitat due to agricultural and urban expansion, and decreased prey abundance due to pest control |
| _____ c. Burrowing owl | 3. Human use of beaches |
| _____ d. Western Silvery Aster | 4. Drainage of temporary pools for breeding |
| _____ e. Small white lady's-slipper | 5. Susceptible to pesticides (DDT) |
| _____ f. Western prairie fringed-orchid | 6. Loss and degradation of native prairie habitat due to human settlement, agricultural expansion and resource extraction |
| _____ g. Western spiderwort | 7. Loss of native prairie habitat, particularly wet meadows from draining |
| _____ h. Great Plains toad | 8. Loss of native prairie grasslands, decreased prey abundance from insecticide use and nest parasitism |
| _____ i. Baird's sparrow | 9. Gravel extraction, encroachment of woody species and invasion of non-native plants |
| _____ j. Ferruginous hawk | 10. Changes to land management practices (burning and grazing) |

Page Total

2009 Manitoba Envirothon
FUNKY FUNGUS TRAIL

Team #

STOP 22 - WILDLIFE (10 points) - Cont'd.

ANSWER

A-3, B-5, C-2, D-9, E-1, F-7, G-10, H-4, I-8, J-6

REFERENCE

Wildlife Resource Guide - Species at Risk fact sheets (PDF)

THEME - BIODIVERSITY IN A CHANGING WORLD (2 points)

EQUIPMENT

Determine the distance between the two (2) points shown on the map provided.

2

ANSWER

5 km (10 cm on map)

REFERENCE

April Workshop - GPS/GIS Training

Page Total